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BEFORE THE ARIZONA CORPORATION COMMISSION

IN THE MATTER OF THE GENERIC DOCKET FOR THE 2010 BIENNIAL TRANSMISSION ASSESSMENT FILED PURSUANT TO A.R.S. § 40-360.02(A)	DOCKET NO. E-00000d-09-0020 **NOTICE OF FILING**

Pursuant to the provisions of A.R.S. § 40-360.02(A), Sonoran Solar Energy, LLC hereby gives notice of filing the attached correspondence (Attachment A) regarding Sonoran's Ten-Year Transmission Plan. This attachment updates the filing made on November 25, 2009.

RESPECTFULLY SUBMITTED this 26th day of May, 2011.

JENNINGS, STROUSS & SALMON, P.L.C.

By: [signature] (for)
Kenneth C. Sundlof, Jr.
201 East Washington Street - 11th Floor
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Attorney Sonoran Solar Energy, LLC

Arizona Corporation Commission
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MAY 26 2011
DOCKETED BY

ORIGINAL and 13 copies of the foregoing filed this 26th day of May, 2011, with:

Arizona Corporation Commission
Docket Control
1200 W. Washington Street
Phoenix, AZ 85007

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COPY of the foregoing hand-delivered this same date to:

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Chief Administrative Law Judge
Hearing Division
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May 26, 2011

ARIZONA CORPORATION COMMISSION
Utilities Division
1200 W. Washington Street
Phoenix, AZ 85007

Re: Sonoran Solar Energy, LLC - Ten-Year Plan

Dear Madam/Sir:

Pursuant to the provisions of A.R.S. § 40-360.02, Sonoran Solar Energy, LLC ("Sonoran") submits its Ten-Year Plan and states as follows:

1. The size and proposed route of any transmission lines proposed to be constructed.

Sonoran Solar Energy, LLC proposes to build a 500 kV generation tie-line that will interconnect the substation at the proposed Sonoran Solar Energy Project ("Project") to the Jojoba 500 kV substation operated by the Salt River Project ("SRP"). The Sonoran Solar Energy Project would be an approximately 300 MW Photovoltaic power plant that would generate electricity using multiple arrays of PV panels electrically connected to associated power inverter units. The current from the power inverters would be gathered by an internal electrical collection system and transformed to transmission voltage prior to leaving the Project Area. The Project Area is located at the west end of the Little Rainbow Valley, east of State Route 85 (SR-85), and south of the Buckeye Hills and the Town of Buckeye, Arizona. The SSEP's facilities would be located almost entirely on BLM-administered lands and would encompass approximately 2,000 acres in western Maricopa County, Arizona. The proposed, 3.5-mile generation tie-line will ultimately interconnect the Project to the grid in a way similar to the route depicted in the attached Exhibit 1. The proposed route for this generation tie-line will be refined and filed with the respective application for a Certificate of Environmental Compatibility.

Arizona Corporation Commission Decision No. 63876 requires Transmission Owners to file internal planning criteria and system ratings with limiting elements identified with their Ten-Year Plan. Sonoran is not a Transmission Owner nor has it established internal transmission planning criteria. The planning criteria and system ratings filed annually by SRP with its Ten-Year Plans will serve as the surrogate record for Sonoran's planned transmission project.

2. The purpose to be served by each proposed transmission line.

The planned generation tie-line will enable Sonoran to connect the proposed Project's substation to the Jojoba 500 kV substation.

3. The estimated date by which each transmission line will be in operation.

The generation tie-line and the proposed Project's substation will be operational by mid-2013 to support start-up and testing of the Project.

4. A technical report showing the project impact on the electric transmission system.

The energy from the power plant will be transformed through the proposed Project substation located near the western boundary of the project site and will be connected to the electric transmission system at the Jojoba 500 kV substation via a 3.5-mile radial 500 kV line.

The photovoltaic supplemental study has been approved by the WATS task force and is pending final approval by the ANPP engineering and operations committee. A copy of the study is attached as Exhibit 2.

Very truly yours,

JENNINGS, STROUSS & SALMON, P.L.C.

By

Kenneth C. Sundlof, Jr.

Enclosures: (1) Map
(2) Draft Study Report dated May 5, 2011

NextEra Energy Resources, LLC

Sonoran Solar Energy Project
Draft Study Report
For
Generator Interconnection Supplemental Study II Photovoltaic Generation

Final Report

Prepared For

Western Arizona Transmission Study Task Force

Prepared By

May 9, 2011

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TSHS02_SONORAN_PV
Stability Plots and TAB (TS01 thru TS16)

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I. EXECUTIVE SUMMARY

On December 10, 2010, the NextEra Energy Resources, LLC (Customer) indicated its desire to modify the generation technology for the SSEP from 500 MW of solar thermal generation to 500 MW of photovoltaic generation. PVETS has requested that additional studies be performed due to the technology change to determine the transient stability impact of the Project on the Palo Verde Transmission System (PVTS).

The results of the transient stability analysis showed that the addition of the Sonoran Solar Energy Project with photovoltaic solar generation did not impact the stability of the existing transmission system. Stable and adequately damped transient stability performances were achieved following all the outages simulated.

The Palo Verde Updated Final Safety Analysis (UFSAR) was performed to determine the simultaneous Palo Verde Transmission System (PVTS) safety operating limits following the addition of the SSEP. The results of the UFSAR analysis showed that the stability of the Palo Verde Nuclear plant is not impacted following the addition of the SSEP with photovoltaic solar generation.

This study report was prepared under the guidance of the WATS study review group for the SSEP's Jojoba interconnection and has addressed the stability impact due to the technology change to photovoltaic generation. The detailed study results were documented in Appendices A and B. All issues and concerns have been adequately addressed and documented in Appendix C of this report.

II. INTRODUCTION

NextEra Energy Resources, LLC (Customer) submitted a completed generator interconnection application to the Arizona Nuclear Power Project (ANPP) Valley Transmission System, the Salt River Project (SRP) for the Sonoran Solar Energy Project (formerly Buckeye Concentrating Solar Project) in February 2008. The Sonoran Solar Energy Project (SSEP or Project) was originally proposed to consist of two 270 MW steam turbines fueled via a solar collector system. The total maximum net plant output of the SSEP is 500 MW. The SSEP will be located in Maricopa County, Arizona and its output will be delivered to the Jojoba 500kV switchyard via a 3-mile radial 500 kV line. The planned commercial operation date for the Project is December, 2012.

WATS approved of the generator interconnection study report for the Project in August 2008. Following the approval of the study report, the Customer requested a replacement of one of the 270 MW steam turbine generators with two (2) 135 MW steam turbine units. A supplemental study was performed for the requested change in number and size of the generators for the Project. The study report was submitted and approved by the WATS in October 2009. On December 10, 2010, the Customer indicated its desire to modify the generation technology for the SSEP from 500 MW of solar thermal generation to 500 MW of photovoltaic generation. WATS has requested that additional studies be performed due to the technology change to determine the impact of the Project on the ANNP Valley Transmission System.

The Customer, in consultation with SRP, has elected a third party contractor, PDS Consulting, PLC (PDS), to perform the requested supplemental study for the Project. The requested supplemental study will evaluate reactive power requirements (if any), transient stability performance and fault duty contributions using the revised generation technology. It was judged that fault duty contribution should not be an issue. Therefore, only the stability analysis was performed using the approved Western Electricity Coordination Council (WECC) 2014 heavy summer base case. This case was further modified and updated by APS and SRP. The case was also reviewed and finalized by WATS on March 21, 2011.

The study base case was based on the WECC 2014 system representation which reflected 2014 heavy summer operating conditions. The latest status for the SSEP in service date is late 2012. The study conclusions should not be different since any significant generation and transmission network changes are not expected in the Palo Verde area according to APS and SRP Ten-Year Plan.

III. PROJECT AND INTERCONNECTION INFORMATION

Table 1 provides general project and interconnection information about the SSEP.

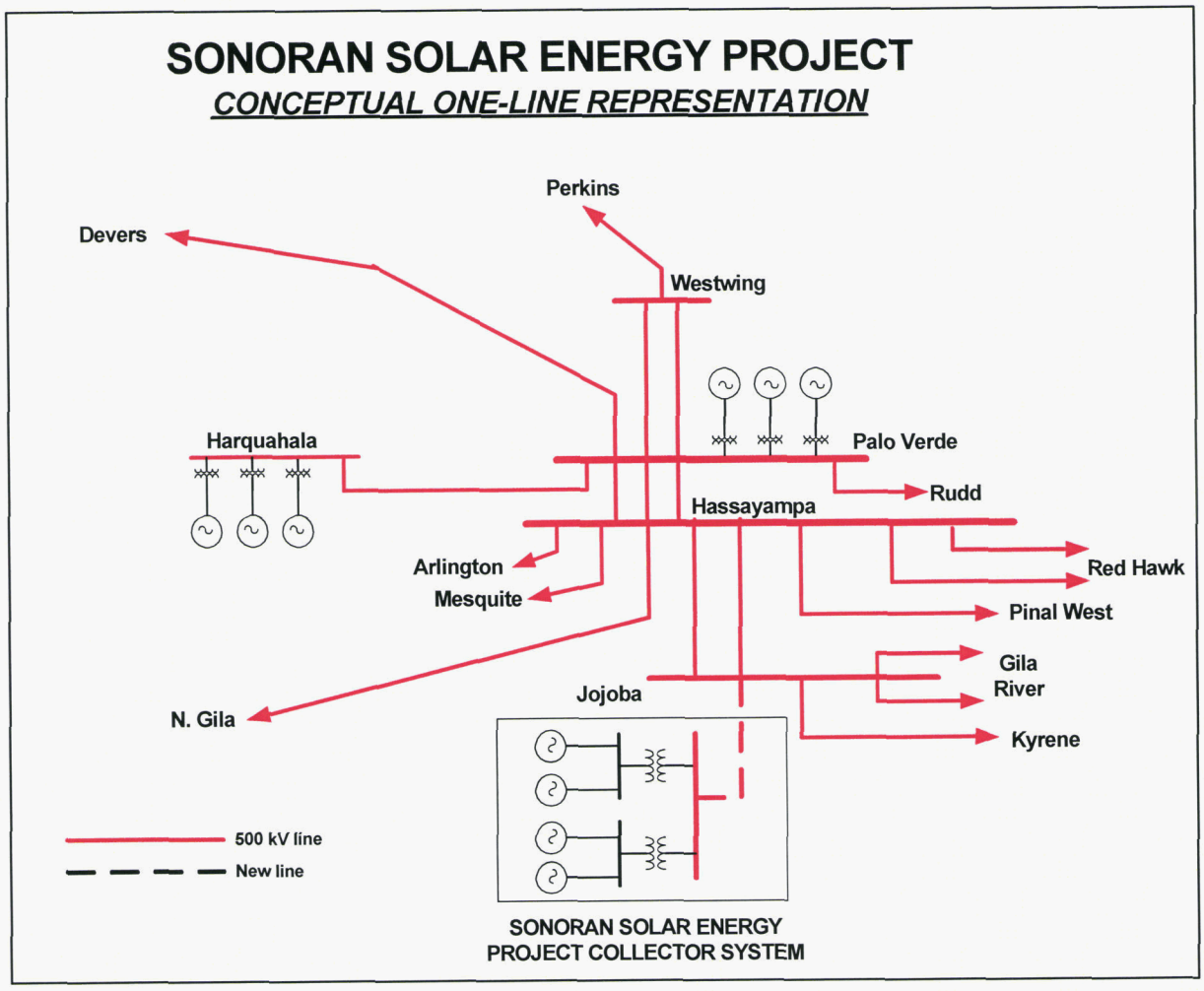
Table 1: Sonoran Solar Project General Information

Project Location	Maricopa County, Arizona
Number and Type of Generators	1000, 500 kW PV modules
Maximum Generator Output	500 MW
Maximum Net Output	500 MW
Power Factor	0.95 leading/lagging
Step-up Transformer	Two (2) 166.5/222/277MVA, 34.5/500 kV 3-phase transformers, Z=10% (166.5 MVA Base)
Interconnection Configuration	3-mile 500kV tie line from SSEP switchyard to Jojoba 500 kV switchyard.
Interconnection Voltage	500 kV

Figure 1 depicts the SSEP's interconnection point and the existing transmission system at the interconnection vicinity. A one line diagram of the Project at the proposed interconnection point is shown in Figure 2.

Figure 1: SSEP Interconnection point and Vicinity Transmission

Figure 2: One-Line Representation of the SSEP at the Interconnection point



IV. STUDY BASE CASE DESCRIPTION AND ASSUMPTIONS

The Supplemental study was conducted using the WECC approved 2014 heavy summer base case as the starting base case. The 2014 heavy summer base case was further modified and updated to reflect 2014 heavy summer forecasted load in SRP and APS balancing authorities. Proposed generation projects in SRP and APS balancing authorities that have interconnection queue dates ahead of the SSEP and also have commercial operation dates earlier than summer 2014 were modeled. Also approved transmission projects that have online date prior to summer of 2014 were modeled. Approved transmission projects that were modeled included:

- New Morgan – Pinnacle Peak 500 kV line and the associated 230 kV lines

Pre-project Base Case

The pre-Project base case to represent 2010-2014 operating time frame was used to model the Palo Verde Nuclear Plant and all the commercially operating generating units at Palo Verde-Hassayampa generation hub at their maximum outputs. Generation capacities and schedules of the Palo Verde Nuclear Plant and the generation facilities at the Palo Verde – Hassayampa generation hub are provided in Table 2. The Palo Verde 500 kV bus was assumed to be operated at 530 kV or 1.06 per unit in the pre-Project base case. Additionally the Palo Verde/Hassayampa common bus was modeled to buck up to 800 MVAr.

Table 2: Capacities & Schedules of Generation Units at Palo Verde –Hassayampa Hub

Power Plant Owners	Power Plant Name	No. Units	2010 -2014 Maximum Generation Capacity	2010-2014 Scheduled Gross Generation	2010-2014 Power Plant Auxiliary Load	2010-2014 Scheduled Generating Net Output
ANPP	Palo Verde	Unit.1	1,410 MW	1,410 MW	65 MW	1,345 MW
		Unit 2	1,407 MW	1,407 MW	65 MW	1342 MW
		Unit 3	1,410 MW	1,410 MW	65 MW	1,345 MW
Subtotal		**3**	**4,227 MW**	**4,227 MW**	**195 MW**	**4,032 MW**
Dynegy	AVEF	1	700 MW (193.3x2+313.3)	620 MW (158x2+304)	20 MW (6.7 MW x 3)	600 MW
Arizona Public Service	Red Hawk	2	1,098 MW ((180x2+189)x2)	1,080 MW ((175.5x2+189)x2)	40 MW (6.7 MW x 6)	1,040 MW
MACH Gen, LLC	Harquahala	3	1,164 MW ((250+138)x3)	1,164 MW ((250+138)x3)	24 MW ((5+3) x 3)	1,140 MW
Sempra Energy	Mesquite	2	1,382 MW ((185x2+321)x2)	1,288 MW ((167.5x2+309)x2)	28 MW (4.6 MW x 6)	1,260 MW
Gila River Power	Gila River	4	2,540 MW ((160x2+315)x4)	2,402 MW ((151x2+298.5)x4)	68 MW (5.66 MW x12)	2,334 MW
Subtotal		**12**	**6,884 MW**	**6,554 MW**	**180 MW**	**6,374 MW**
Total		15	11,111 MW	10,781 MW	375 MW	10,4 06 MW

Post-Project Base Cases

Post-Project base cases were developed from the pre-Project case. The post-Project base cases have modeled the proposed SSEP as depicted in Figure 2. One scheduling scenarios was studied. This scheduling scenario is depicted in Table 3. The higher queue interconnectors Q1 and Q2 were modeled in the case. The 500 MW output of the proposed Project will be scheduled to displace Phoenix area and/or merchant generators in the Palo Verde hub as requested by the customer.

Table 3: Generation Scheduling Scenario

Scheduling Scenarios	SSEP Net Output (MW)	Power Scheduled to S. California (MW)	Power Scheduled to Phoenix (MW)	Displaced Generation
Studied Scenario	500	250	250	Phoenix Area Peaking Units and S. California Area Generation

As such, one post-Project base case was developed. The description of the base cases was provided in Table 4.

Table 4: Post-Project Base Cases

Post-Project Base Cases	Base Case Description
PV Gen Max Case With Studied Scheduling Scenario	Developed from pre-Project base case and models scheduling scenario

The final post-project base case as identified below was updated and approved by the WATS review group.

- 14HS_Q3.sav to be represented for the 2014 heavy summer operating conditions. This case was originally picked up from the WECC 2014HS3-SA.sav (Dated on 3/1/2010)
- Composition of 4 X125 MW photovoltaic collector systems at the Sonoran Pant
- Use of variable reactive power control capability at the inverter station to achieve a desirable unit power factor or a minimum var interchange at the interconnection point

Palo Verde Updated Final Safety Analysis Report (UFSAR) Cases

The Palo Verde Updated Final Safety Analysis was performed to determine the simultaneous PVTS safety operating limits following the addition of the SSEP. This includes operating the Palo Verde Nuclear Units at 7% above the maximum generation output. The *PV Gen Max Case A* will be used to determine the operating limits (if any) following the interconnection of the SSEP. The objective of this analysis is to ensure the stability of the Palo Verde Nuclear plant.

V. STUDY METHODOLOGY AND EVALUATION CRITERIA

With the revision of the generation technology of the SSEP, reactive power requirements were evaluated to ensure that SSEP can operate within +/- 0.95 power factor range under the study conditions.

Transient stability analysis was conducted on the Post-Project case represented with the maximum generation output at the Palo Verde/Hassayampa Hub and the SSEP dispatching scenario. Transient stability runs will be simulated for 10 seconds excluding a 1 second pre-outage run to ensure the system is stable and positively damped.

Selected critical contingencies were simulated. Outages to be simulated included:

Category B:

- Palo Verde-Colorado River 500 kV Line
- Hassayampa-North Gila 500 kV Line
- Moenkopi- Eldorado 500 kV Line
- Navajo-Crystal 500 kV Line
- Hassayampa – Jojoba 500kV line
- Hassyampa-Pinal West 500 kV line
- Jojoba – Kyrene 500 kV line
- Palo Verde – Rudd 500 kV line
- Mead-Perkins 500 kV Line
- Palo Verde – Westwing # 1 500 kV line

Category C:

- IPPDC Bi-Pole
- Palo Verde Generating units 1 and 2

Category D:

- Palo Verde-Westwing 500 kV #1 & 2 Lines (Note*1)
- Hassyampa-Jojoba & Hassayampa-Pinal West 500 kV lines (Note*1)
- Palo Verde-Westwing #1 & Palo Verde – Rudd 500 kV Lines (Note*1)
- Jojoba – Kyrene & Hassayampa – Pinal West 500 kV lines (Note*1)

Footnote *1: This outage will be treated as WECC Contingency Category D.

The transient stability evaluation criteria used to evaluate the impact of the project were included the following:

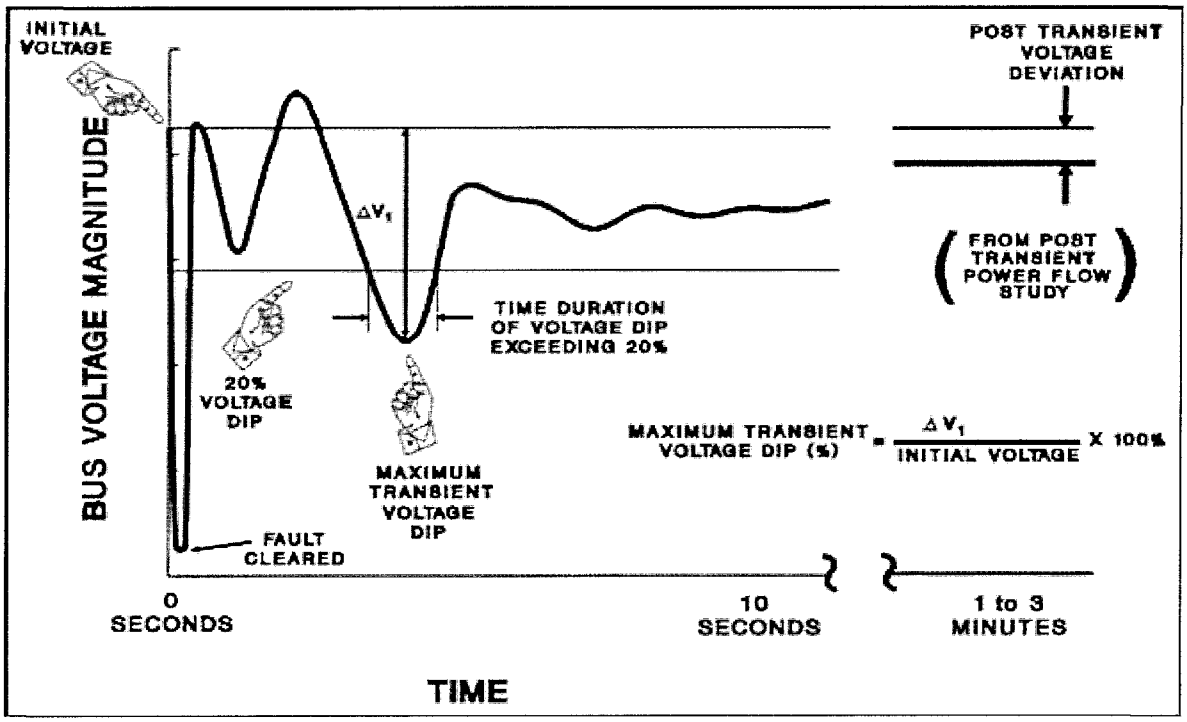
- All machines in the interconnected system shall remain in synchronism as demonstrated by their relative rotor angles.
- System stability is evaluated based on the damping of the relative rotor angles and the damping of the voltage magnitude swings.
- WECC transient voltage dip criteria: The transient voltage dip must not exceed 25% at load buses or 30% at non-load buses for N-1 contingency. For N-2 contingency, the transient voltage dip must not exceed 30% at any bus. The maximum duration of the voltage dip of 20% at load buses must not exceed 20 cycles for N-1 contingency or 40 cycles for N-2 contingency.
- WECC transient frequency criteria: The minimum transient frequency for N-1 contingency is 59.6 Hz; if below 59.6 Hz, the duration must not exceed 6 cycles at load bus. For N-2 contingencies, the minimum transient frequency is 59.0 Hz; if below 59.0 Hz, the duration should not exceed 6 cycles at load bus.

Summary of the transient stability analysis evaluation criteria is provided in Table 5 and depicted graphically in Figure 3.

Table 5: Stability and Post-transient Analysis Evaluation Criteria

NERC and WECC Categories	Outage Frequency Associated with the Performance Category (outage/year)	Transient Voltage Dip Standard	Minimum Transient Frequency Standard	Post -Transient Voltage Deviation Standard
A System normal	Not Applicable	Nothing in addition to NERC		
B One element out-of-service	≥ 0.33	Not to exceed 25% at load buses or 30% at non-load buses. Not to exceed 20% for more than 20 cycles at load buses.	Not below 59.6Hz for 6 cycles or more at a load bus.	Not to exceed 5% at any bus.
C Two or more elements out-of-service	0.033 – 0.33	Not to exceed 30% at any bus. Not to exceed 20% for more than 40 cycles at load buses.	Not below 59.0Hz for 6 cycles or more at a load bus.	Not to exceed 10% at any bus.
D Extreme multiple-element outages	< 0.033	Nothing in addition to NERC		

Figure 3: Graphical Representation of Stability Analysis Evaluation Criteria



Palo Verde Updated Final Safety Analysis Report (UFSAR)

The methodology and evaluation criteria for the UFSAR analysis will include:

- Dispatching of the Palo Verde Nuclear Units at 7% above its maximum operating limit of 4227 MW
- Dispatching at maximum of all the commercially operating generating units (PVTS Interconnections) in the Palo Verde hub up to 6884 MW.
- Modeling of the Palo Verde Nuclear Units and the PVTS Interconnections to buck up to 800 MVAR
- Operating the SSEP at 504 MW gross generation output with 2.52 MW plant load and 1.48 MW of the interconnected line losses.
- Determining the maximum total net generation that can safely be injected by Palo Verde Nuclear Units and the Palo Verde/Hassayampa Interconnectors without exceeding any of the thermal capability limits.
- Determine the Palo Verde plant stability limit and/or a transient voltage dip limit

VI. STUDY RESULTS

VI.A OVERALL SUMMARY

The key finding from the transient stability analysis is that the proposed generation project interconnection can achieve a reliable system performance in the Palo Verde interconnected transmission system while meeting the voltage dip, damping and frequency deviation limits of the WECC transmission system. The results show no negative impact to the interconnected transmission system.

While transient stability results indicate that voltage ride through may not be an issue, it remains the responsibility of SSEP to meet the voltage ride through requirements as defined in Appendix C.

The details of the stability analysis results are provided in Appendices A and B. summaries of results of the technical analyses are presented in the Section VII, Exhibit 1 and Exhibit 2.

The following subsections provide highlights of the analysis:

VI.B IMPACT ON THE INTERCONNECTED TRANSMISSION SYSTEM

(See TSHS-TABLE 1 and TSHS-TABLE 2 in Appendix A)

Of 16 selected contingencies; 10 cases (Category B), 3 (Category C) and 3 (Category D) were evaluated. None were indicated any stability problem. The following is a brief summary:

1. The worst contingency was a three-phase 4 cycles fault on the Hassayampa-N. Gila 500 kV line. The Palo Verde power grid and the WECC interconnected system remained stable. The transient voltage dips, damping and frequency deviations were within the NERC/WECC criteria limits. The lowest voltage dip of 16.3% at the COLORADO RIVER 500 kV bus in the SCE area was detected.

2. The next worst contingency was a three-phase 4 cycles fault on the Palo Verde-Colorado River 500 kV line. The Palo Verde power grid and the WECC interconnected system remained stable. The transient voltage dips, damping and frequency deviations were within the NERC/WECC criteria limits. The lowest voltage dip of 14.1% at the NORTH GILA 500 kV bus in the SDG&E area was detected.

3. For the remaining selected contingencies evaluated, the Palo Verde power grid and the WECC interconnected system remained stable. The transient voltage dips, damping and frequency deviations were within the NERC/WECC criteria limits.

VI. C IMPACT ON THE PALO VERDE PLANT SAFETY OPERATING LIMITS

(See FSAR-TABLE 1 in Appendix B)

The Updated Final Safety Analysis Report (UFSAR) indicated a reliable transmission system with a 7% generation margin added to the three Palo Verde nuclear units and the operation of the Palo Verde plant bucking at 810 MVARS. The results showed that all selected N-1 contingencies met the WECC criteria and were in conformance with the requirements set forth by the Nuclear Regulatory Commission (NRC). These N-1 contingencies are listed below:

- Loss of the most significant transmission line (either a Palo Verde-Colorado River or a Hassayampa-N. Gila 500 kV line)
- Loss of the largest generating unit in WECC (Palo Verde Unit=1,508 MW)
- Loss of the largest single load in WECC (either an Edmonton pump load=840 MW or a Valley S. bus load= 1147 MW)

The significant stability study results are summarized as follows:

1. The worst contingency was a three-phase 4 cycles fault on the Hassayampa-N. Gila 500 kV line. The Palo Verde power grid and the WECC interconnected system remained stable. The transient voltage dips, damping and frequency deviations were within the NERC/WECC criteria limits. The lowest voltage dip of 17.7% at the COLORADO RIVER 500 kV bus in the SCE area was detected.
2. The next worst contingency was a three-phase 4 cycles fault on the Palo Verde-Colorado River 500 kV line. The Palo Verde power grid and the WECC interconnected system remained stable. The transient voltage dips, damping and frequency deviations were within the NERC/WECC criteria limits. The lowest voltage dip of 15.0% at the NORTH GILA 500 kV bus in the SDG&E area was detected.
3. No significant stability problem for loss of either a largest generator (one Palo Verde Unit), a loss of the biggest pumping load of 840 MW (Edmonton) or a loss of the largest bus load of 1147 MW (Valley S.) in the WECC system.

VII. EXHIBITS

EXHIBIT 1: Summary of Transient Stability Study Results for the Impact on the Palo Verde Interconnected Transmission System

OUTAGE	PV EAST MAX CASE		
	VOLTAGE DIP CRITERIA VIOLATION	FREQUENCY CRITERIA VIOLATION	DAMPING
PALO VERDE-DEVERS 500 KV LINE	NO	NO	POSITIVE
HASSYAMP-N. GILA 500 KV LINE	NO	NO	POSITIVE
PALO VERDE - RUDD 500 KV LINE	NO	NO	POSITIVE
NAVAJO – CRYSTAL 500 KV LINE	NO	NO	POSITIVE
MOENKOPI – ELDORDO 500 KV LINE	NO	NO	POSITIVE
PALO VERDE – WESTWING #1 500 KV LINE	NO	NO	POSITIVE
HASSYAMP – JOJOBA 500 KV LINE	NO	NO	POSITIVE
PERKINS – MEAD 500 KV LINE	NO	NO	POSITIVE
JOJOBA – KYRENE 500 KV LINE	NO	NO	POSITIVE
HASSYAMP – PINAL_W 500 KV LINE	NO	NO	POSITIVE
PALO VERDE G-2	NO	NO	POSITIVE
PALO VERDE – WESTWING #1 &2 500 KV LINES	NO	NO	POSITIVE
IPPDC BIPOLE	NO	NO	POSITIVE
PALO VERDE-WESTWING & PALO VERDE-RUDD 500 KV LINES	NO	NO	POSITIVE

EXHIBIT 2: Summary of Transient Stability Study Results for the Impact on the Palo Verde Plant Operating Limits (FSAR)

OUTAGE	ADDED 7% GENERATION MARGIN TO THE PALO VERDE UNIT WITH PALO VERDE PLANT BUCKING AT 810 MVARS			
	VOLTAGE DIP CRITERIA VIOLATION	FREQUENCY CRITERIA VIOLATION	DAMPING	PALO VERDE STABILITY
PALO VERDE-DEVERS 500 KV LINE	NO	NO	POSITIVE	STABLE
HASSYAMP-N. GILA 500 KV LINE	NO	NO	POSITIVE	STABLE
LOSS OF ONE PALO VERDE GENERATOR	NO	NO	POSITIVE	STABLE
LOSS OF THE LARGEST EDMOUNT PUMPING LOAD (840 MW)	NO	NO	POSITIVE	STABLE
LOSS OF THE BIGGEST BUS LOAD (1147 MW)	NO	NO	POSITIVE	STABLE

VIII. RESPONSES TO COMMENTS

Since the formation of the Sonoran Project Interconnection Study Review Group, WATS members were given opportunities to review and comment on all aspects of the Study. Throughout the study period, The Sonoran Project solicited and received comments on the additional stability analysis and the SSEP Jojoba interconnection impact study report. The responses to these comments are provided in Appendix C.

Appendix A: Palo Verde Simultaneous Maximum Generation with SSEP 500 MW
TSHS01_SONORAN_PV
TSHS02_SONORAN_PV
Stability Plots and TAB (TS01 thru TS16)

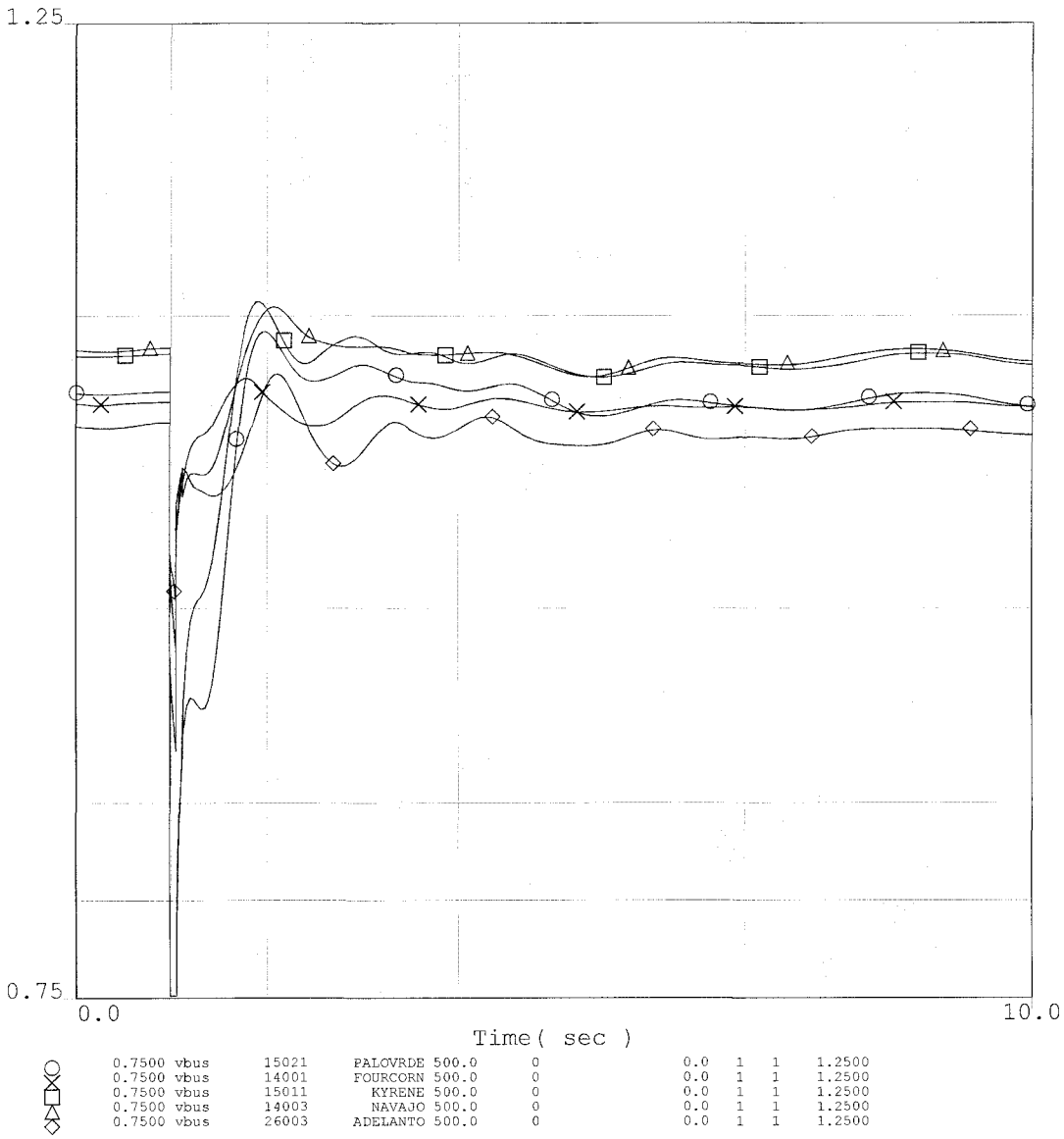
TSHS-TABLE 1
SONORAN SOLAR PROJECT INTERCONNECTION IMPACT STUDY
TRANSIENT STABILITY RESULTS FOR MAXIMUM PALO VERDE HUB GENERATION
2014 HEAVY SUMMER OPERATING CONDITIONS (SONORA PHOTOVOLTIC TYPE)

		POWER FLOW (MW)			STABILITY RESULTS				
CASE NO.	POST-PROJECT CASE DESCRIPTION	PV/HAA TOTAL	PV E TOTAL	PV W TOTAL	MAX. TRANSIENT VOLTAGE DIP	TRANSIENT VOLTAGE DIP	TRANSIENT FREQUENCY	DAMPING	CASE RESULTS COMMENTS
14HS-POST-Q3	BASE CASE	11451	7831	3620					
NERC/WECC CATEGORY B (LOSS OF ONE SINGLE ELEMENT) N-1 CONTINGENCY		MITIGATION SCHEME (RAS)							
ST-1	3 PH FLT ON PALO VERDE 500kV BUS L/O PALO VERDE-DEVERS 500kV LINE	NONE			14.1% at N.GILA 500kV	<20%---<20cycle	>59.6 Hz<6cycle	Damping>0	STABLE AND WELL DAMPED WITHIN NERC/WECC CRITERIA LIMITS
ST-2	3 PH FLT ON HASSAYAMPA 500kV BUS L/O HASSAYAMPA-N.GILA 500kV LINE	NONE			16.3% at COLO R 500kV	<20%---<20cycle	>59.6 Hz<6cycle	Damping>0	STABLE AND WELL DAMPED WITHIN NERC/WECC CRITERIA LIMITS
ST-3	3 PH FLT ON MOENKOPI 500kV BUS L/O ONE MOENKOPI-ELDORADO 500kV LINE	NONE			1.6% at STATELIN69kV	<20%---<20cycle	>59.6 Hz<6cycle	Damping>0	STABLE AND WELL DAMPED WITHIN NERC/WECC CRITERIA LIMITS
ST-4	3 PH FLT ON NAVAGO 500kV Bus L/O NAVAJO-CRYSTAL 500kV LINE	NONE			1.8% at STATELIN69kV	<20%---<20cycle	>59.6 Hz<6cycle	Damping>0	STABLE AND WELL DAMPED WITHIN NERC/WECC CRITERIA LIMITS
ST-5	3 PH FLT ON HASSAYAMPA 500kV BUS L/O HASSAYAMPA-JOJOBA 500kV LINE	NONE			8.2% at Q1SOLAR230kV	<20%---<20cycle	>59.6 Hz<6cycle	Damping>0	STABLE AND WELL DAMPED WITHIN NERC/WECC CRITERIA LIMITS
ST-6	3 PH FLT ON HASSAYAMPA 500kV BUS L/O HASSAYAMPA-PINAL W. 500kV LINE	NONE			5.9% at COLO R 500kV	<20%---<20cycle	>59.6 Hz<6cycle	Damping>0	STABLE AND WELL DAMPED WITHIN NERC/WECC CRITERIA LIMITS
ST-7	3 PH FLT ON JOJOBA 500kV BUS L/O JOJOBA-KYRENE. 500kV LINE	NONE			7.3% at GILABEND230kV	<20%---<20cycle	>59.6 Hz<6cycle	Damping>0	STABLE AND WELL DAMPED WITHIN NERC/WECC CRITERIA LIMITS
ST-8	3 PH FLT ON PALO VERDE 500kV BUS L/O PALO VERDE-RUDD 500kV LINE	NONE			12.8% at COLORV500kV	<20%---<20cycle	>59.6 Hz<6cycle	Damping>0	STABLE AND WELL DAMPED WITHIN NERC/WECC CRITERIA LIMITS
ST-9	3 PH FLT ON PERKINS 500kV BUS L/O PERKINS-MEAD500kV LINE	NONE			2.7% at COLORV500kV	<20%---<20cycle	>59.6 Hz<6cycle	Damping>0	STABLE AND WELL DAMPED WITHIN NERC/WECC CRITERIA LIMITS
ST-10	3 PH FLT ON PALO VERDE 500kV BUS L/O ONE PALO VERDE-WESTWING 500kV LINE	NONE			12.1% at COLORV500kV	<20%---<20cycle	>59.6 Hz<6cycle	Damping>0	STABLE AND WELL DAMPED WITHIN NERC/WECC CRITERIA LIMITS

TSHS-TABLE 2
SONORAN SOLAR PROJECT INTERCONNECTION IMPACT STUDY
TRANSIENT STABILITY RESULTS FOR MAXIMUM PALO VERDE HUB GENERATION
2014 HEAVY SUMMER OPERATING CONDITIONS (SONORA PHOTOVOLTIC TYPE)

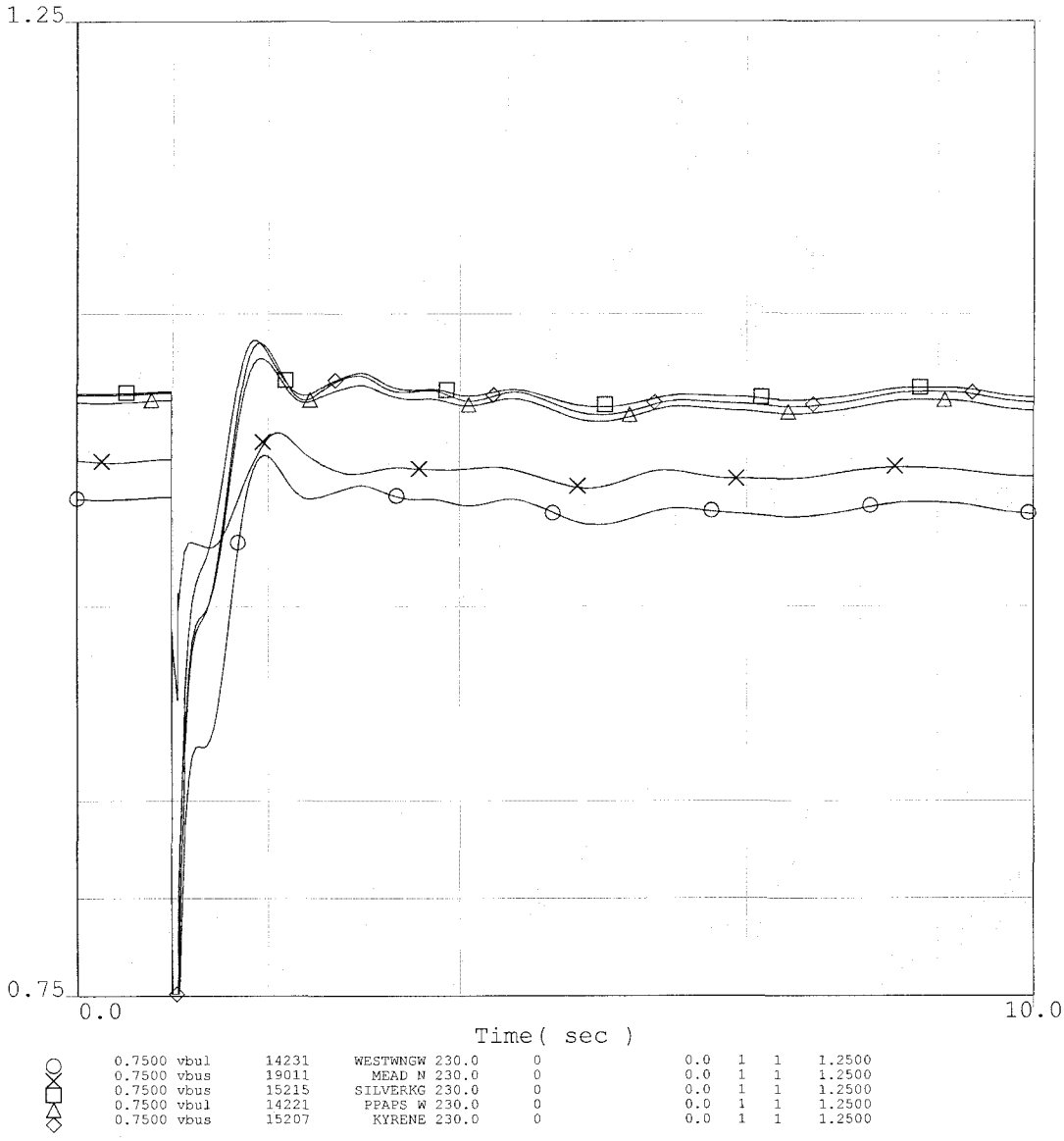
		POWER FLOW (MW)			STABILITY RESULTS				
CASE NO.	POST-PROJECT CASE DESCRIPTION	PV/HAA TOTAL	PV E TOTAL	PV W TOTAL	MAX. TRANSIENT VOLTAGE DIP	TRANSIENT VOLTAGE DIP	TRANSIENT FREQUENCY	DAMPING	CASE RESULTS COMMENTS
14HS-POST-Q3	BASE CASE	11451	7831	3620					
NERC/WECC CATEGORY C (LOSS OF TWO OR MORE ELEMENTS) N-2 CONTINGENCY		MITIGATION SCHEME (RAS)							
ST-11	SLG FLT ON PALO VERDE-WESTWING #1 L/O TWO PALO VERDE-WESTWING 500kV LINES	NONE			8.8% at RUDD 500kV	<20%---<40cycle	>59.0Hz<6cycle	Damping>0	STABLE AND WELL DAMPED WITHIN NERC/WECC CRITERIA LIMITS
ST-12	IPP BIPOLAR DC BLOCK L/O IPP DC LINE	NONE			7.5% at GONDER69kV	<20%---<40cycle	>59.0 Hz<6cycle	Damping>0	STABLE AND WELL DAMPED WITHIN NERC/WECC CRITERIA LIMITS
ST-13	A LOSS OF TWO PALO VERDE GENERATORS	NONE			27.9% at ALKALIC115kV	<20%---<40cycle	>59.0 Hz<6cycle	Damping>0	STABLE AND WELL DAMPED WITHIN NERC/WECC CRITERIA LIMITS
NERC/WECC CATEGORY D (LOSS OF TWO OR MORE ELEMENTS) N-2 CONTINGENCY		MITIGATION SCHEME (RAS)							
ST-14	3 PH FLT ON HASSAYAMPA 500kV BUS L/O HASSAYAMPA-JOJOBA 500kV & HASSAYAMPA-PINAL WEST 500kV LINES	NONE			8.2% at SOLAR1230kV	<20%---<40cycle	>59.0 Hz<6cycle	Damping>0	STABLE AND WELL DAMPED WITHIN NERC/WECC CRITERIA LIMITS
ST-15	3 PH FLT ON PALO VERDE 500kV BUS L/O PALO VERDE-WESTWING#1 & PALO VERDE-RUDD 500kV LINES	NONE			24.1% at PINALW500kV	<20%---<40cycle	>59.0Hz<6cycle	Damping>0	STABLE AND WELL DAMPED WITHIN NERC/WECC CRITERIA LIMITS
ST-16	3 PH FLT ON JOJOBA 500kV BUS L/O JOJOBA-KYRENE & HASSAYAMPA-PINAL WEST 500kV LINES	NONE			10.8% at RUDD 500kV	<20%---<40cycle	>59.0Hz<6cycle	Damping>0	STABLE AND WELL DAMPED WITHIN NERC/WECC CRITERIA LIMITS

ARIZONA_voltages:



14HS-TS1:THREE PHASE NORMAL FAULT CLEARING ON PV-DEVERS 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

ARIZONA_voltages:



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SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

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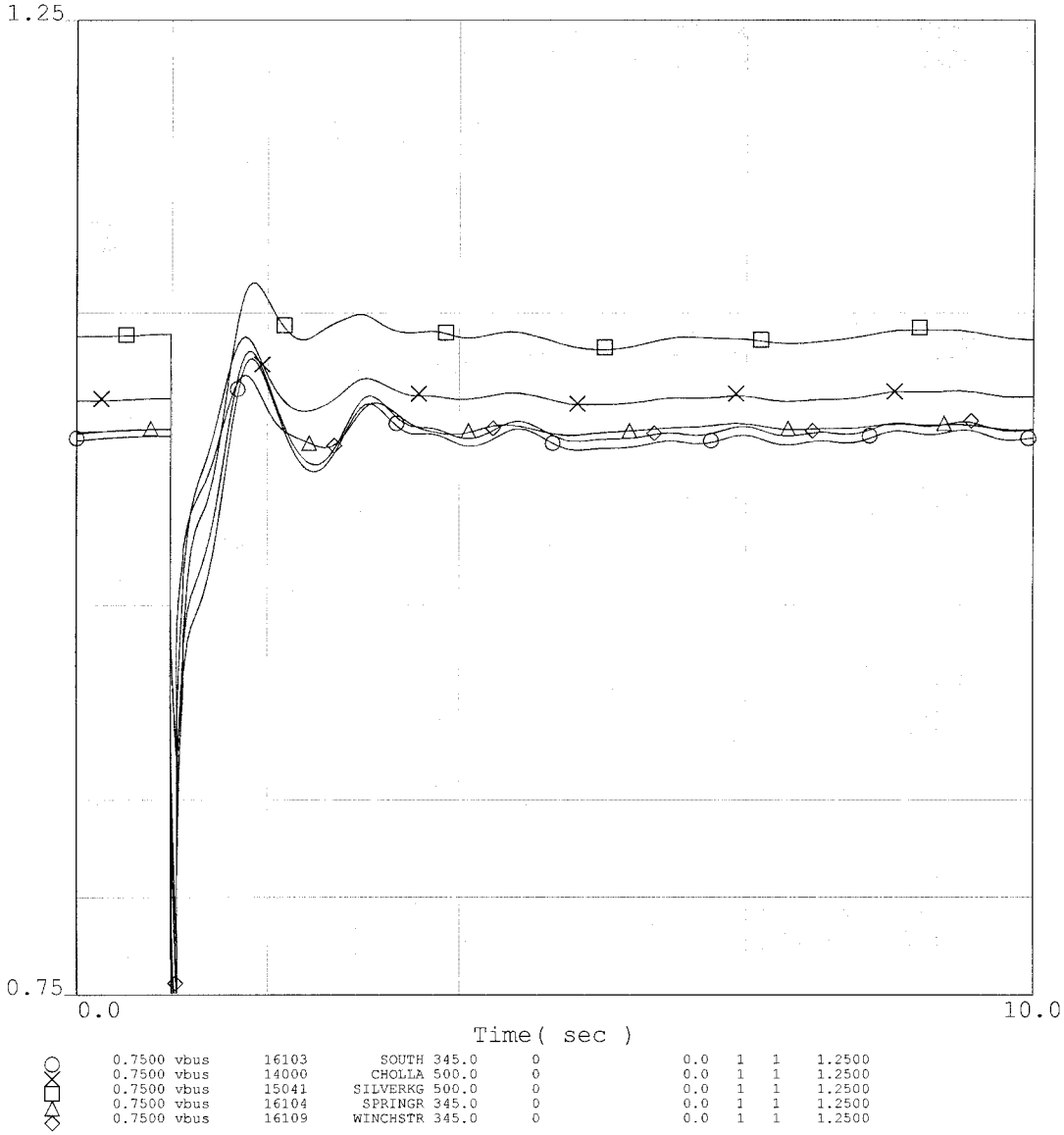

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SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

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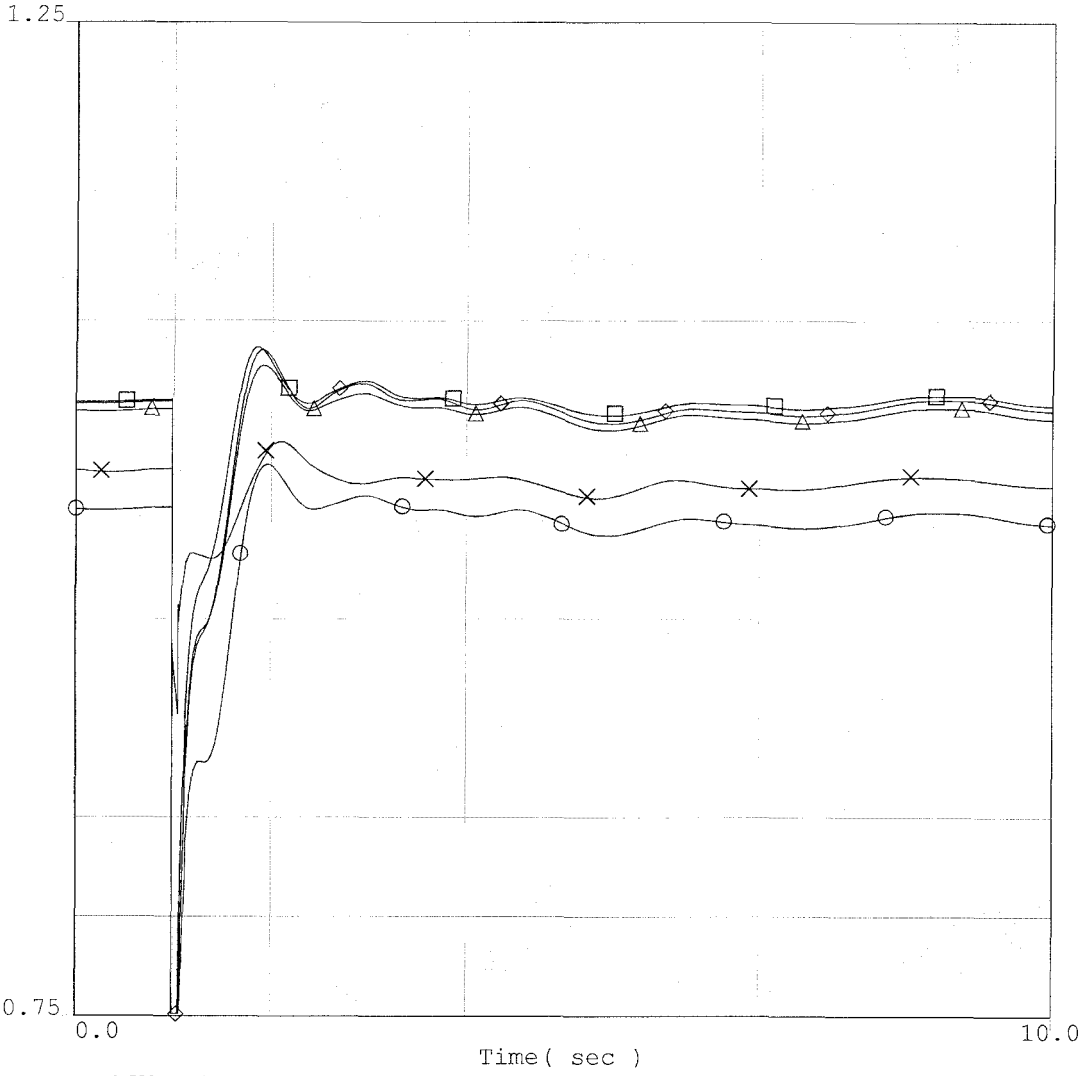

○	0.7500 vbul	14231	WESTWNGW 230.0	0	0.0	1	1	1.2500
⊗	0.7500 vbus	19011	MEAD N 230.0	0	0.0	1	1	1.2500
□	0.7500 vbus	15215	SILVERKG 230.0	0	0.0	1	1	1.2500
△	0.7500 vbul	14221	PPAPS W 230.0	0	0.0	1	1	1.2500
◇	0.7500 vbus	15207	KYRENE 230.0	0	0.0	1	1	1.2500

14HS-TS1:THREE PHASE NORMAL FAULT CLEARING ON PV-DEVERS 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

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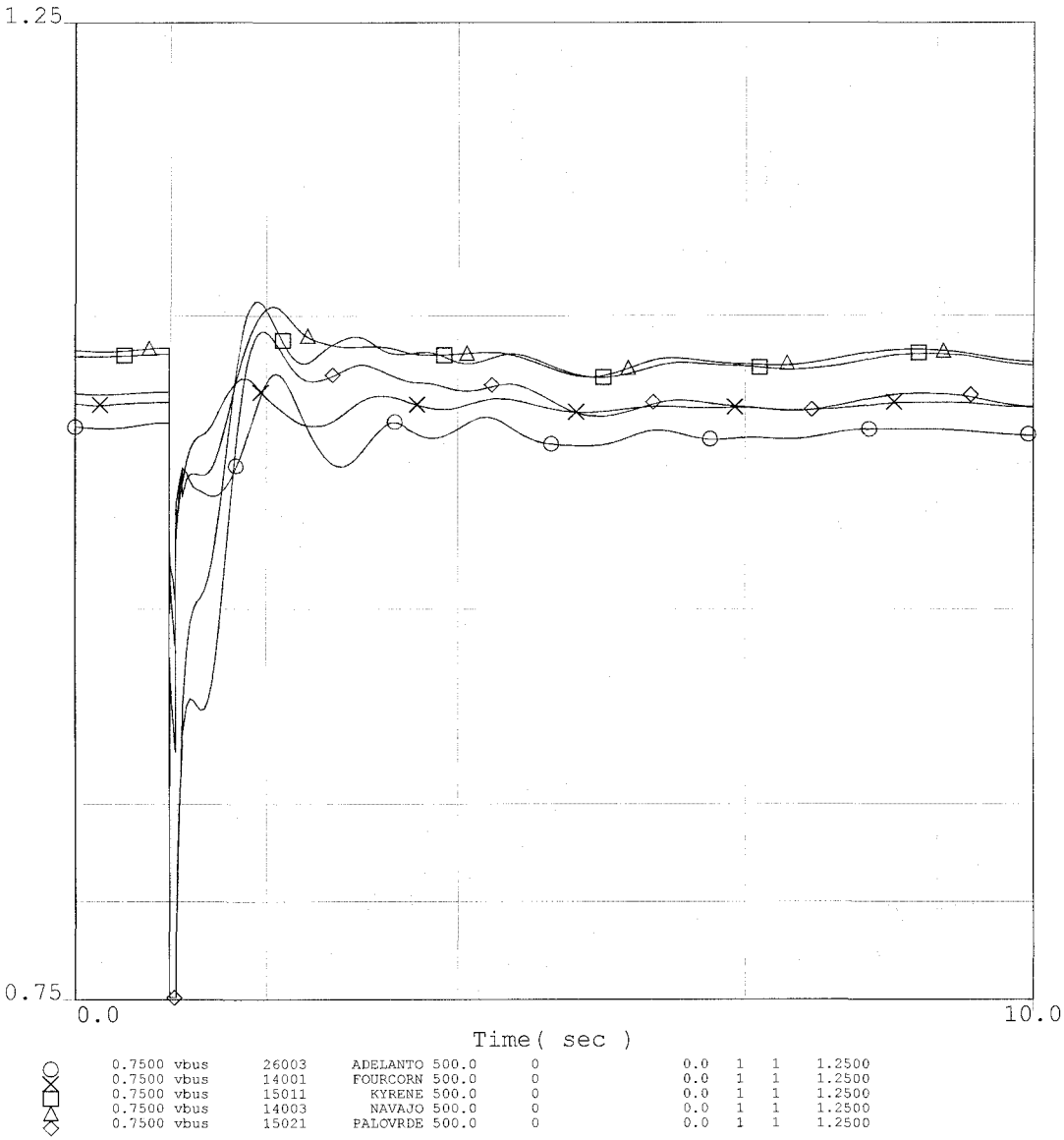
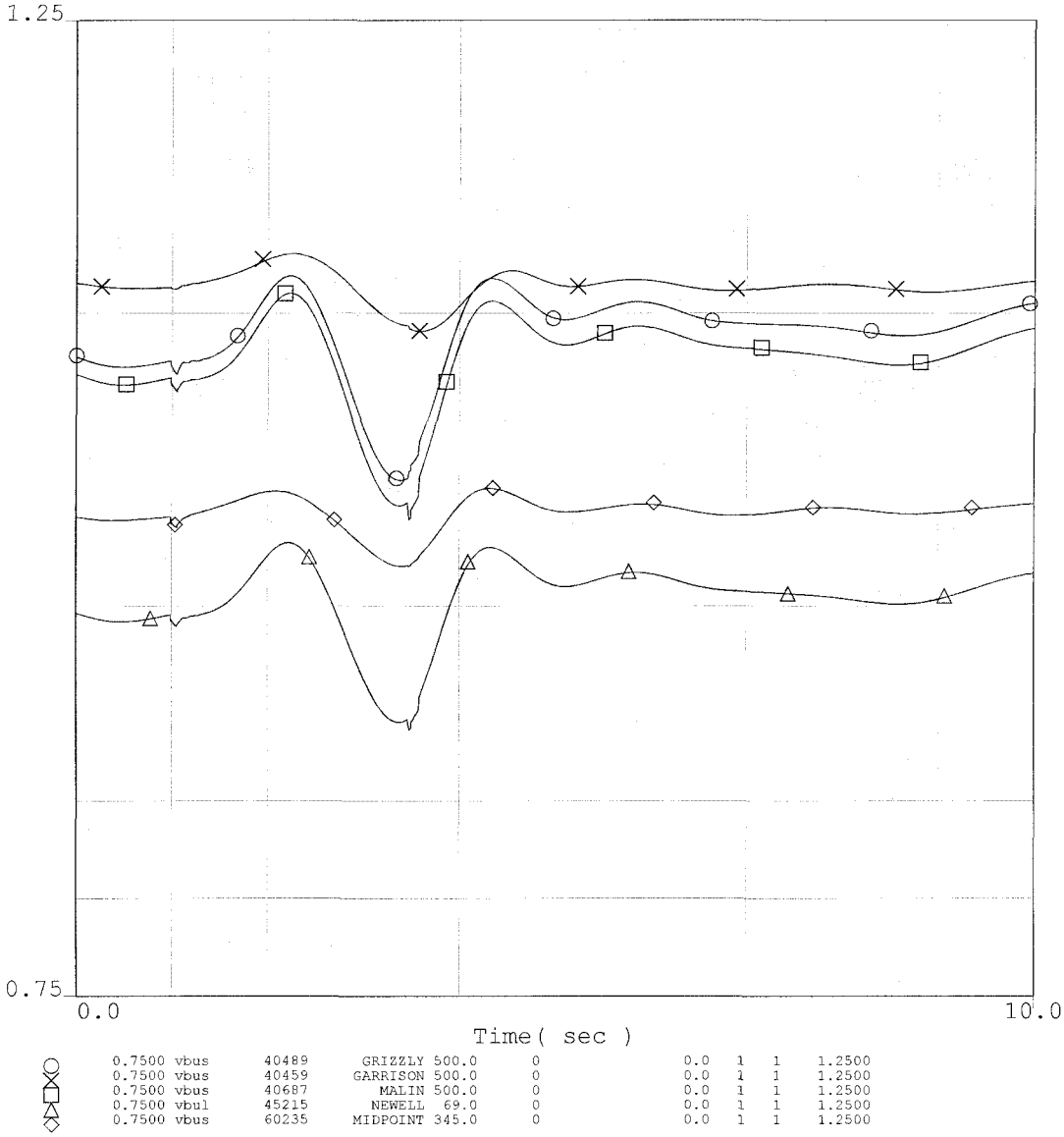


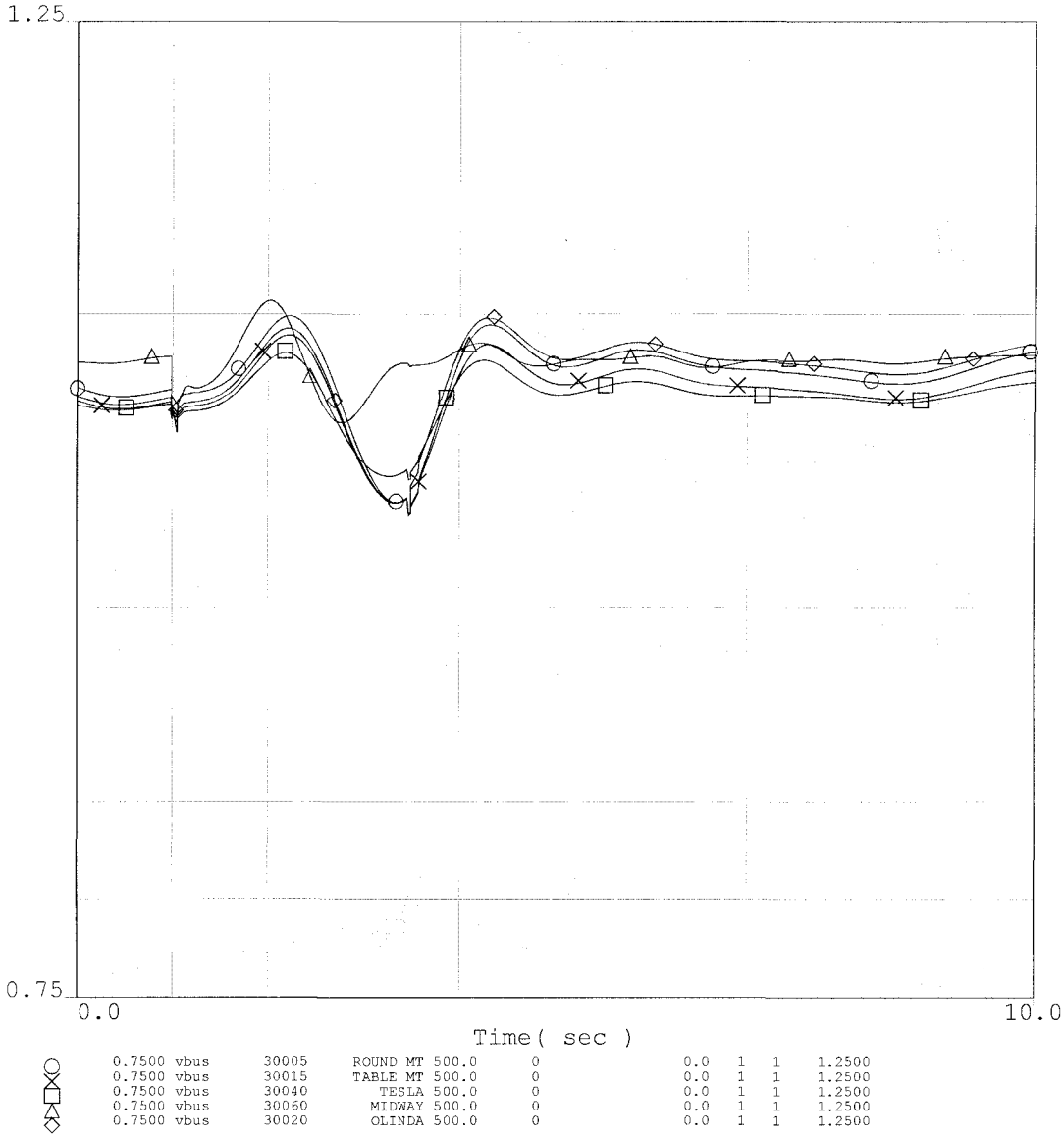
14HS-TS1:THREE PHASE NORMAL FAULT CLEARING ON PV-DEVERS 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

NORTHWEST_voltages:



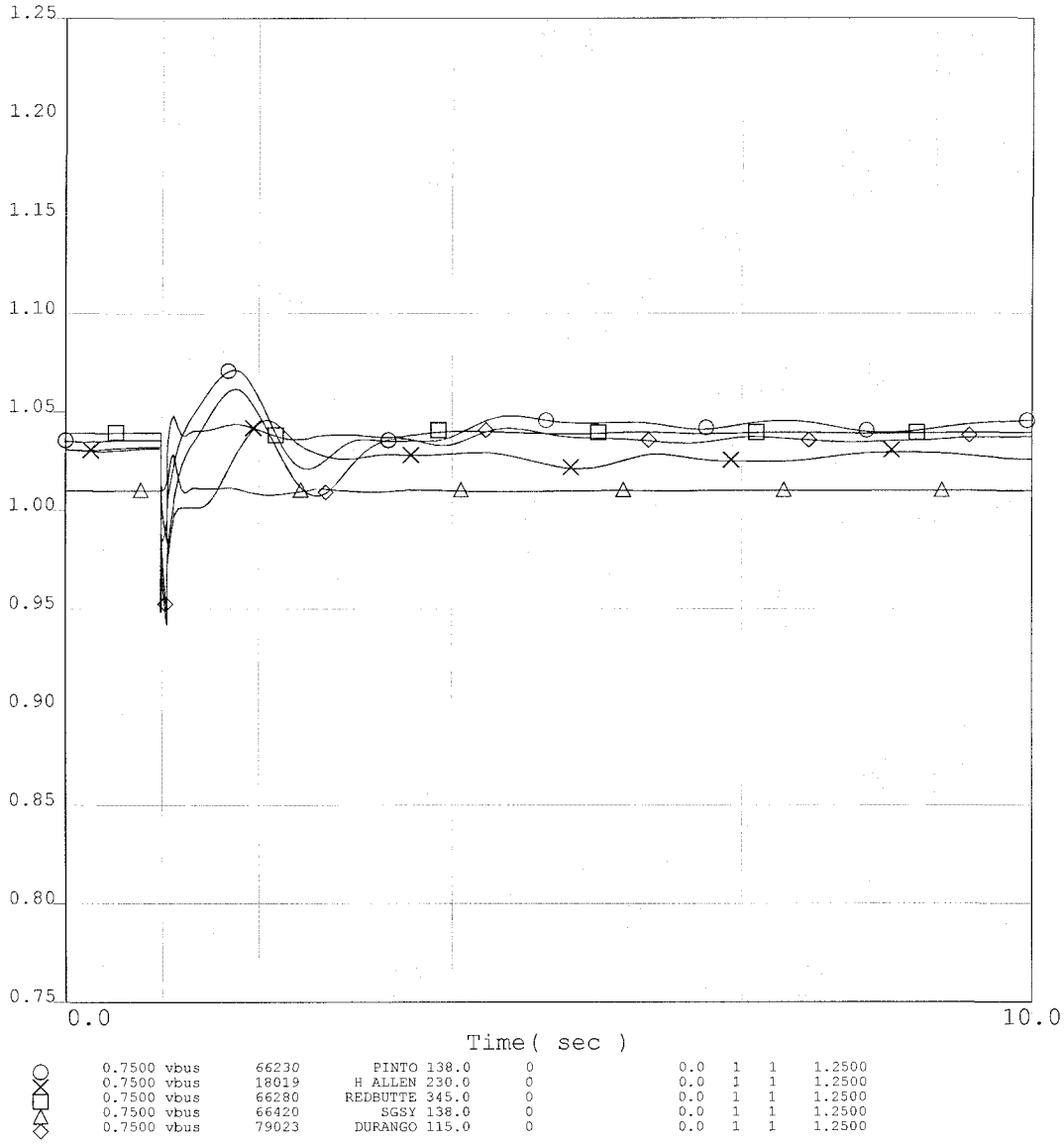
14HS-TS1:THREE PHASE NORMAL FAULT CLEARING ON PV-DEVERS 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

CALIFORNIA_voltages:



14HS-TS1:THREE PHASE NORMAL FAULT CLEARING ON PV-DEVERS 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

UTAH_voltages:



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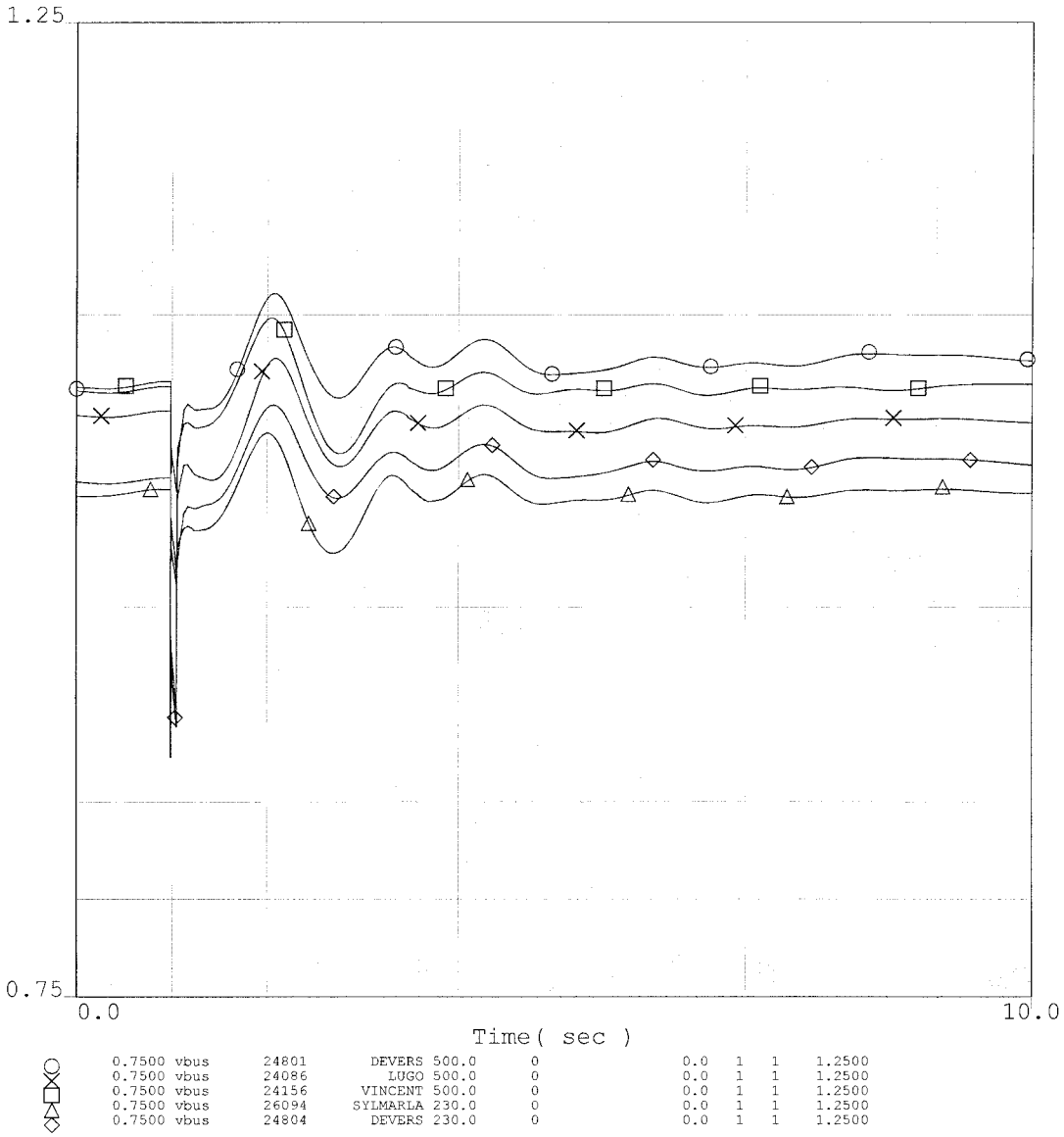
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

CALIFORNIA_voltages:



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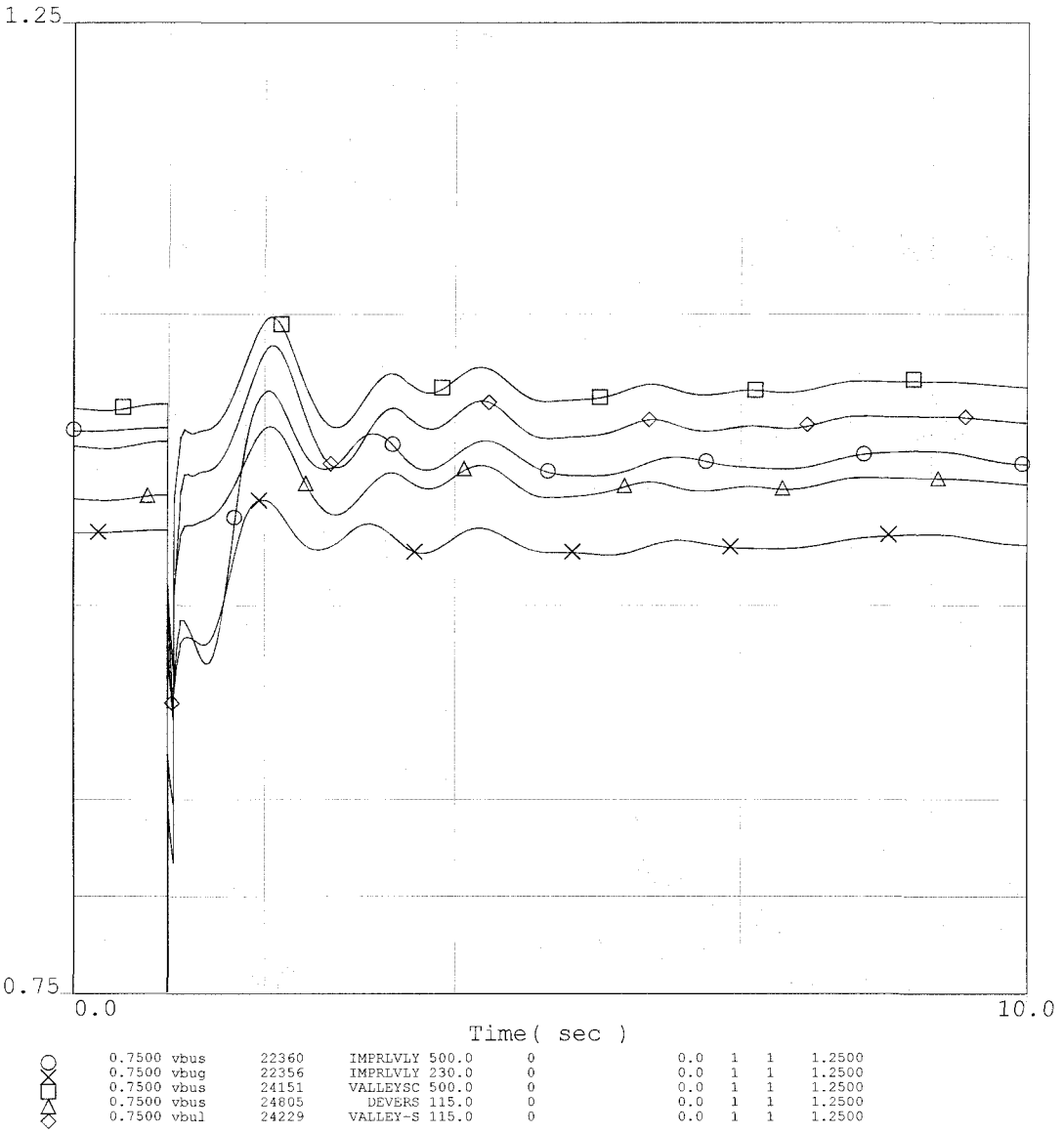
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

CALIFORNIA_voltages:



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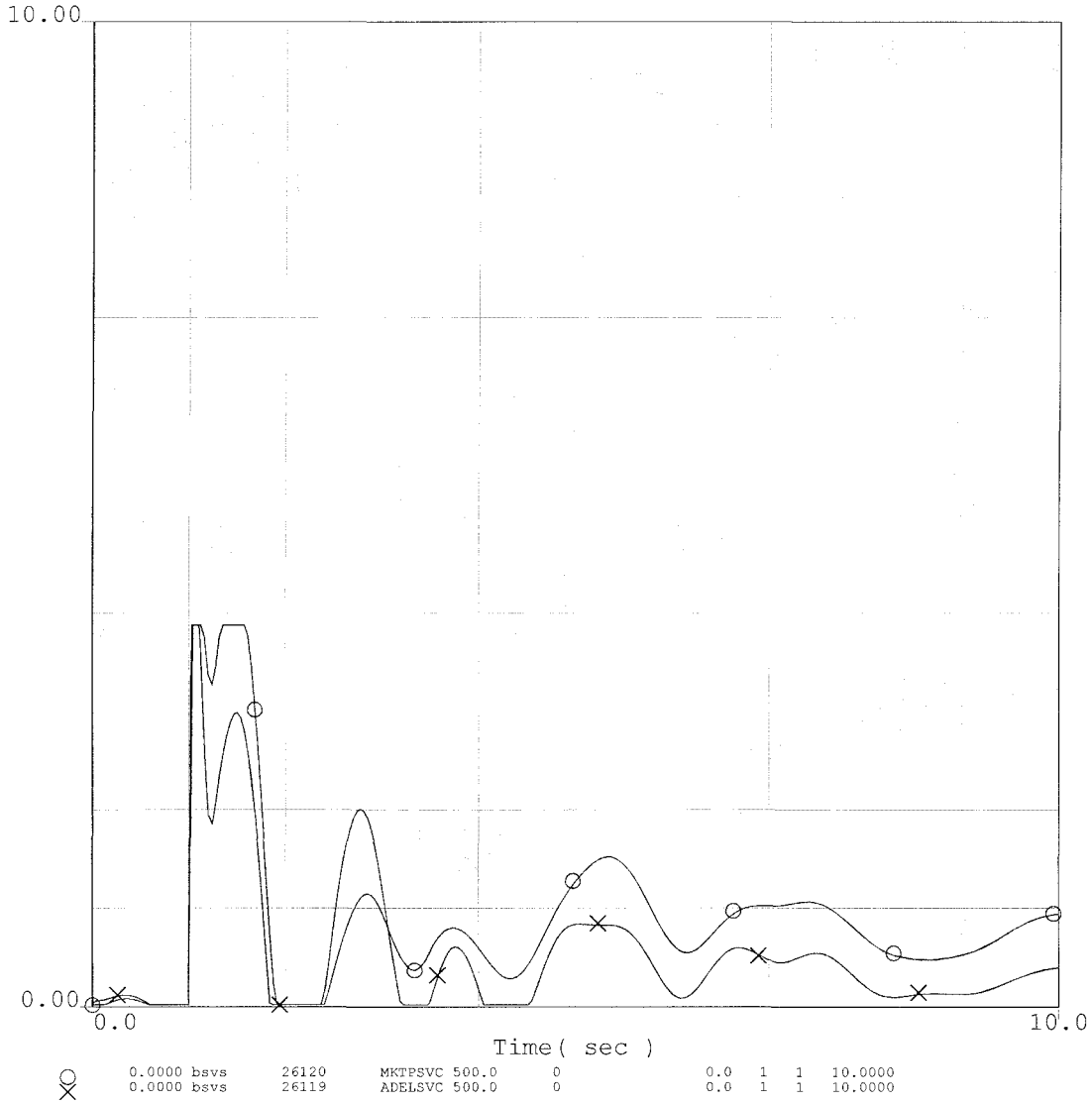
SVC_output



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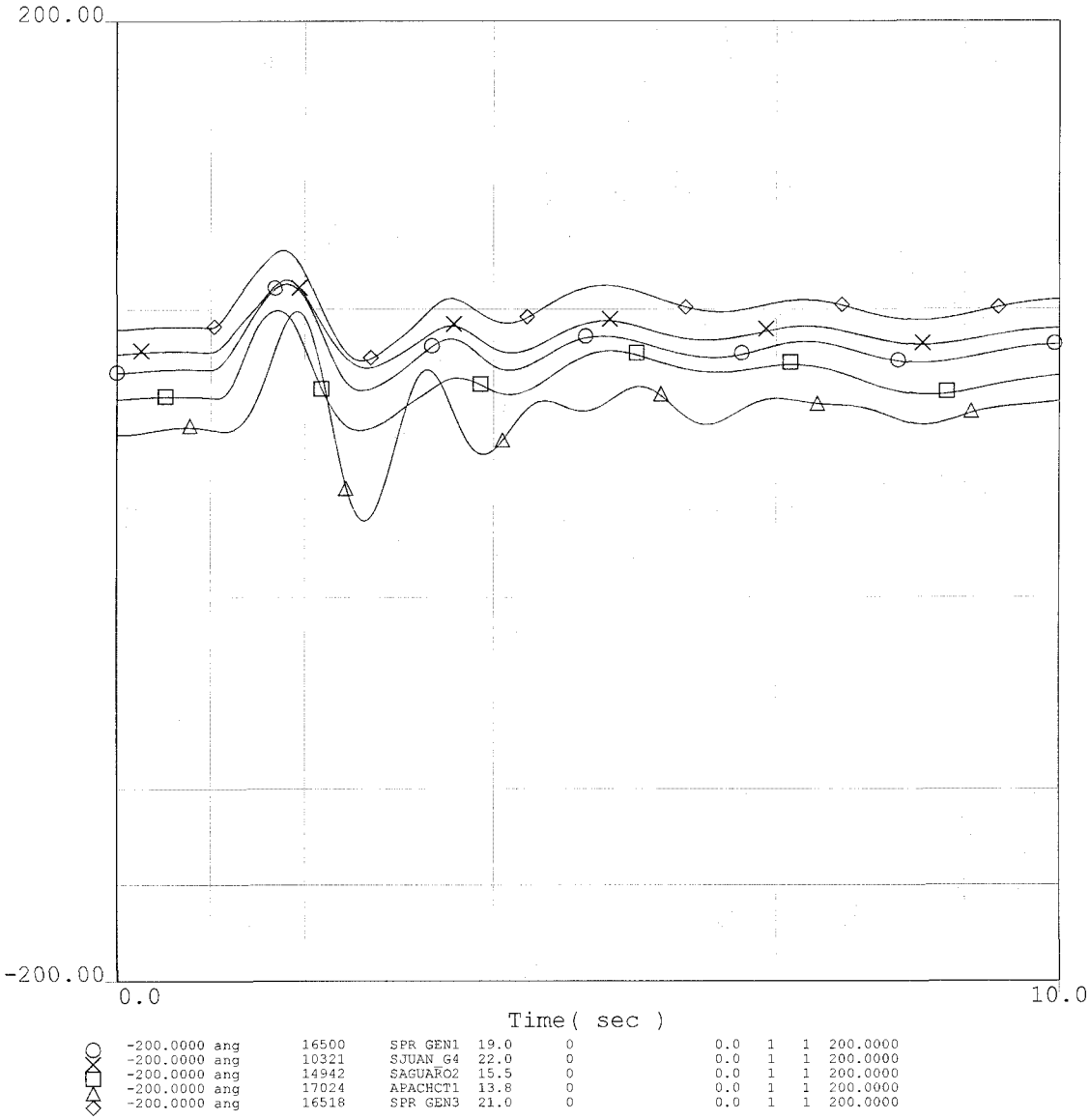
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

SYSTEM_Rotorangles



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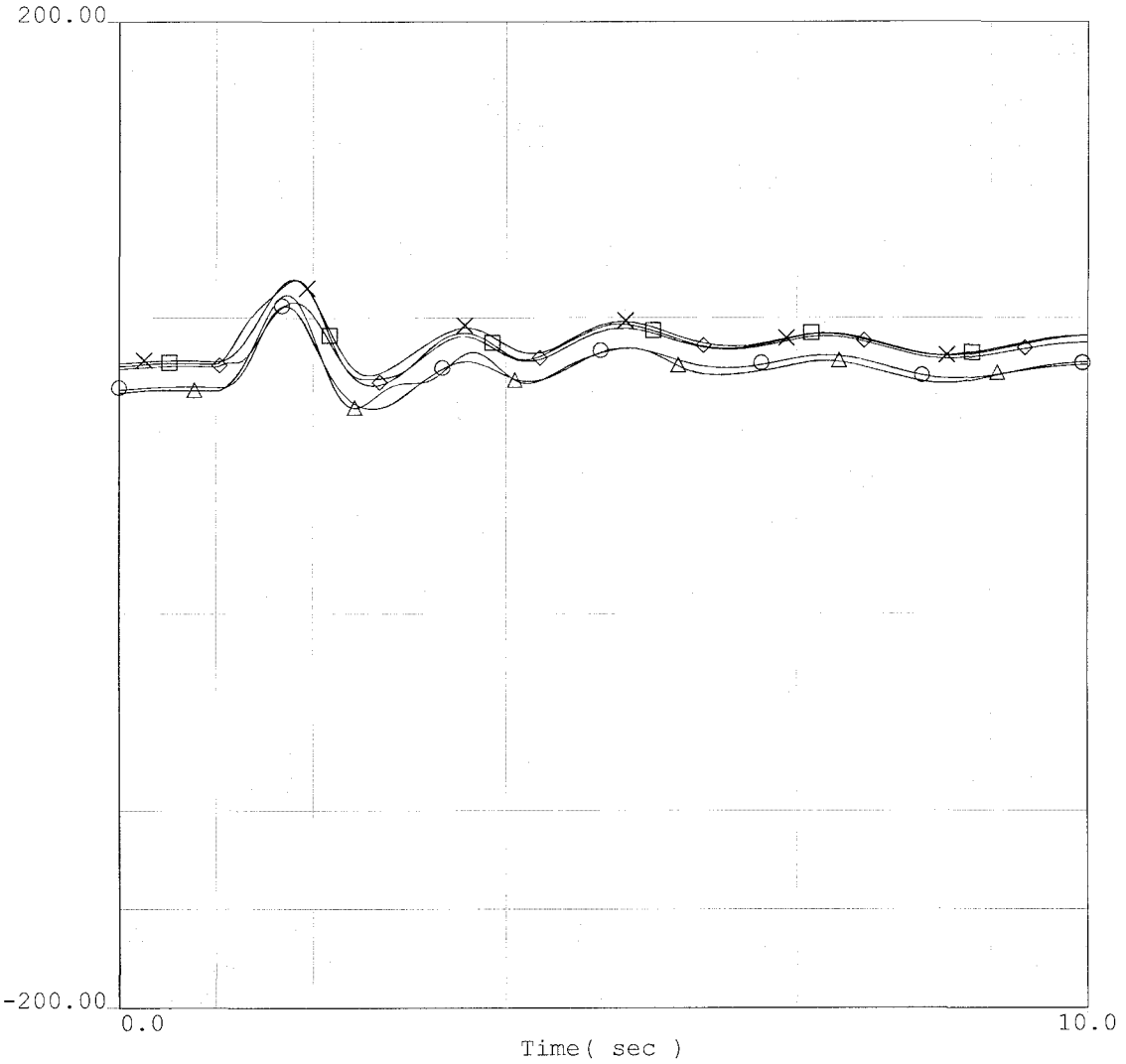
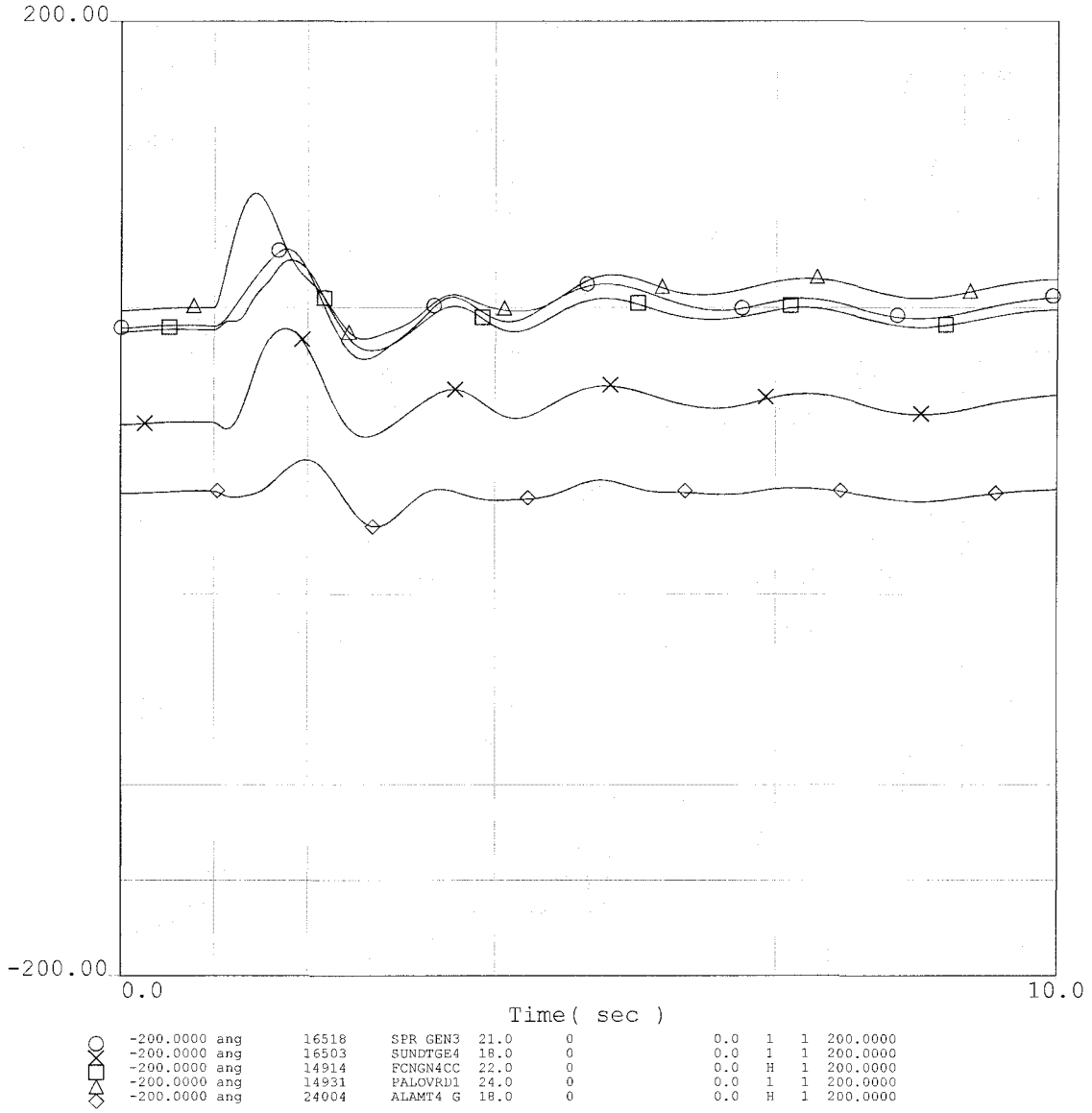
SYSTEM_Rotorangles



-200.0000 ang	15140	DBG-CT1	18.0	0	0.0	1	1	200.0000
-200.0000 ang	14945	SAG. CT3	13.8	0	0.0	1	1	200.0000
-200.0000 ang	14902	CHOLLA3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	15921	SANTAN 1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	14903	CHOLLA4	22.0	0	0.0	1	1	200.0000

14HS-TS1:THREE PHASE NORMAL FAULT CLEARING ON PV-DEVERS 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

SYSTEM_Rotorangles



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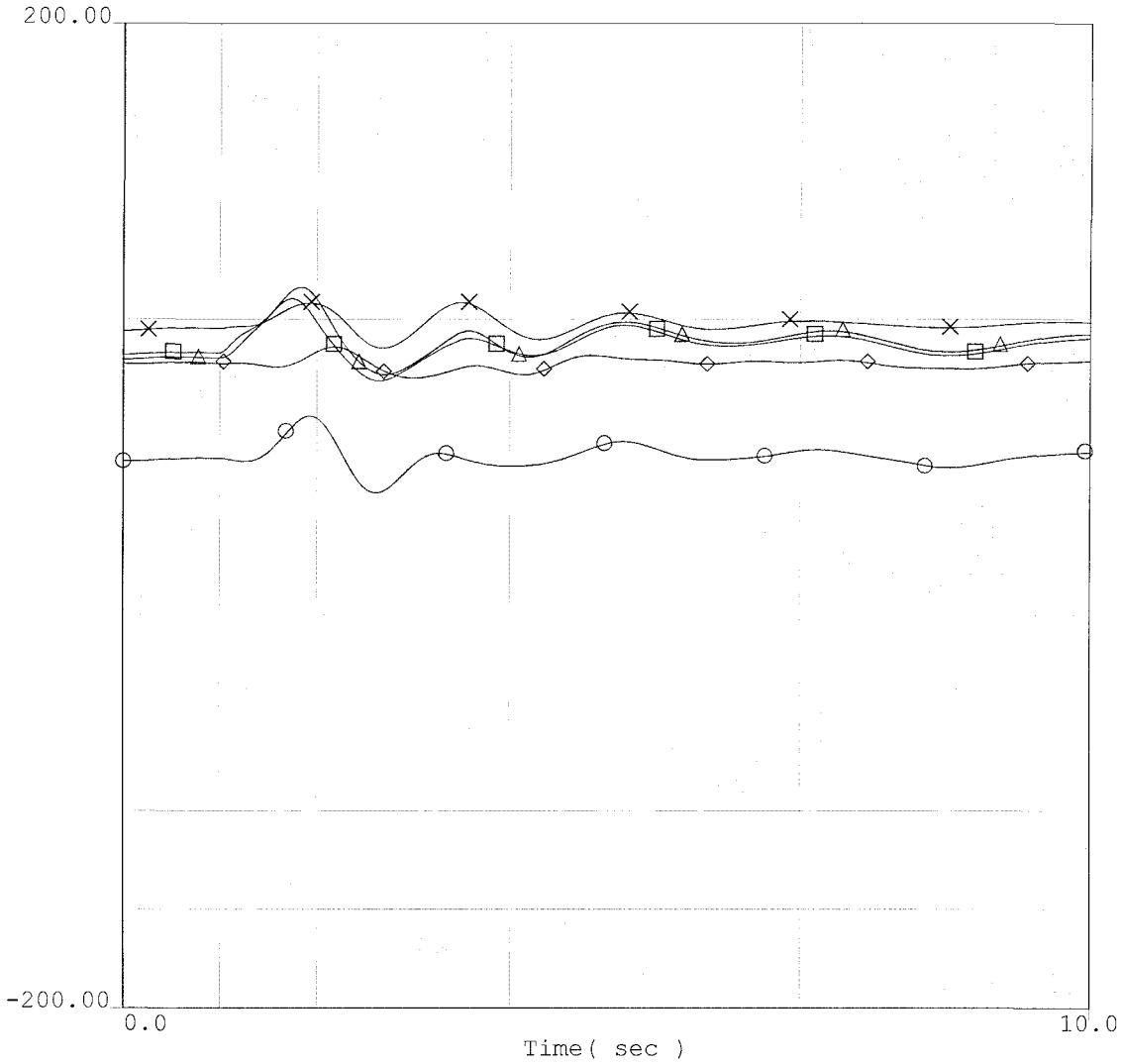
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

SYSTEM_Rotorangles



-200.0000 ang	24129	S.ONOFR2	22.0	0	0.0	1	1	200.0000
-200.0000 ang	26039	INTERM1G	26.0	0	0.0	1	1	200.0000
-200.0000 ang	15981	NAVAJO 1	26.0	0	0.0	1	1	200.0000
-200.0000 ang	10318	SJUAN_G1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	36411	DIABLO 1	25.0	0	0.0	1	1	200.0000

14HS-TS1:THREE PHASE NORMAL FAULT CLEARING ON PV-DEVERS 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

14hs_q3_pv-dv.chf

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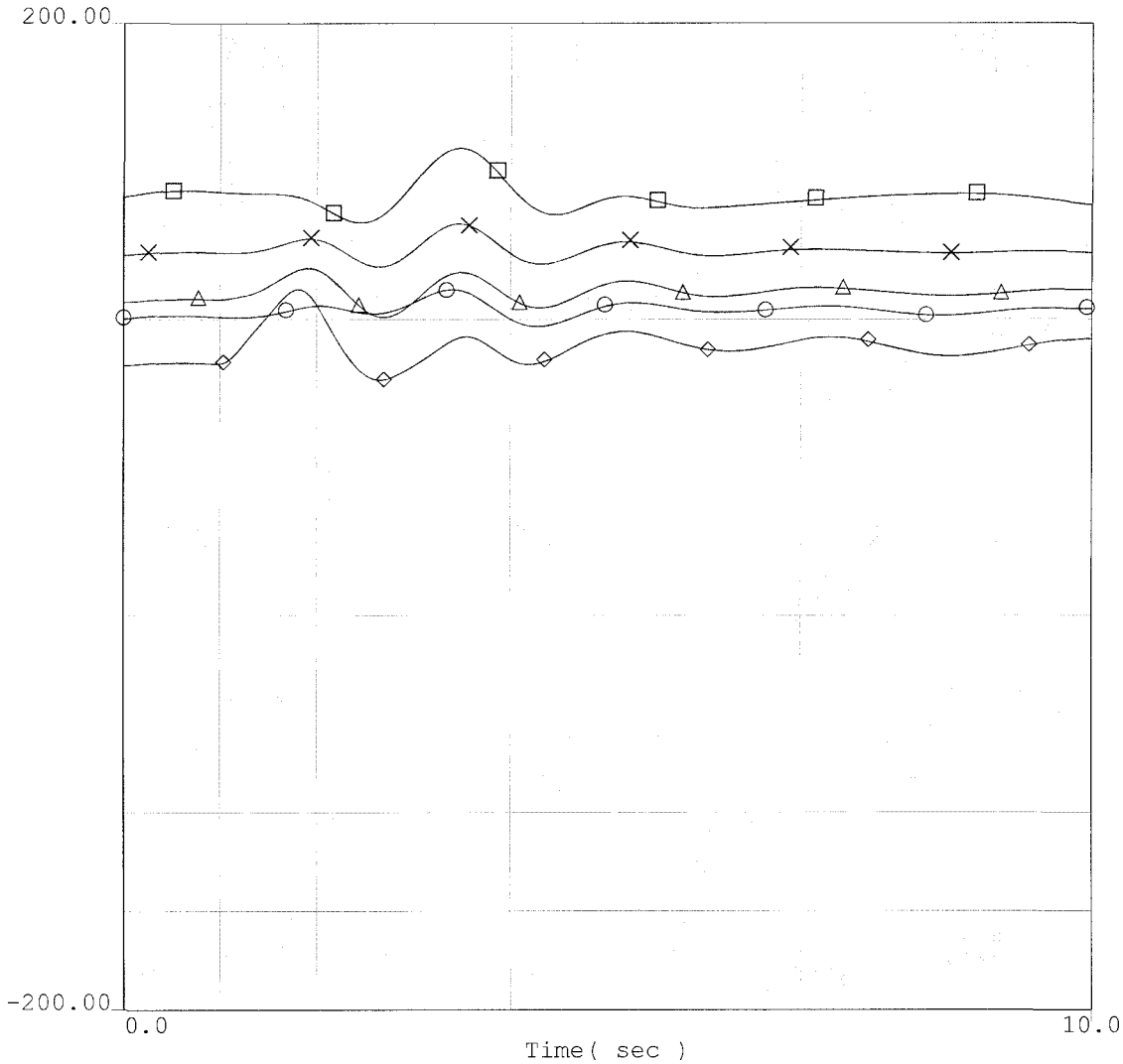
Tue Mar 29 10:17:24 2011

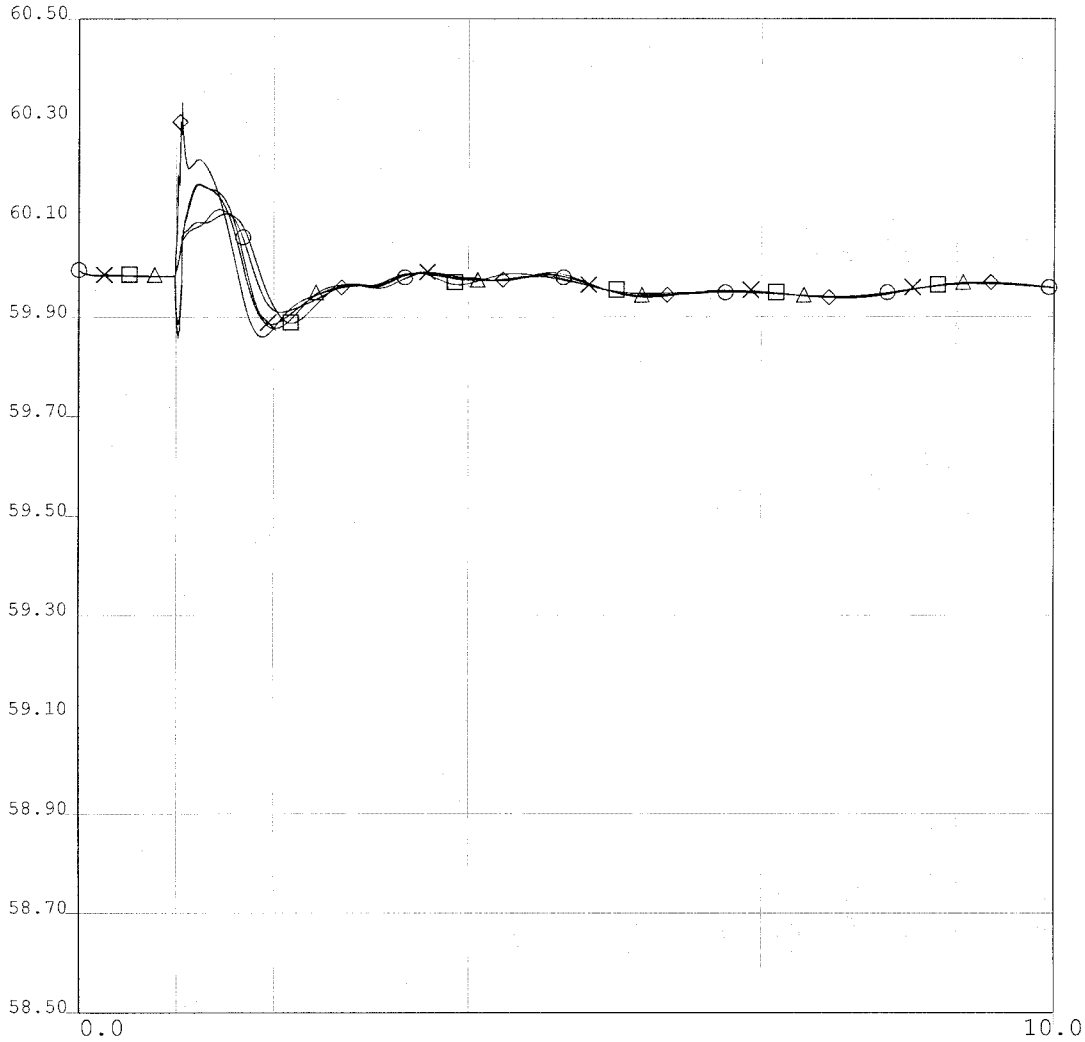
SYSTEM_Rotorangles



-200.0000 ang	73129	MBPP-1	24.0	0	0.0	1	1	200.0000
-200.0000 ang	60086	BRIDGER1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	62050	COLSTP 1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	65500	EHUNTR 3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	10321	SJUAN_G4	22.0	0	0.0	1	1	200.0000

14HS-TS1:THREE PHASE NORMAL FAULT CLEARING ON PV-DEVERS 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

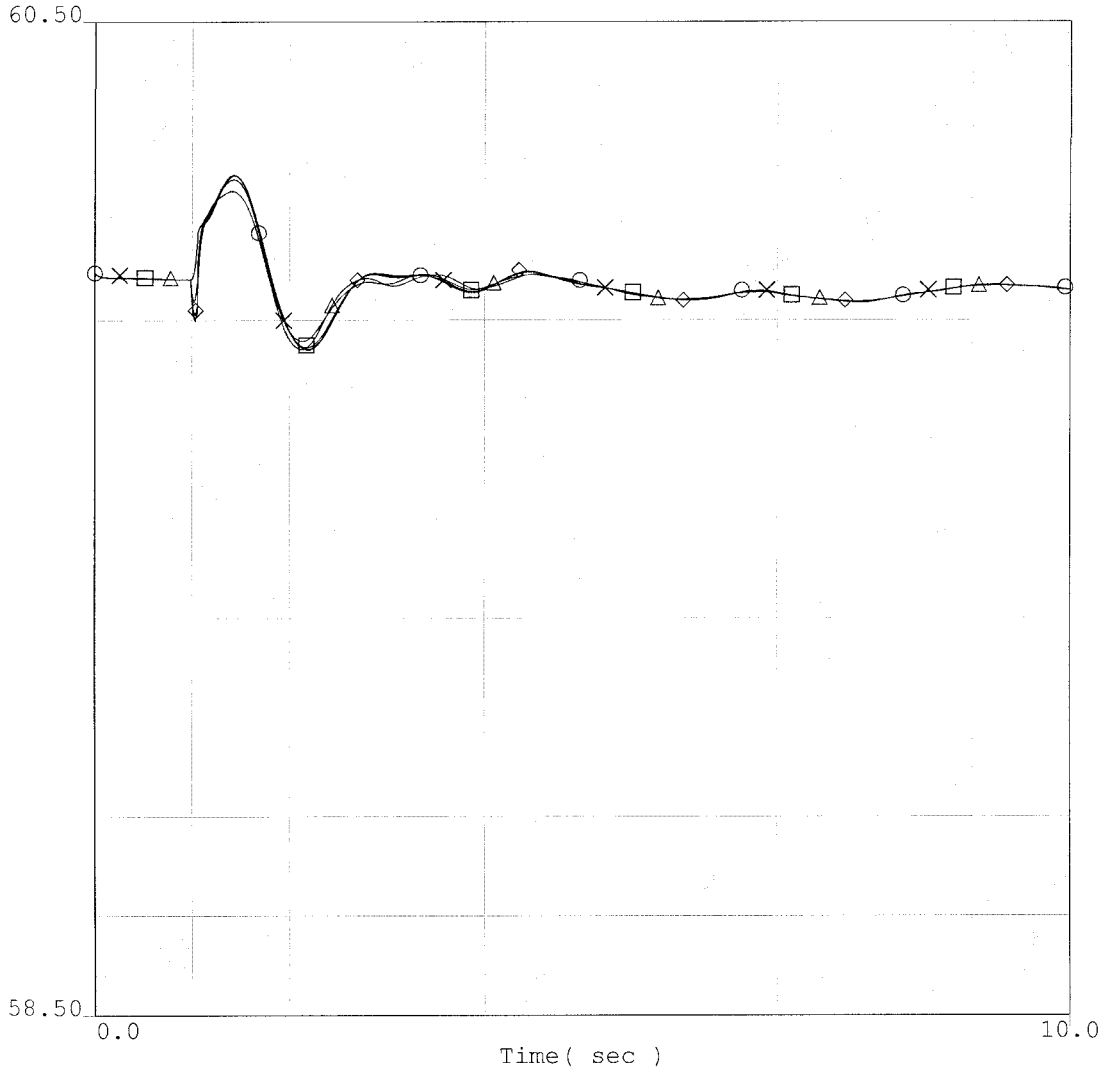
Frequencies:



58.5000 fbus	14003	NAVAJO 500.0	0	0.0	1	1	60.5000
58.5000 fbus	14005	WESTWING 500.0	0	0.0	1	1	60.5000
58.5000 fbus	14001	FOURCORN 500.0	0	0.0	1	1	60.5000
58.5000 fbus	14016	PNPKAPS 500.0	0	0.0	1	1	60.5000
58.5000 fbus	15021	PALOVRDE 500.0	0	0.0	1	1	60.5000

14HS-TS1:THREE PHASE NORMAL FAULT CLEARING ON PV-DEVERS 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

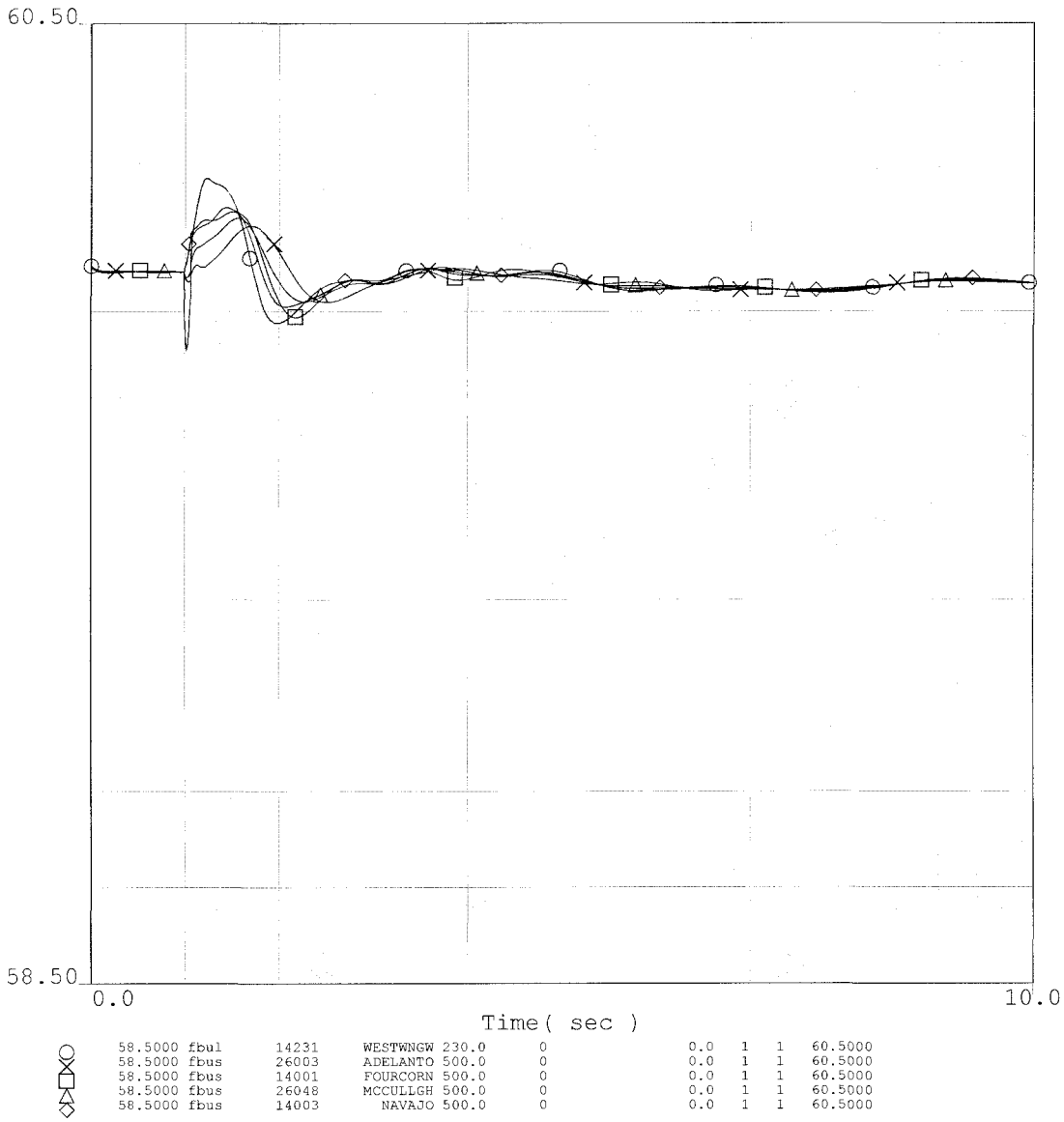
Frequencies:



58.5000	fbus	16000	TORTOLIT 500.0	0	0.0	1	1	60.5000
58.5000	fbus	16105	VAIL 345.0	0	0.0	1	1	60.5000
58.5000	fbus	16103	SOUTH 345.0	0	0.0	1	1	60.5000
58.5000	fbul	15001	CORONADO 500.0	0	0.0	1	1	60.5000
58.5000	fbus	16109	WINCHSTR 345.0	0	0.0	1	1	60.5000

14HS-TS1:THREE PHASE NORMAL FAULT CLEARING ON PV-DEVERS 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

Frequencies:



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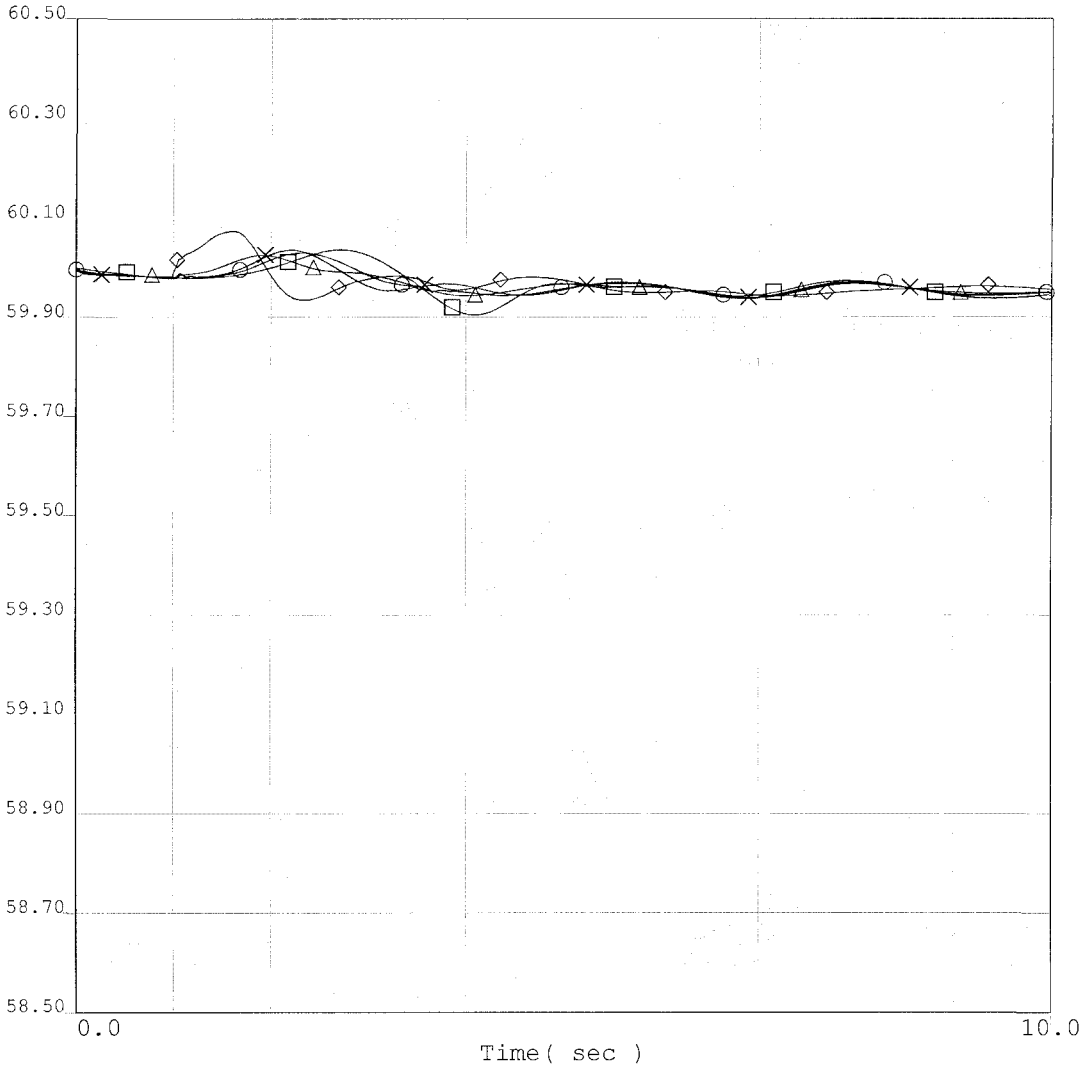
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

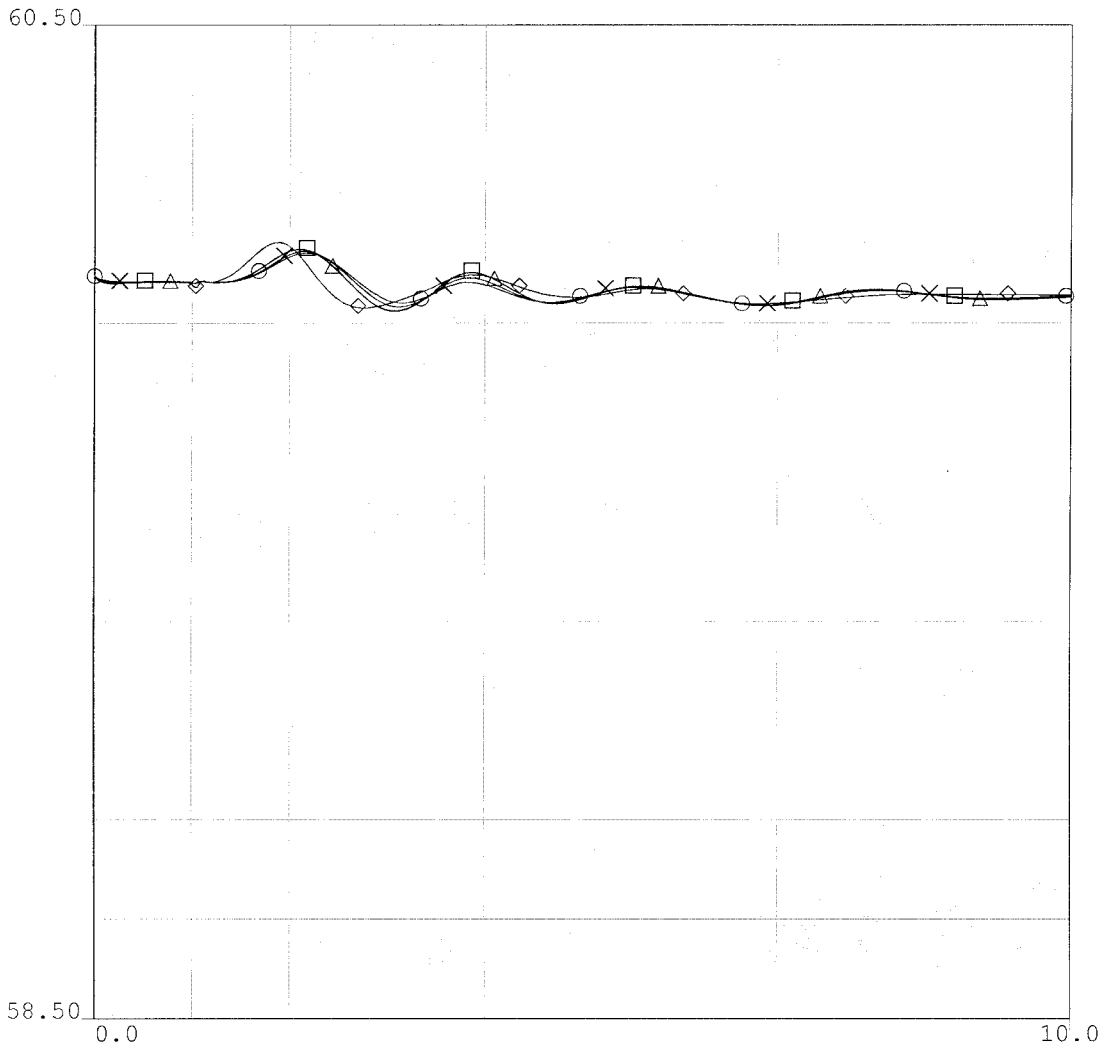
Frequencies:



58.5000 fbus	40489	GRIZZLY 500.0	0	0.0	1	1	60.5000
58.5000 fbus	40687	MALIN 500.0	0	0.0	1	1	60.5000
58.5000 fbus	40459	GARRISON 500.0	0	0.0	1	1	60.5000
58.5000 fbus	60235	MIDPOINT 345.0	0	0.0	1	1	60.5000
58.5000 fbus	66230	PINTO 138.0	0	0.0	1	1	60.5000

14HS-TS1:THREE PHASE NORMAL FAULT CLEARING ON PV-DEVERS 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

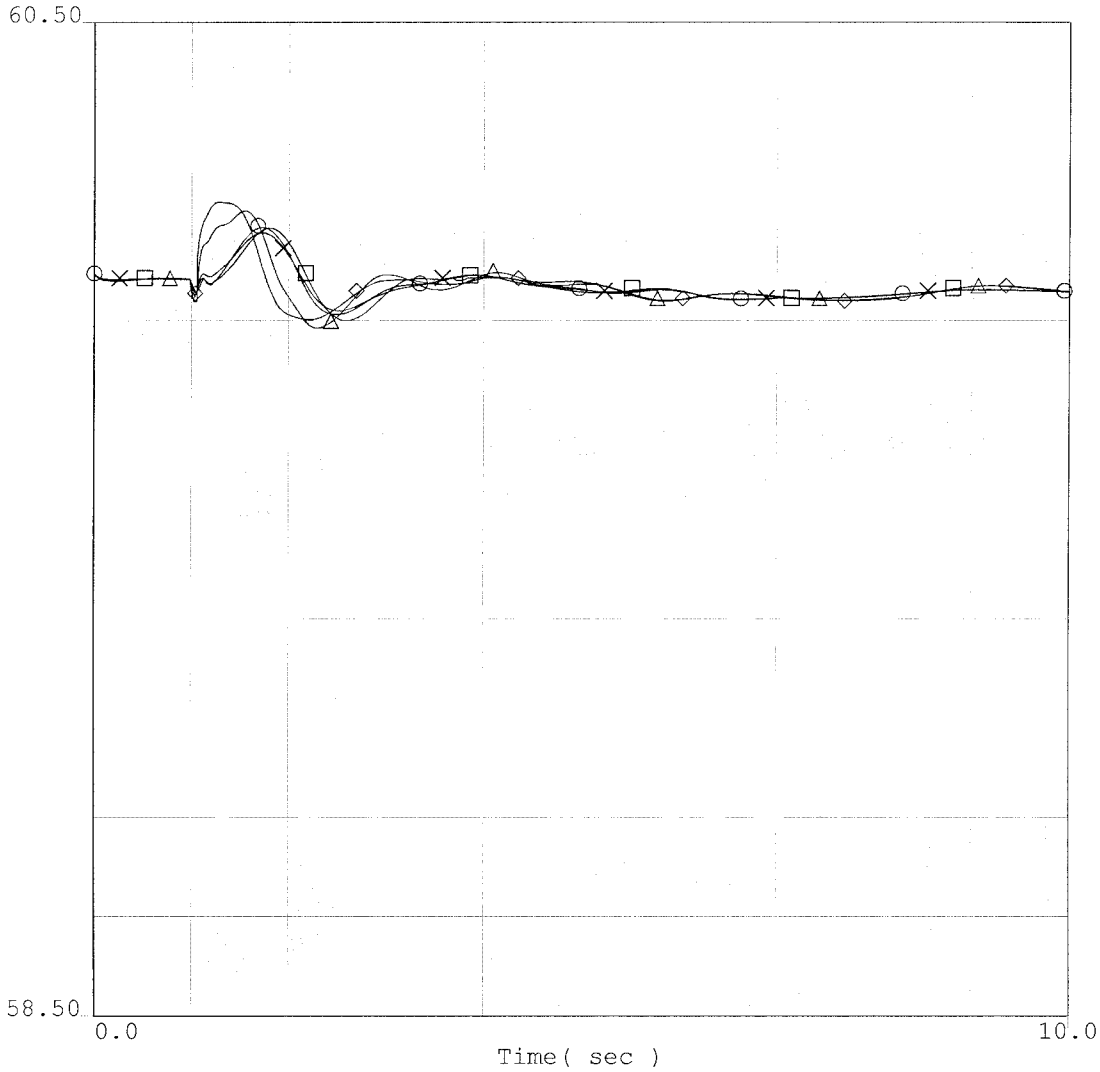
Frequencies:



○	58.5000 fbus	30005	ROUND MT 500.0	0	0.0	1	1	60.5000
⊗	58.5000 fbus	30015	TABLE MT 500.0	0	0.0	1	1	60.5000
□	58.5000 fbus	30035	TRACY 500.0	0	0.0	1	1	60.5000
△	58.5000 fbus	30040	TESLA 500.0	0	0.0	1	1	60.5000
◇	58.5000 fbus	30060	MIDWAY 500.0	0	0.0	1	1	60.5000

14HS-TS1:THREE PHASE NORMAL FAULT CLEARING ON PV-DEVERS 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

Frequencies:



58.5000 fbus	24801	DEVERS 500.0	0	0.0	1	1	60.5000
58.5000 fbus	24086	LUGO 500.0	0	0.0	1	1	60.5000
58.5000 fbus	26094	SYLMARLA 230.0	0	0.0	1	1	60.5000
58.5000 fbus	22468	MIGUEL 500.0	0	0.0	1	1	60.5000
58.5000 fbus	22536	N.GILA 500.0	0	0.0	1	1	60.5000

14HS-TS1:THREE PHASE NORMAL FAULT CLEARING ON PV-DEVERS 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

HIGHEST VOLTAGE DIP

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct	@time
14	RUDD	69	vbul	1	0.893	10.7	1.504
22	N.GILA	500	vbus	1.036	0.89	14.1	1.504
22	CARLTNHS	138	vbug	0.966	0.906	6.2	1.504

LOWEST FREQUENCY

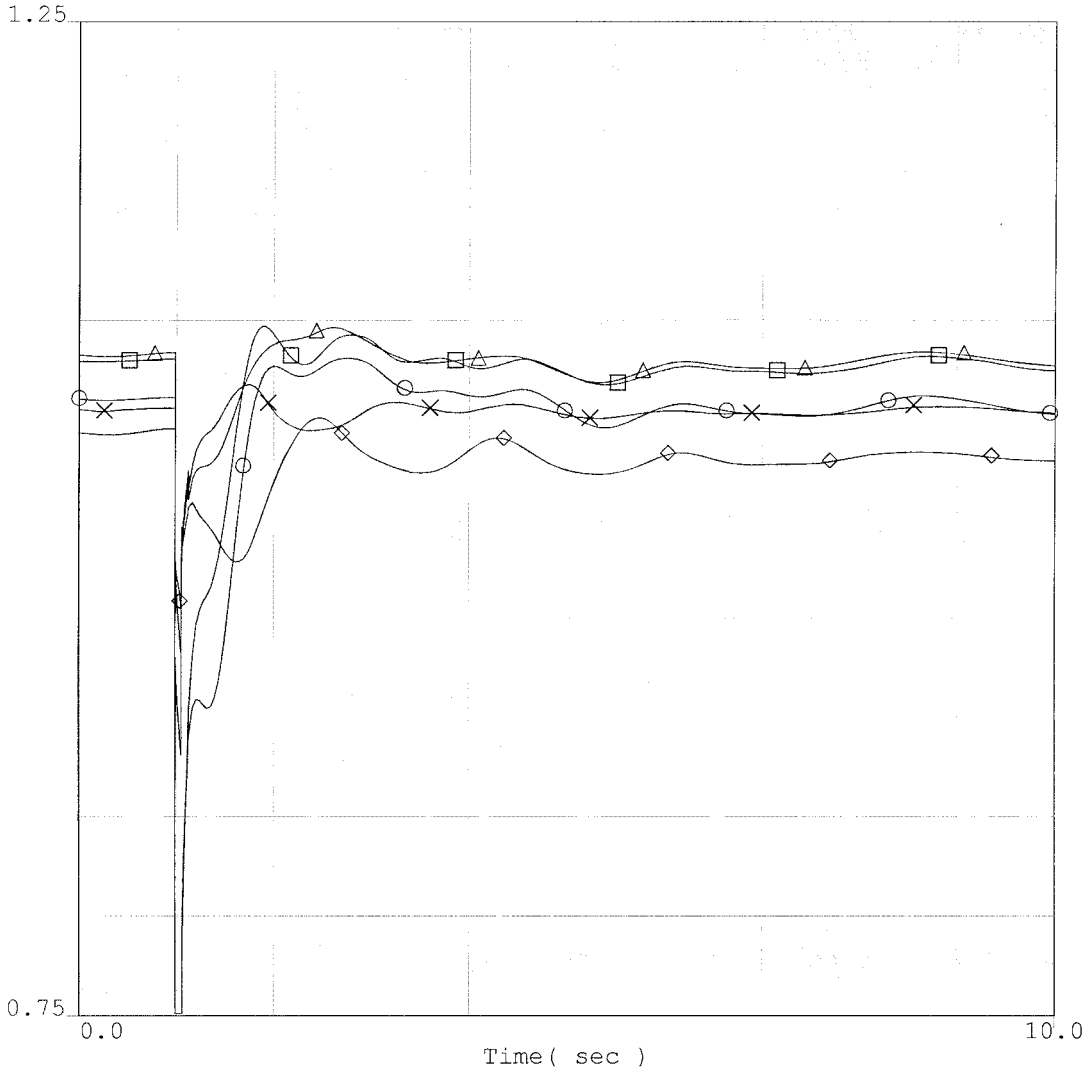
AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
14	WHITETNK	69	fbul	59.492	1.046
14	Q1COL1	34.5	fbus	58.585	1.046
14	WPHX GT1	13.8	fbug	59.739	2.079

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

There were 0 violations of MORC criteria 1 (25% Voltage Dip) !
There were 0 violations of MORC criteria 2 (20% Voltage Dip for 20 Cycles)!
There were 0 violations of MORC criteria 3 (59.6 HZ for 6 Cycles)!

ARIZONA_voltages:



○	0.7500	vbus	15021	PALOVRDE 500.0	0	0.0	1	1	1.2500
×	0.7500	vbus	14001	FOURCORN 500.0	0	0.0	1	1	1.2500
□	0.7500	vbus	15011	KYRENE 500.0	0	0.0	1	1	1.2500
△	0.7500	vbus	14003	NAVAJO 500.0	0	0.0	1	1	1.2500
◇	0.7500	vbus	26003	ADELANTO 500.0	0	0.0	1	1	1.2500

14HS-TS2:THREE PHASE NORMAL FAULT CLEARING ON HAA-N.GILA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

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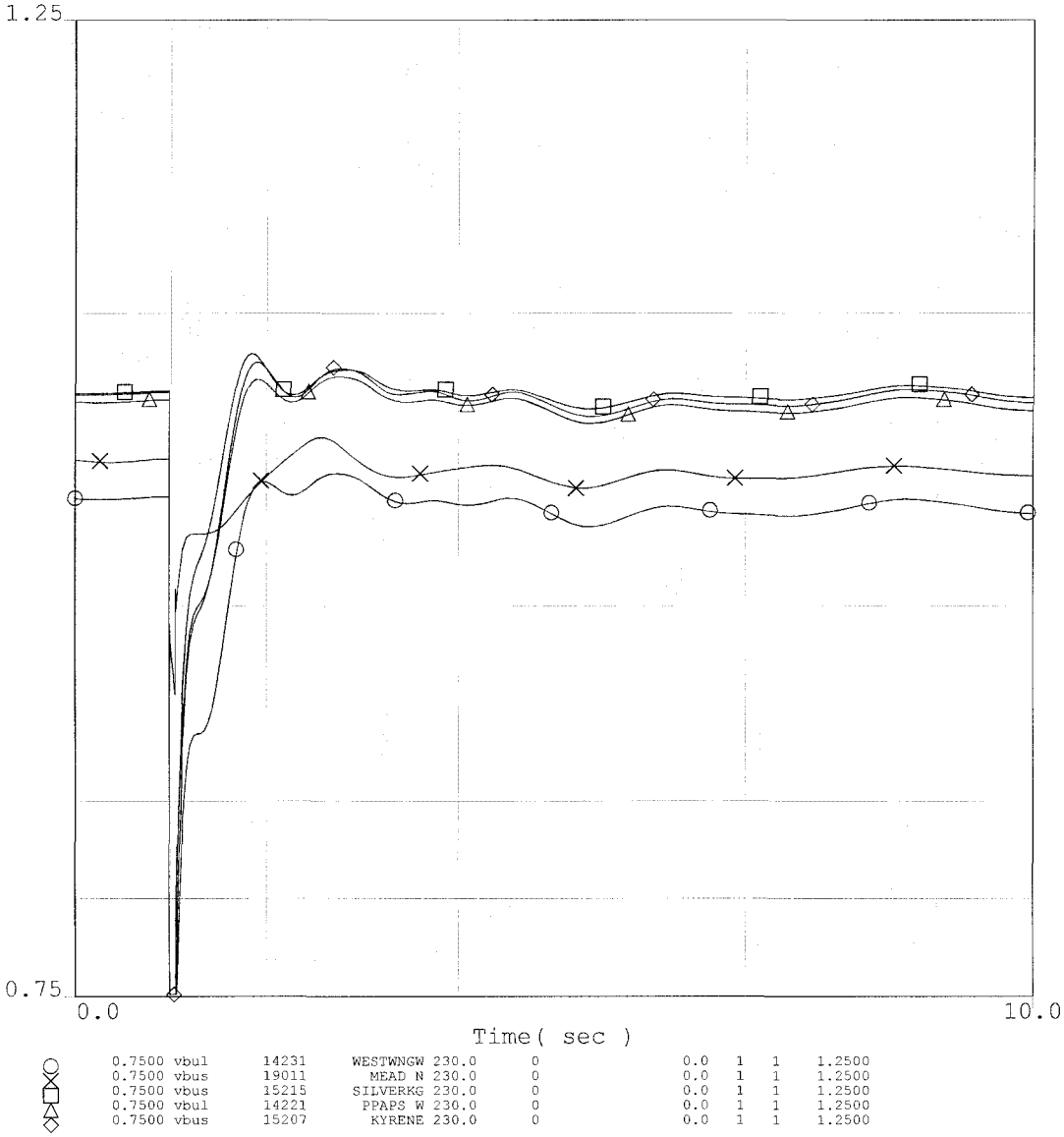

14HS-TS2:THREE PHASE NORMAL FAULT CLEARING ON HAA-N.GILA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

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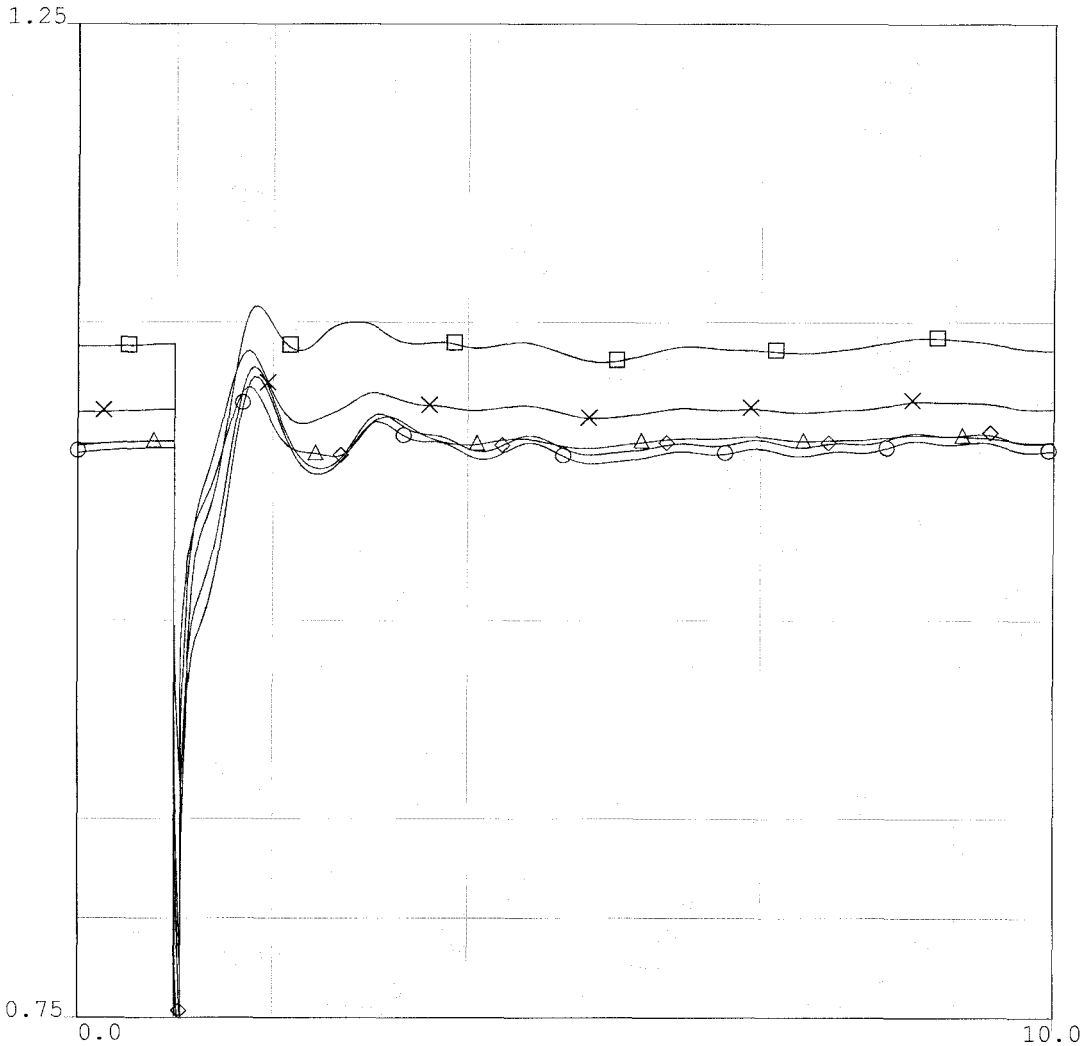

○	0.7500 vbus	16103	SOUTH 345.0	0	0.0	1	1	1.2500
⊠	0.7500 vbus	14000	CHOLLA 500.0	0	0.0	1	1	1.2500
□	0.7500 vbus	15041	SILVERKG 500.0	0	0.0	1	1	1.2500
△	0.7500 vbus	16104	SPRINGR 345.0	0	0.0	1	1	1.2500
◇	0.7500 vbus	16109	WINCHSTR 345.0	0	0.0	1	1	1.2500

14HS-TS2:THREE PHASE NORMAL FAULT CLEARING ON HAA-N.GILA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

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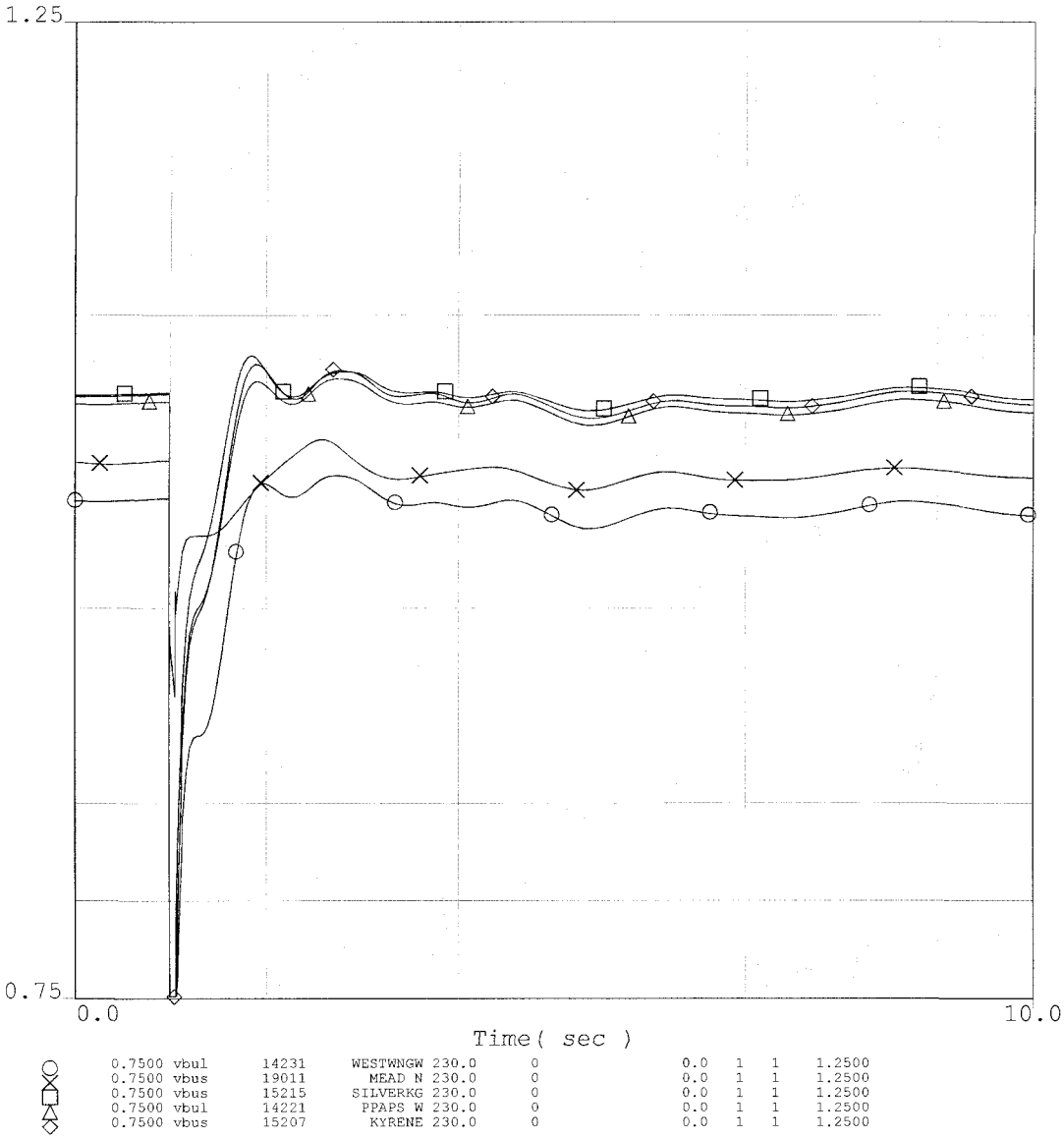

14HS-TS2:THREE PHASE NORMAL FAULT CLEARING ON HAA-N.GILA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

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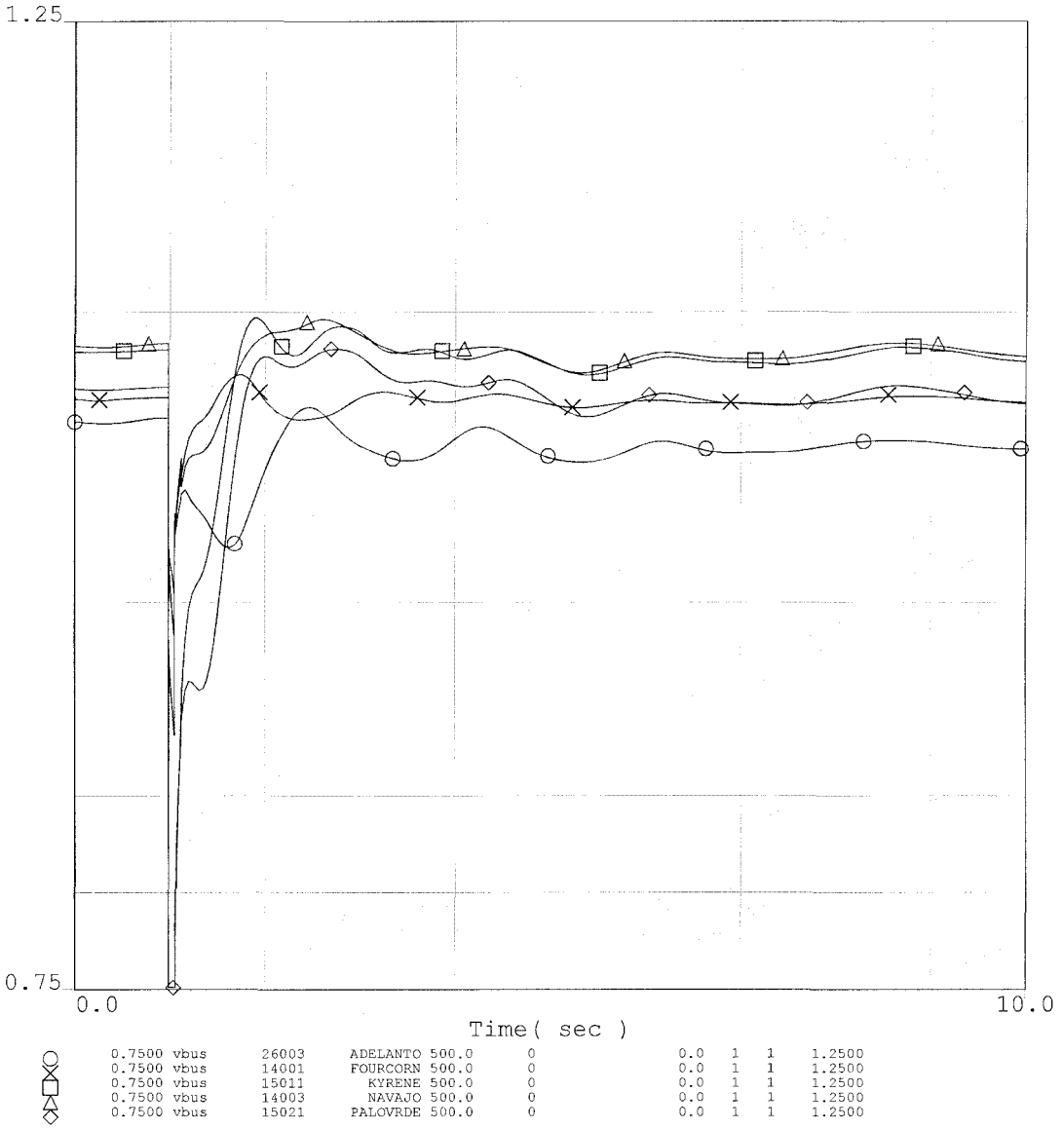
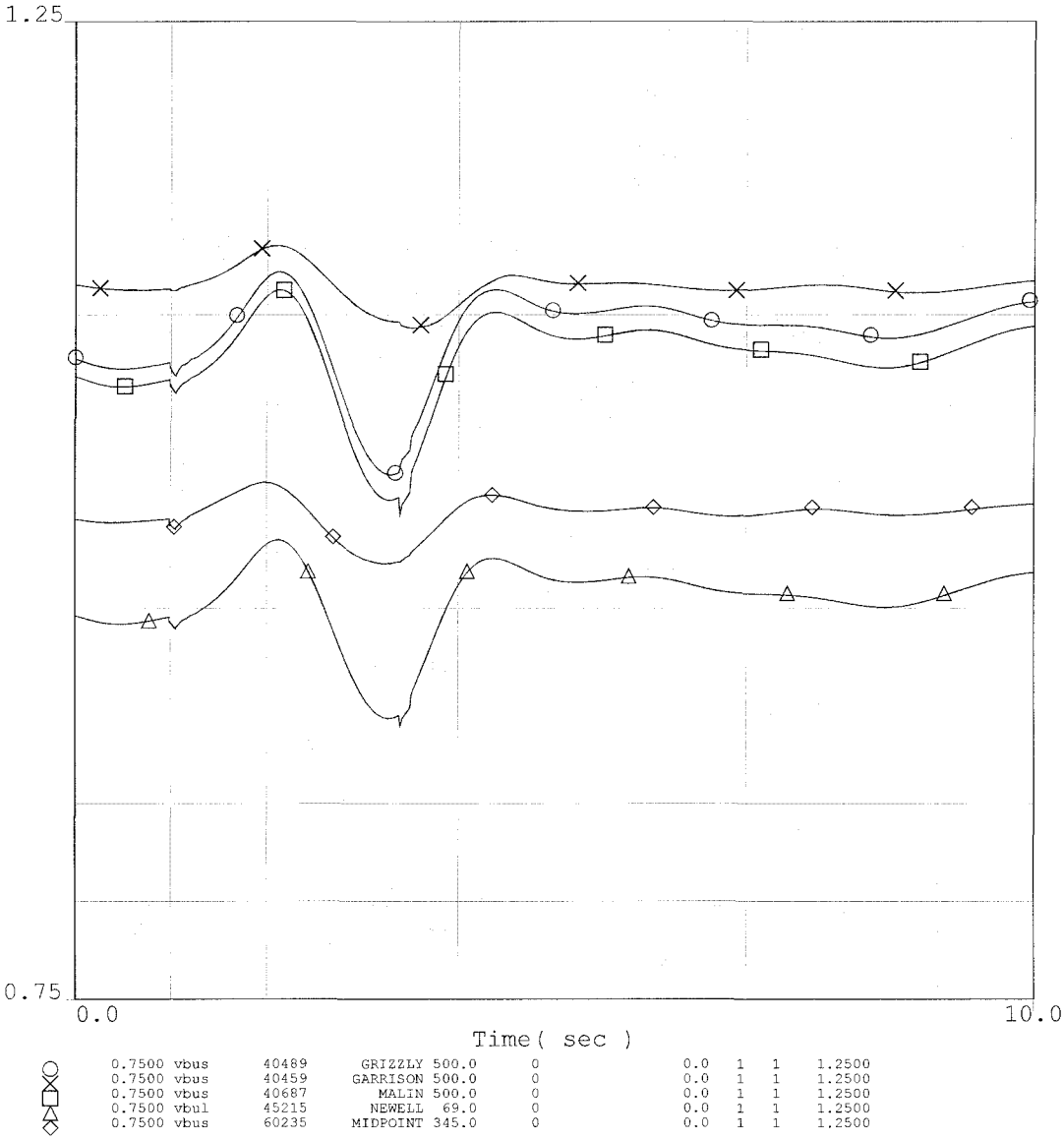


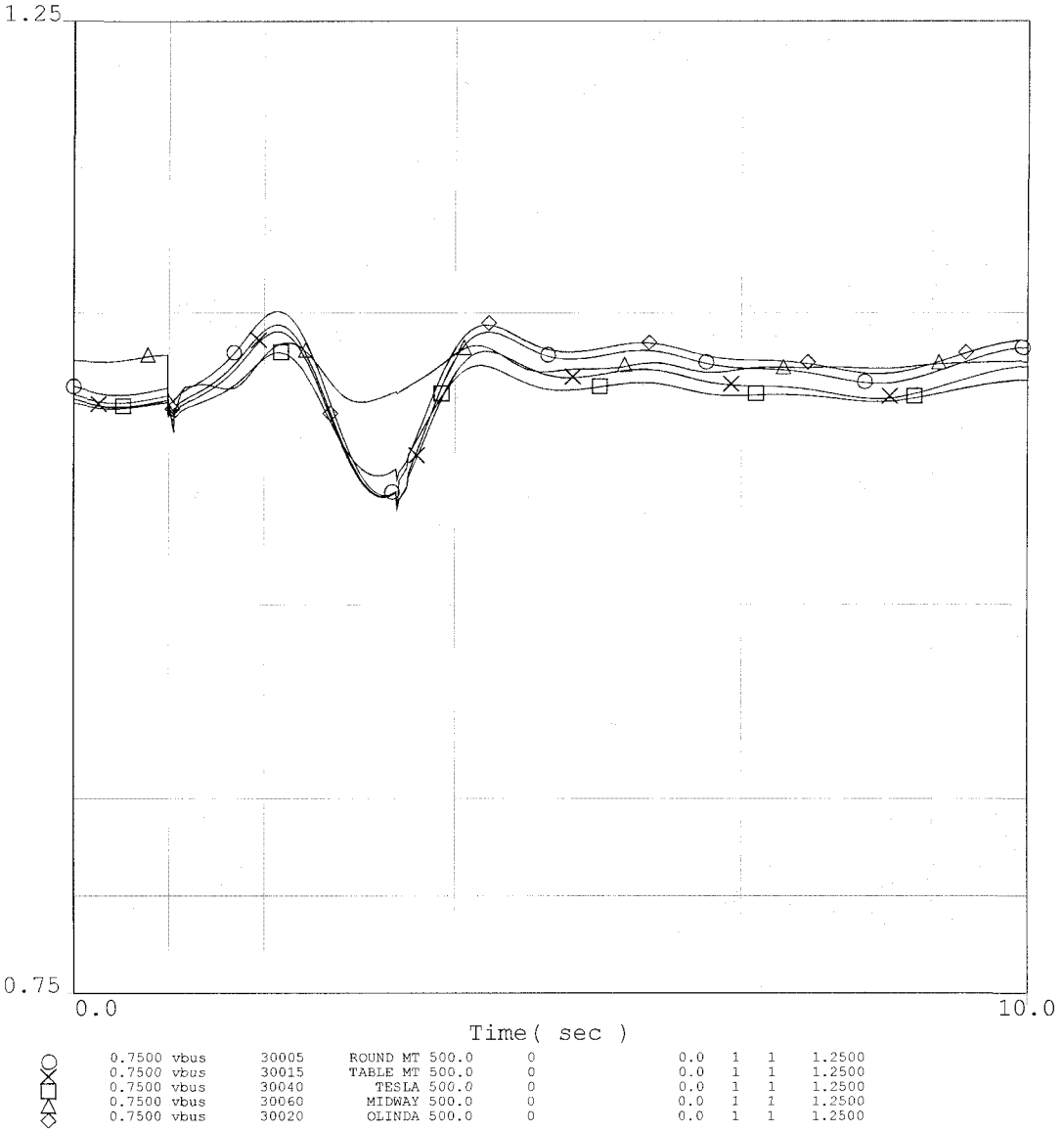
14HS-TS2:THREE PHASE NORMAL FAULT CLEARING ON HAA-N.GILA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

NORTHWEST_voltages:



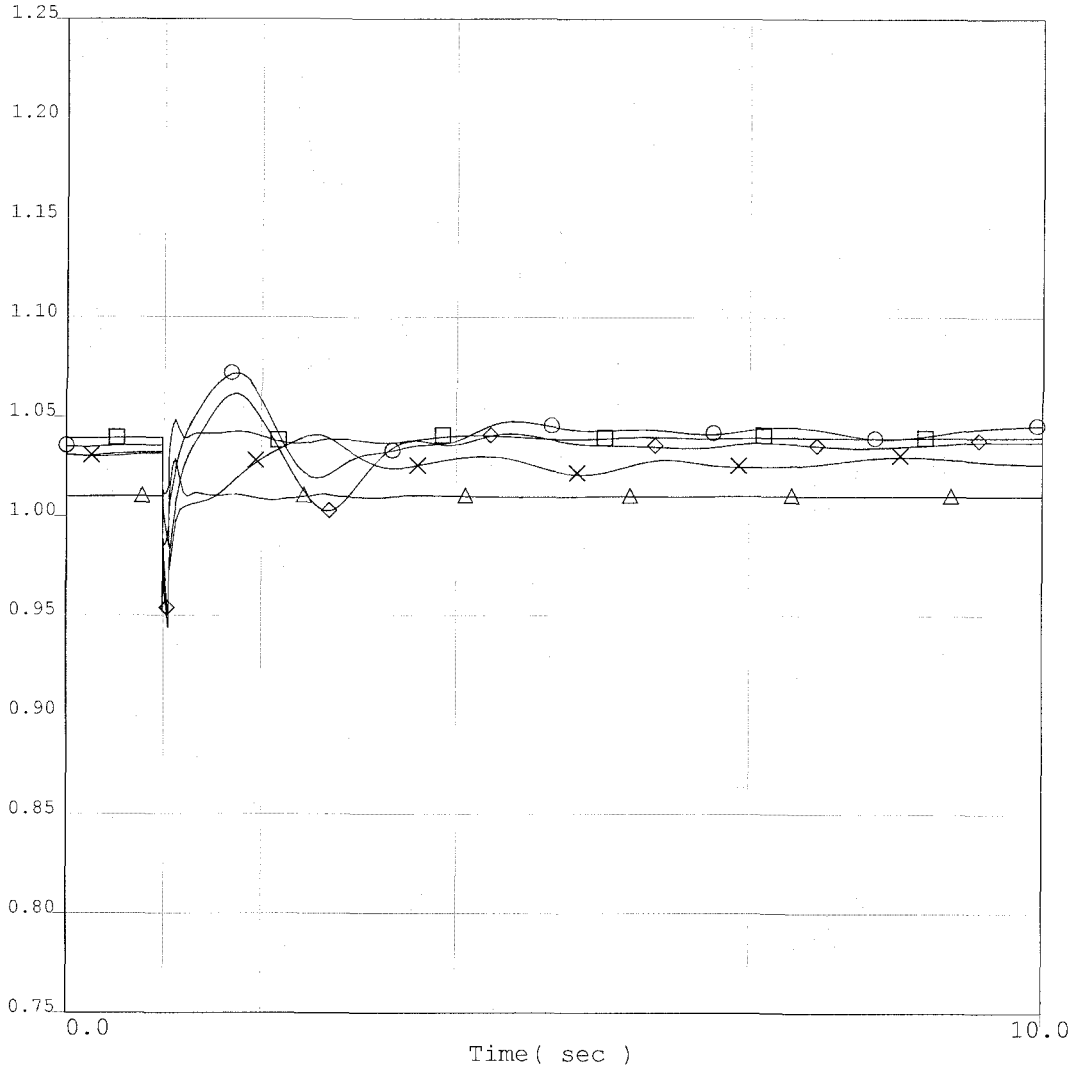
14HS-TS2:THREE PHASE NORMAL FAULT CLEARING ON HAA-N.GILA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

CALIFORNIA_voltages:



14HS-TS2:THREE PHASE NORMAL FAULT CLEARING ON HAA-N.GILA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

UTAH_voltages:



0.7500 vbus	66230	PINTO 138.0	0	0.0	1	1	1.2500
0.7500 vbus	18019	H ALLEN 230.0	0	0.0	1	1	1.2500
0.7500 vbus	66280	REDBUTTE 345.0	0	0.0	1	1	1.2500
0.7500 vbus	66420	SGSY 138.0	0	0.0	1	1	1.2500
0.7500 vbus	79023	DURANGO 115.0	0	0.0	1	1	1.2500

14HS-TS2:THREE PHASE NORMAL FAULT CLEARING ON HAA-N.GILA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

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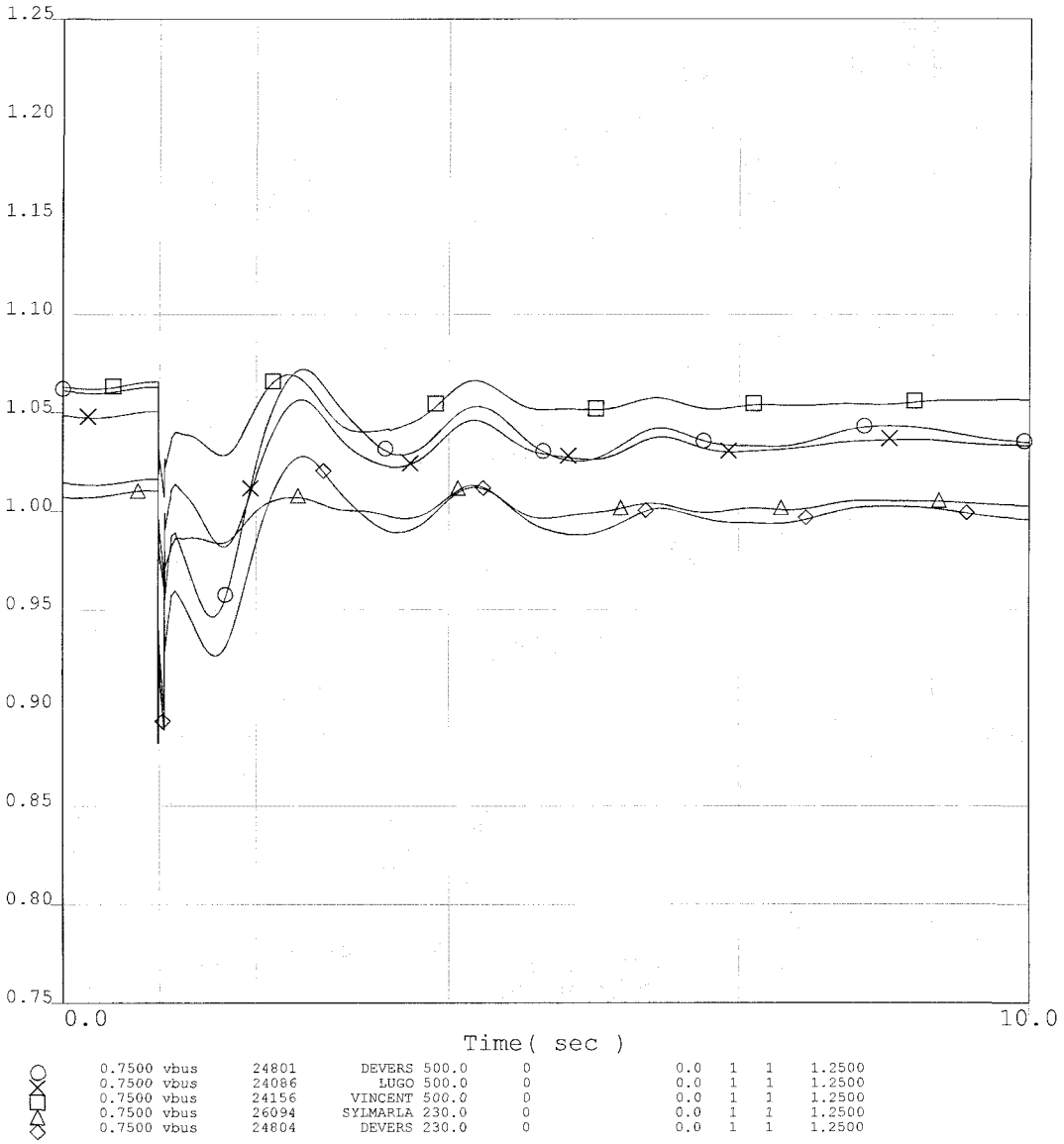
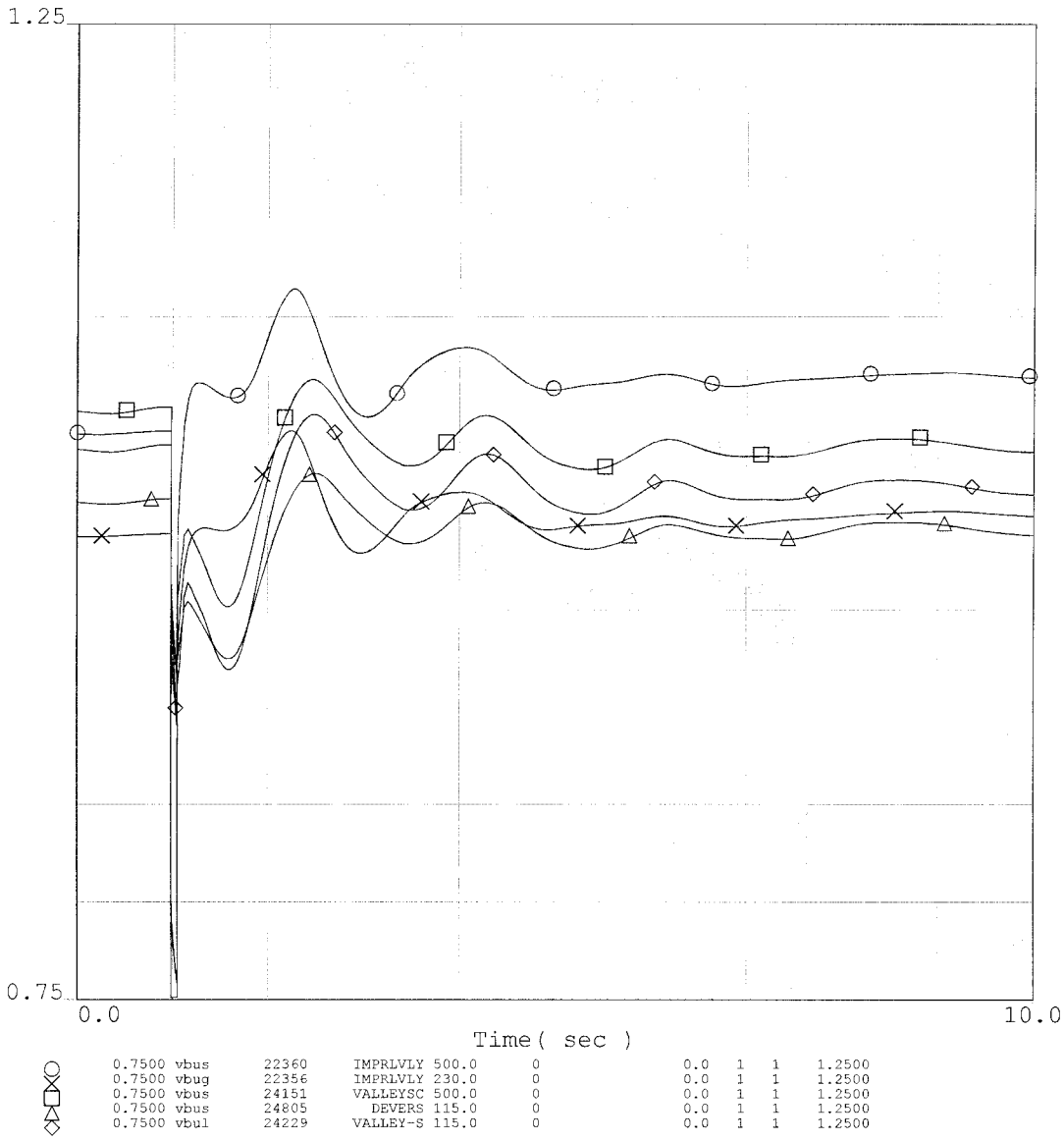


14HS-TS2:THREE PHASE NORMAL FAULT CLEARING ON HAA-N.GILA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

CALIFORNIA_voltages:



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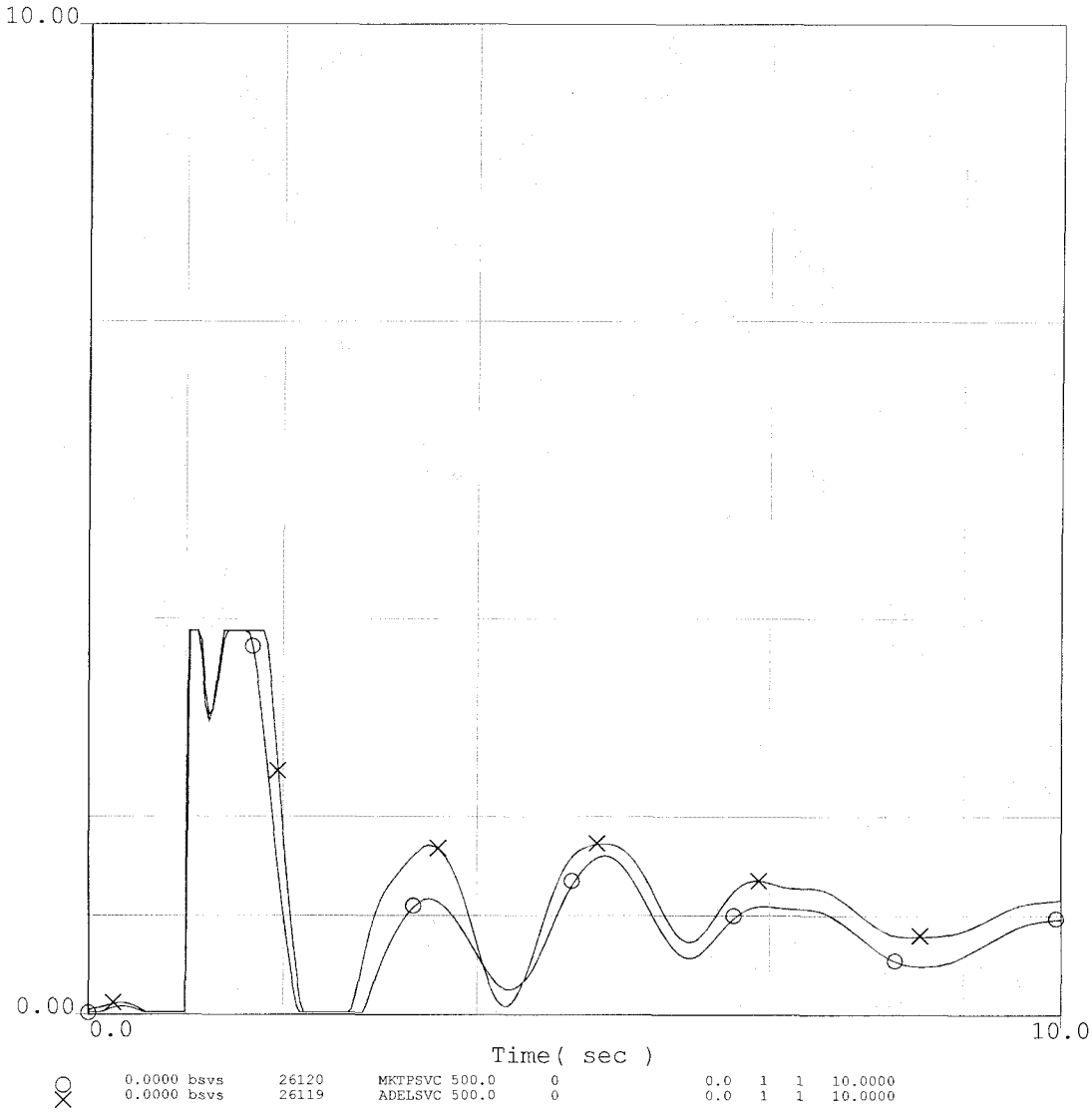
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

SVC_output



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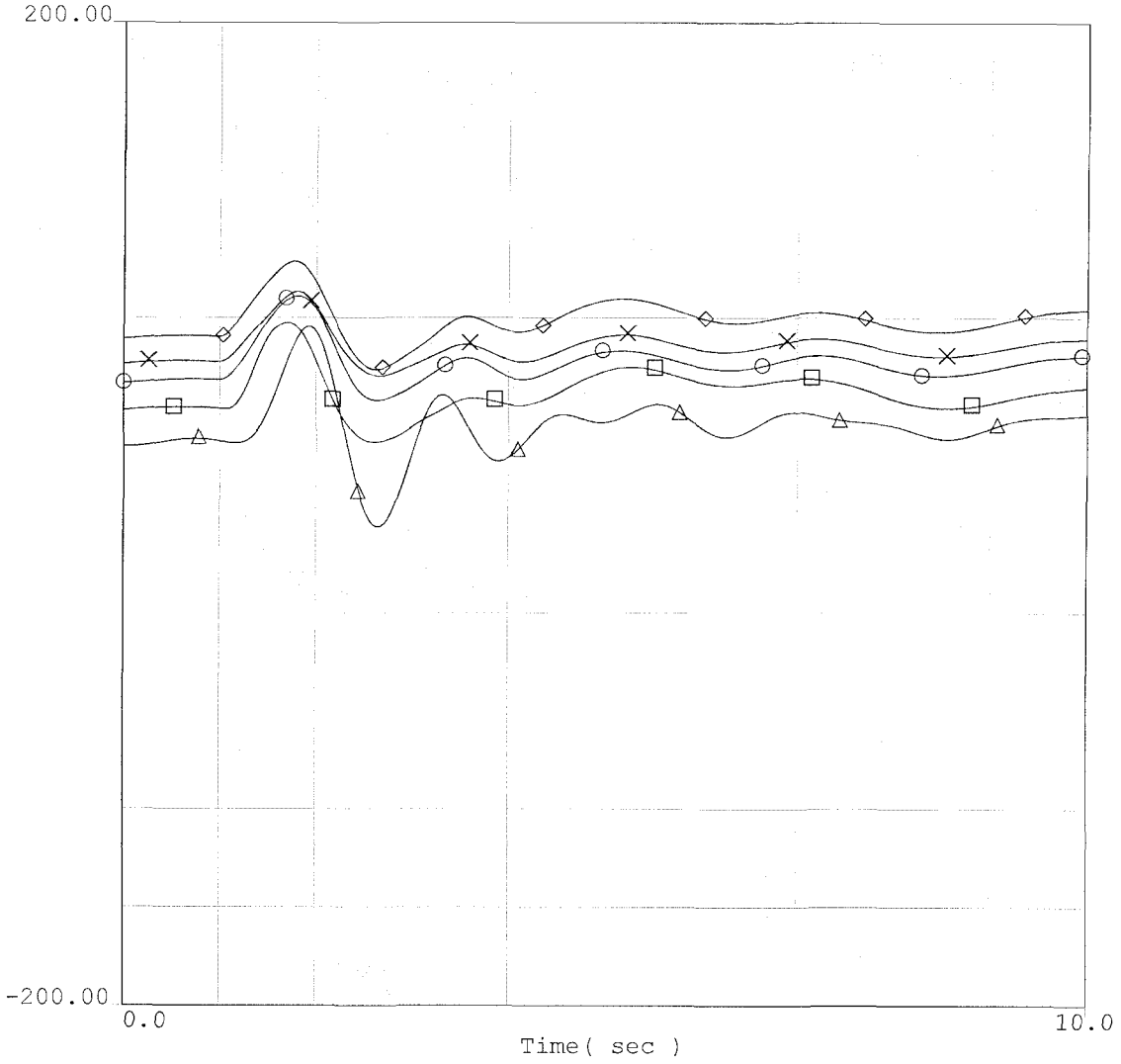
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

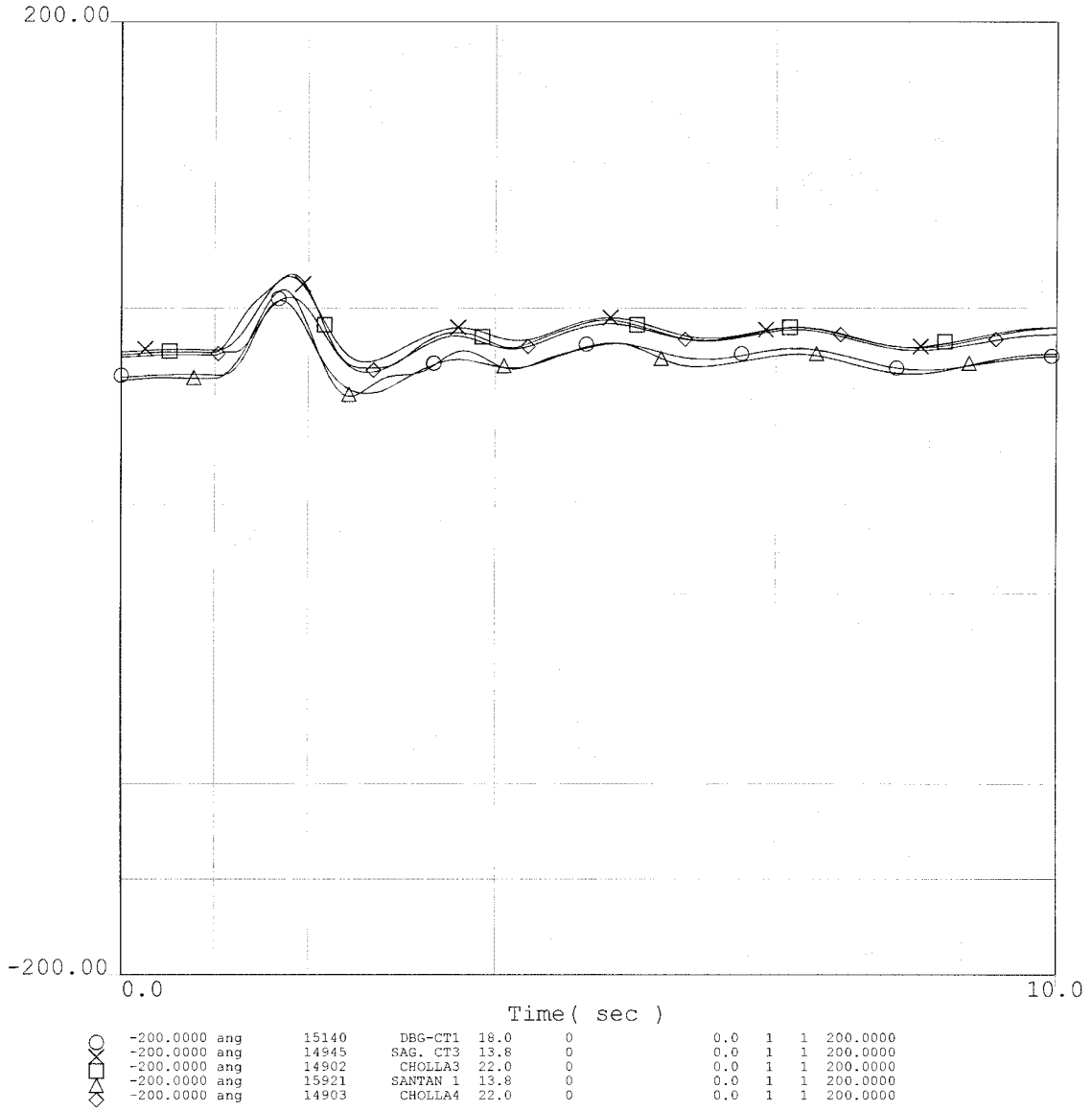
SYSTEM_Rotorangles



-200.0000 ang	16500	SPR GEN1	19.0	0	0.0	1	1	200.0000
-200.0000 ang	10321	SJUAN_G4	22.0	0	0.0	1	1	200.0000
-200.0000 ang	14942	SAGUARO2	15.5	0	0.0	1	1	200.0000
-200.0000 ang	17024	APACHCT1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	16518	SPR GEN3	21.0	0	0.0	1	1	200.0000

14HS-TS2:THREE PHASE NORMAL FAULT CLEARING ON HAA-N.GILA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

SYSTEM_Rotorangles



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SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
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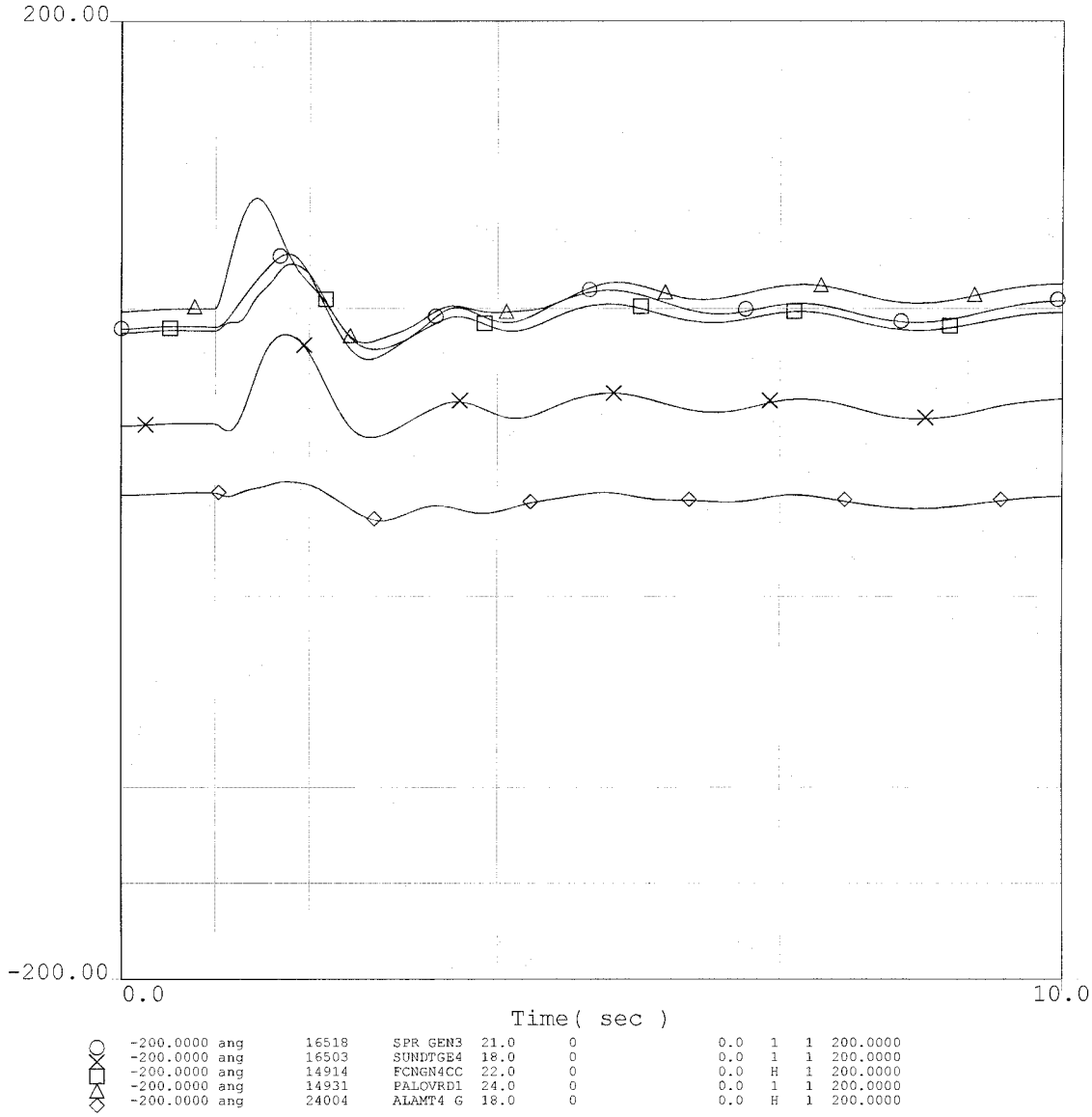
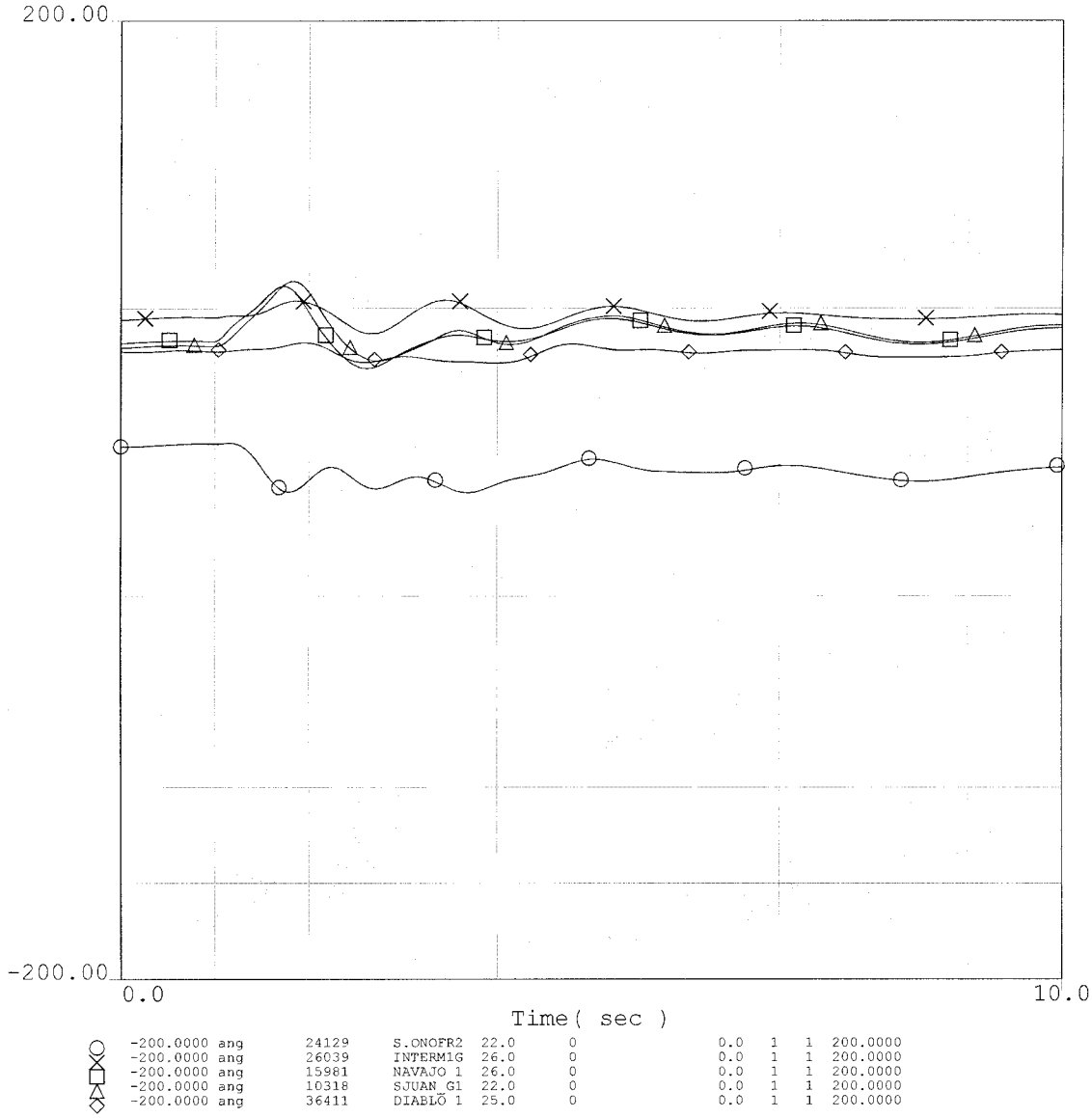
SYSTEM_Rotorangles



14HS-TS2:THREE PHASE NORMAL FAULT CLEARING ON HAA-N.GILA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

SYSTEM_Rotorangles



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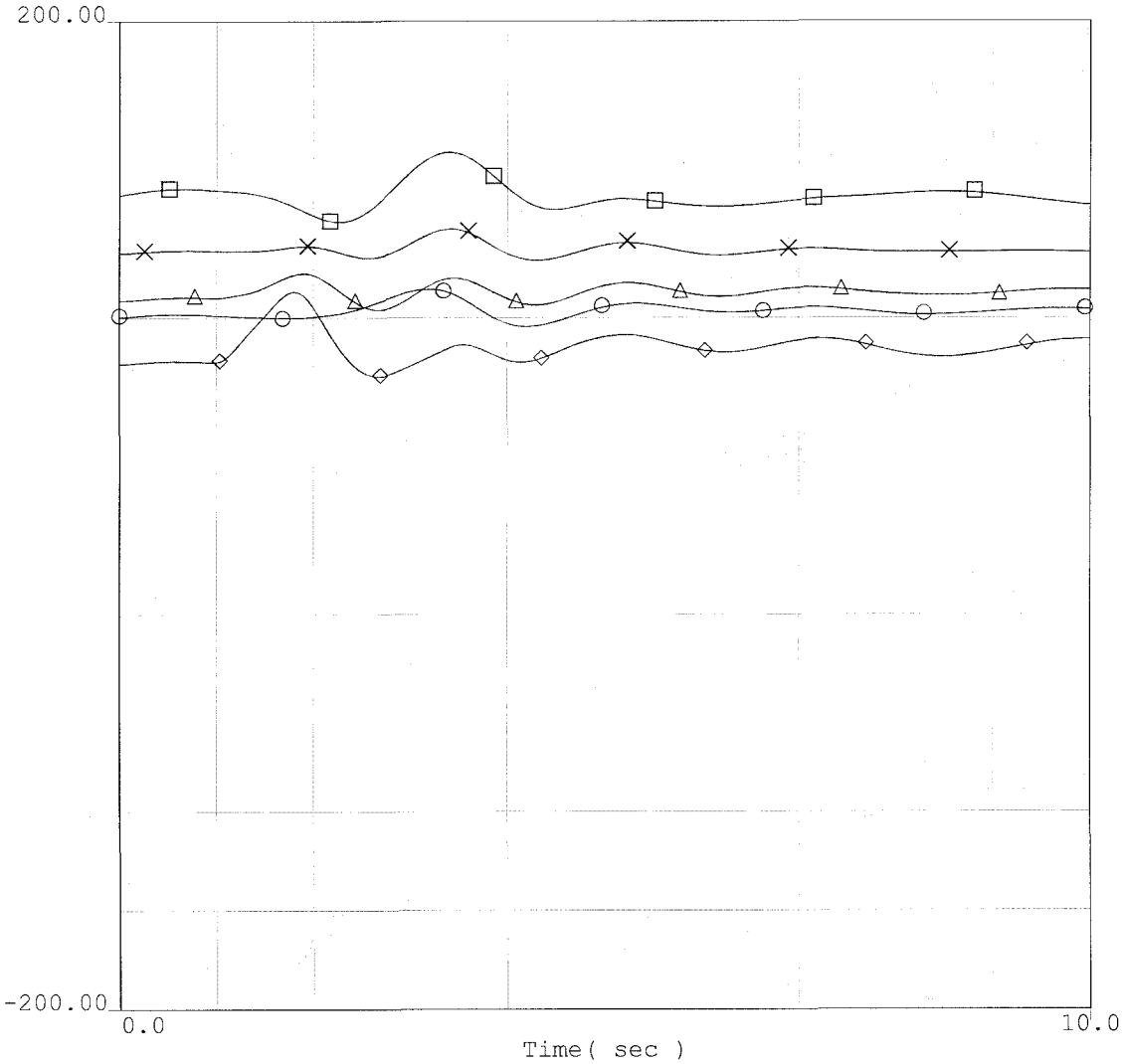
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

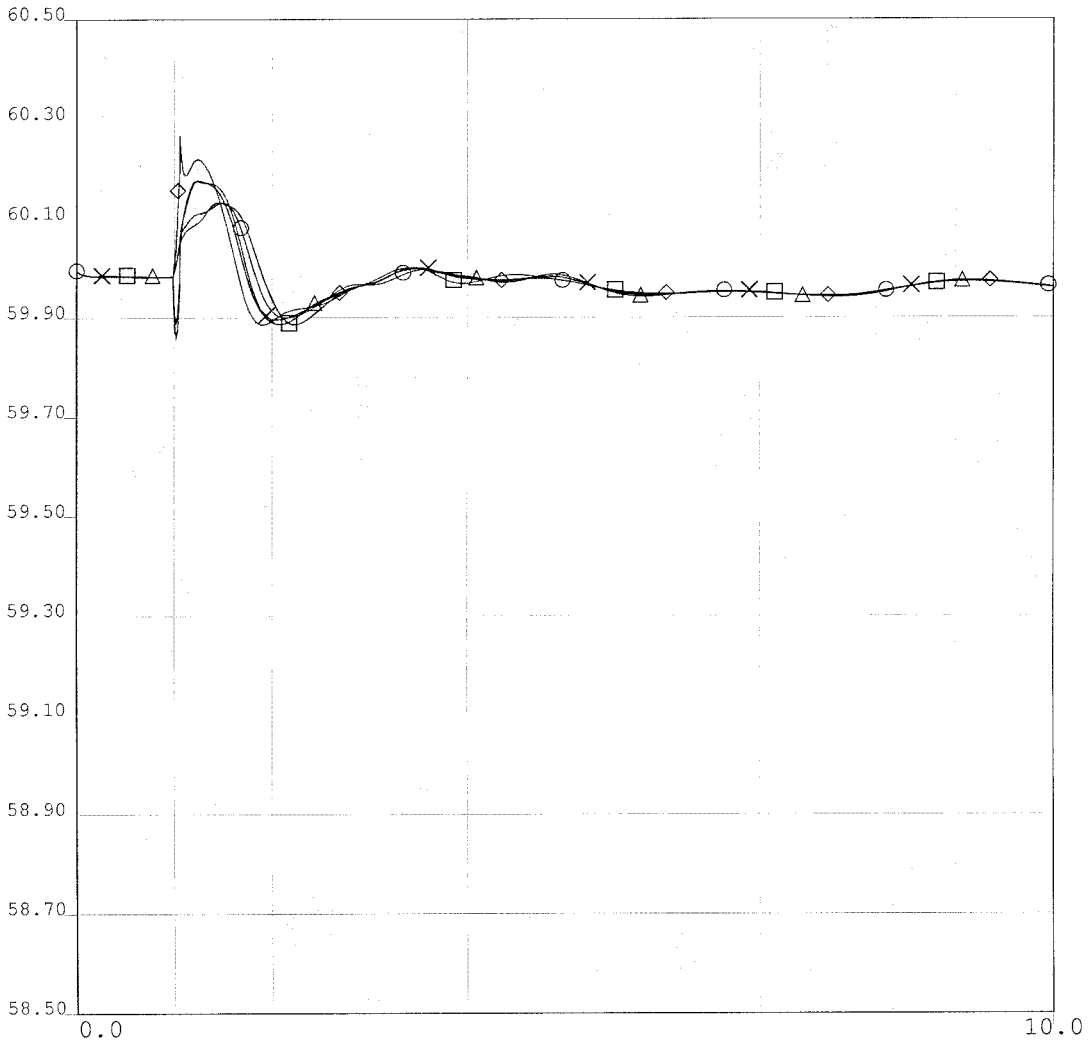
SYSTEM_Rotorangles



-200.0000 ang	73129	MBPP-1	24.0	0	0.0	1	1	200.0000
-200.0000 ang	60086	BRIDGER1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	62050	COLSTP 1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	65500	EHUNTR 3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	10321	SJUAN_G4	22.0	0	0.0	1	1	200.0000

14HS-TS2:THREE PHASE NORMAL FAULT CLEARING ON HAA-N.GILA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

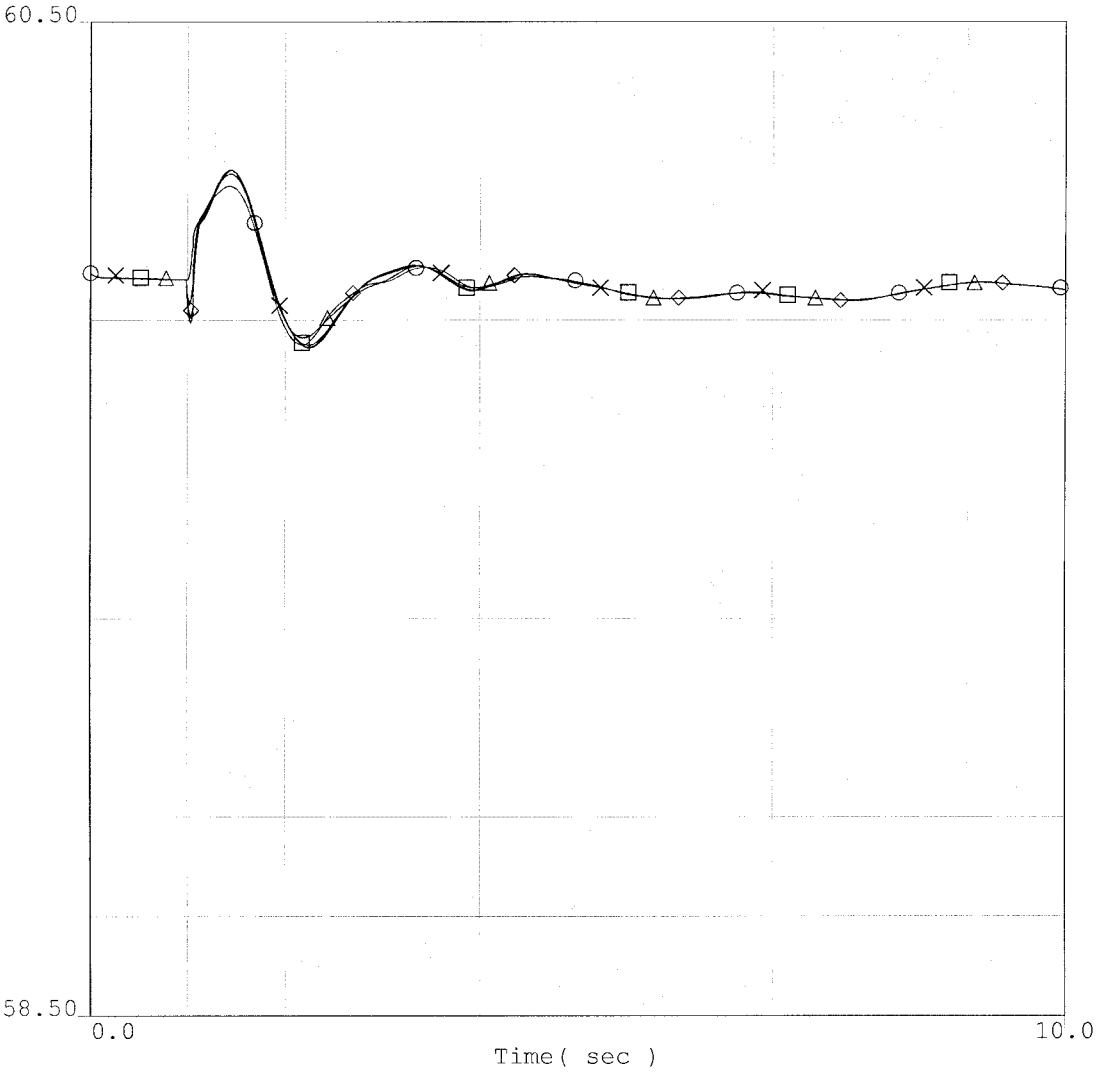
Frequencies:



58.5000	fbus	14003	NAVAJO 500.0	0	0.0	1	1	60.5000
58.5000	fbus	14005	WESTWING 500.0	0	0.0	1	1	60.5000
58.5000	fbus	14001	FOURCORN 500.0	0	0.0	1	1	60.5000
58.5000	fbus	14016	PNPKAPS 500.0	0	0.0	1	1	60.5000
58.5000	fbus	15021	PALOVRDE 500.0	0	0.0	1	1	60.5000

14HS-TS2:THREE PHASE NORMAL FAULT CLEARING ON HAA-N.GILA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

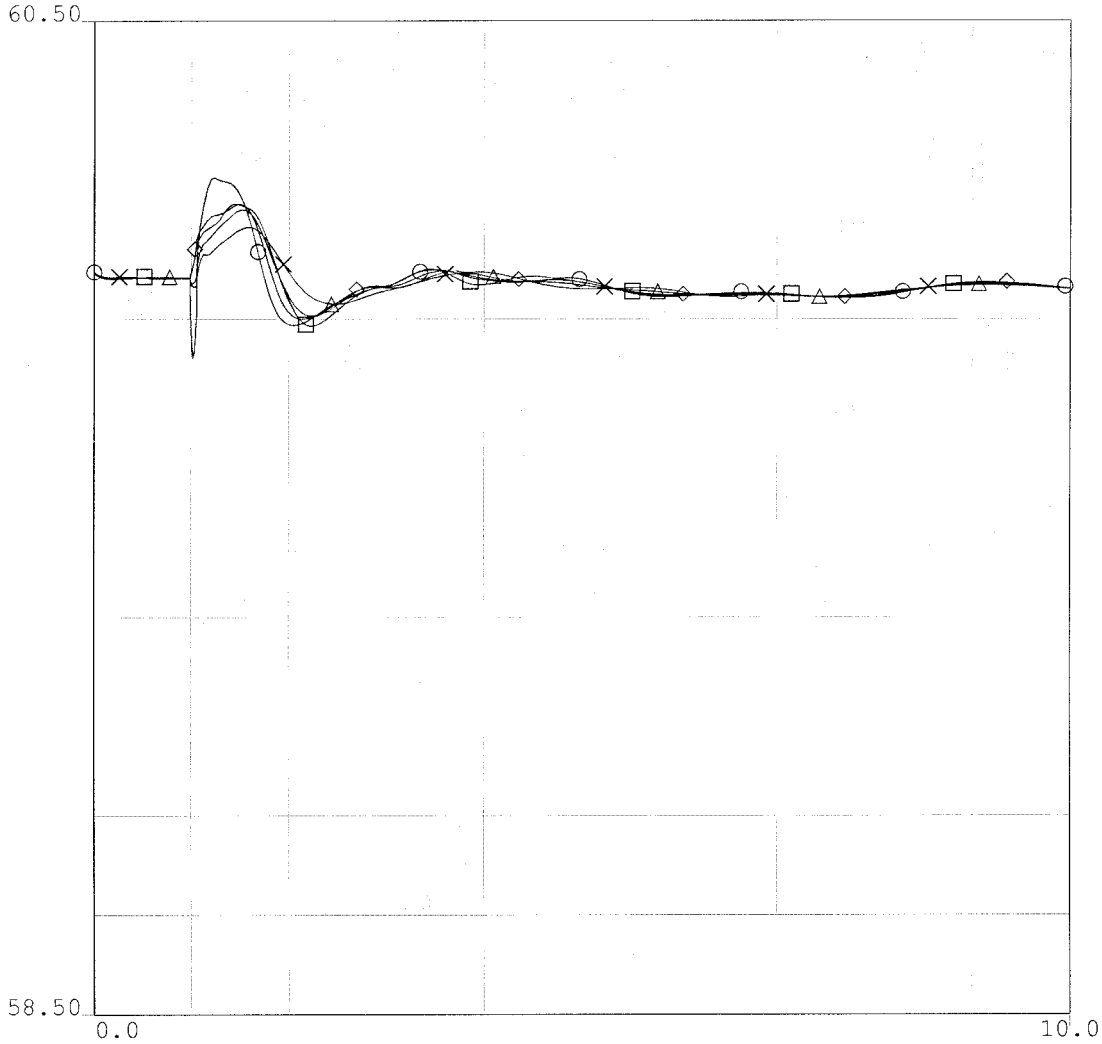
Frequencies:



58.5000	fbus	16000	TORTOLIT 500.0	0	0.0	1	1	60.5000
58.5000	fbus	16105	VAIL 345.0	0	0.0	1	1	60.5000
58.5000	fbus	16103	SOUTH 345.0	0	0.0	1	1	60.5000
58.5000	fbul	15001	CORONADO 500.0	0	0.0	1	1	60.5000
58.5000	fbus	16109	WINCHSTR 345.0	0	0.0	1	1	60.5000

14HS-TS2:THREE PHASE NORMAL FAULT CLEARING ON HAA-N.GILA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

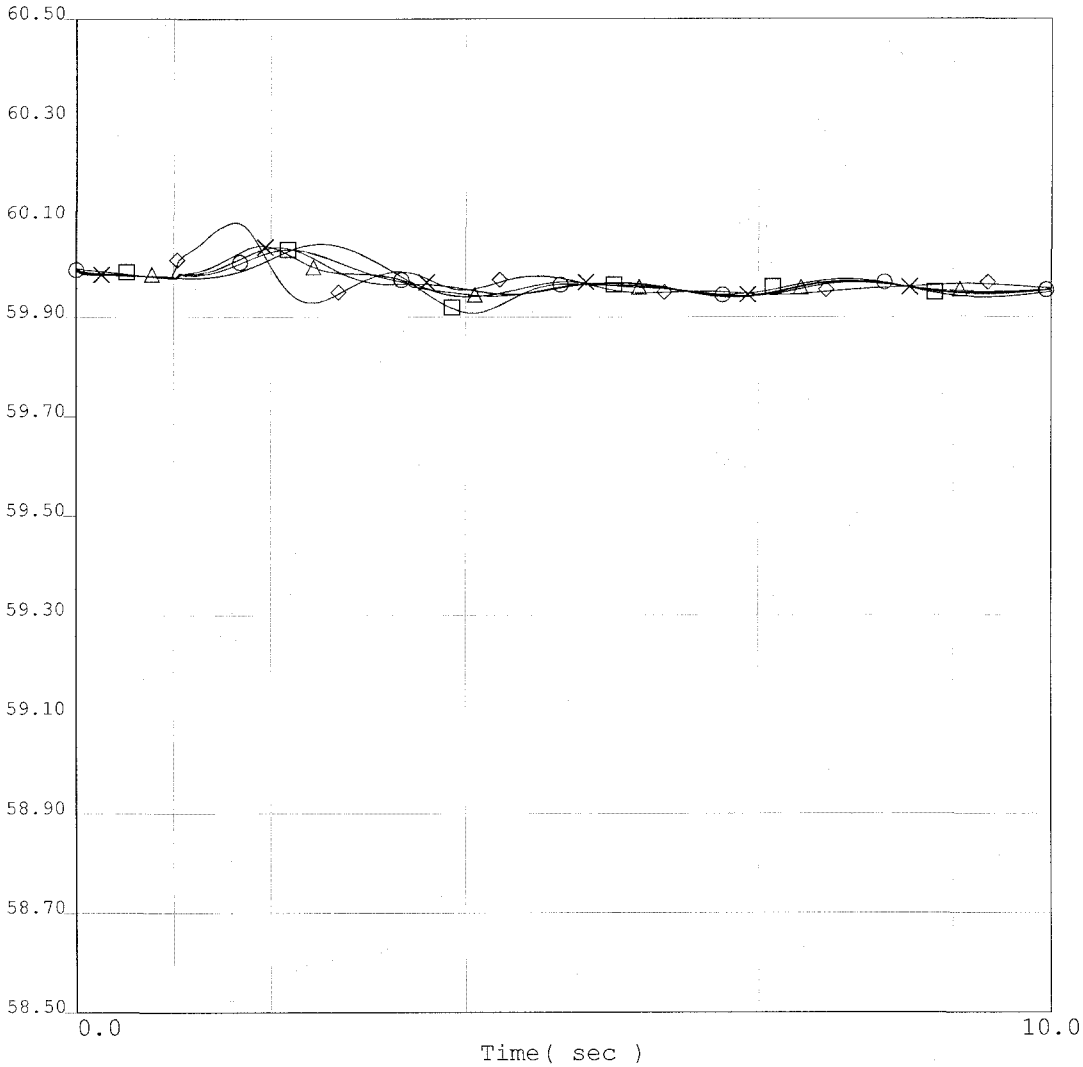
Frequencies:



○	58.5000	fbul	14231	WESTWNGW 230.0	0	0.0	1	1	60.5000
⊠	58.5000	fbus	26003	ADELANTO 500.0	0	0.0	1	1	60.5000
□	58.5000	fbus	14001	FOURCORN 500.0	0	0.0	1	1	60.5000
△	58.5000	fbus	26048	MCCULLGH 500.0	0	0.0	1	1	60.5000
◇	58.5000	fbus	14003	NAVAJO 500.0	0	0.0	1	1	60.5000

14HS-TS2:THREE PHASE NORMAL FAULT CLEARING ON HAA-N.GILA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

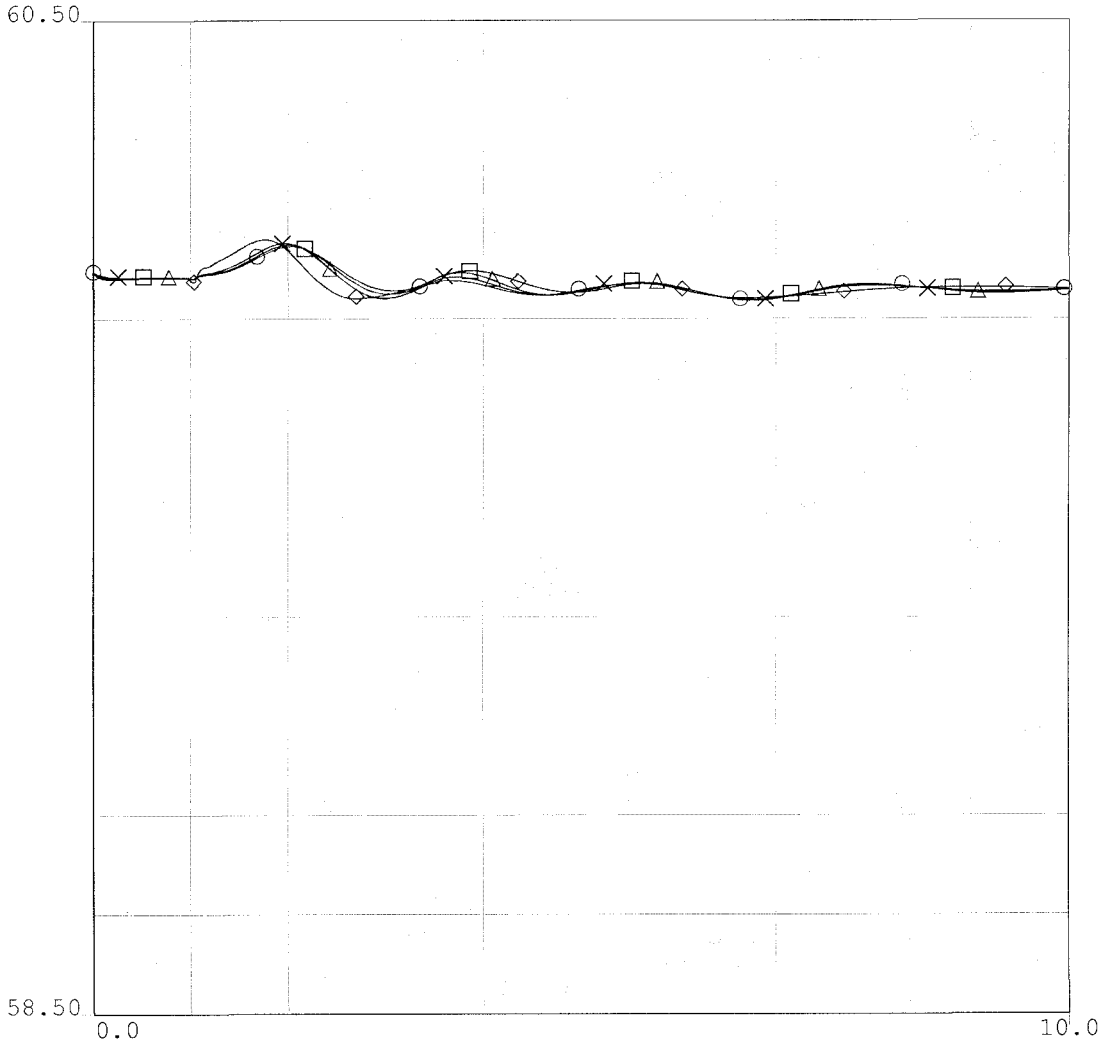
Frequencies:



58.5000	fbus	40489	GRIZZLY 500.0	0	0.0	1	1	60.5000
58.5000	fbus	40687	MALIN 500.0	0	0.0	1	1	60.5000
58.5000	fbus	40459	GARRISON 500.0	0	0.0	1	1	60.5000
58.5000	fbus	60235	MIDPOINT 345.0	0	0.0	1	1	60.5000
58.5000	fbus	66230	PINTO 138.0	0	0.0	1	1	60.5000

14HS-TS2:THREE PHASE NORMAL FAULT CLEARING ON HAA-N.GILA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

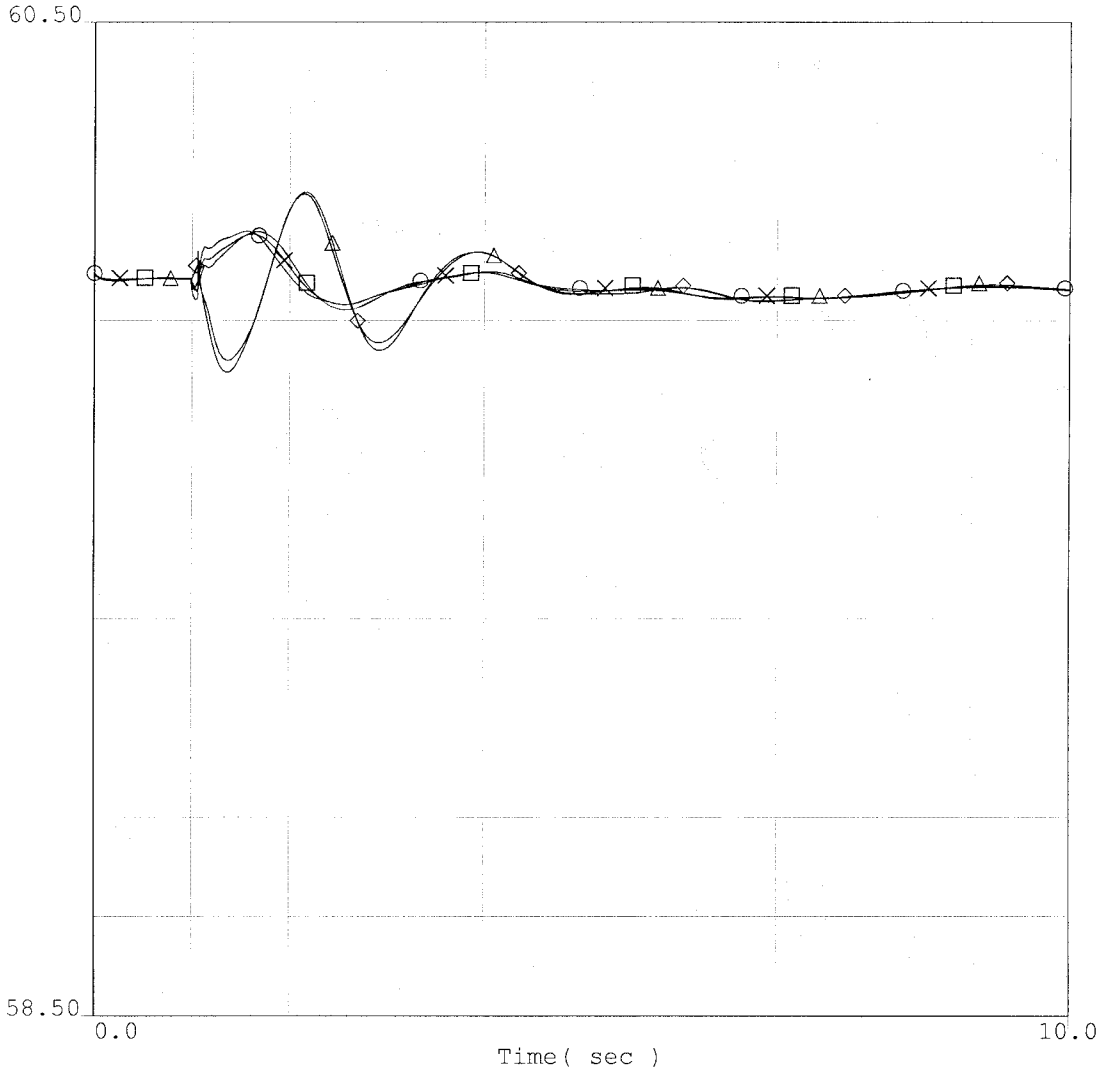
Frequencies:



58.5000	fbus	30005	ROUND MT 500.0	0	0.0	1	1	60.5000
58.5000	fbus	30015	TABLE MT 500.0	0	0.0	1	1	60.5000
58.5000	fbus	30035	TRACY 500.0	0	0.0	1	1	60.5000
58.5000	fbus	30040	TESLA 500.0	0	0.0	1	1	60.5000
58.5000	fbus	30060	MIDWAY 500.0	0	0.0	1	1	60.5000

14HS-TS2:THREE PHASE NORMAL FAULT CLEARING ON HAA-N.GILA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

Frequencies:



○	58.5000 fbus	24801	DEVERS 500.0	0	0.0	1	1	60.5000
⊗	58.5000 fbus	24086	LUGO 500.0	0	0.0	1	1	60.5000
□	58.5000 fbus	26094	SYLMARLA 230.0	0	0.0	1	1	60.5000
△	58.5000 fbus	22468	MIGUEL 500.0	0	0.0	1	1	60.5000
◇	58.5000 fbus	22536	N.GILA 500.0	0	0.0	1	1	60.5000

14HS-TS2:THREE PHASE NORMAL FAULT CLEARING ON HAA-N.GILA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

HIGHEST VOLTAGE DIP

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct	@time
14	KOFA	69	vbul	0.99	0.829	16.3	1.767
24	COLRIVER	500	vbus	1.06	0.887	16.3	1.504
24	DEVRSVC1	500	vbug	1.06	0.946	10.7	1.567

LOWEST FREQUENCY

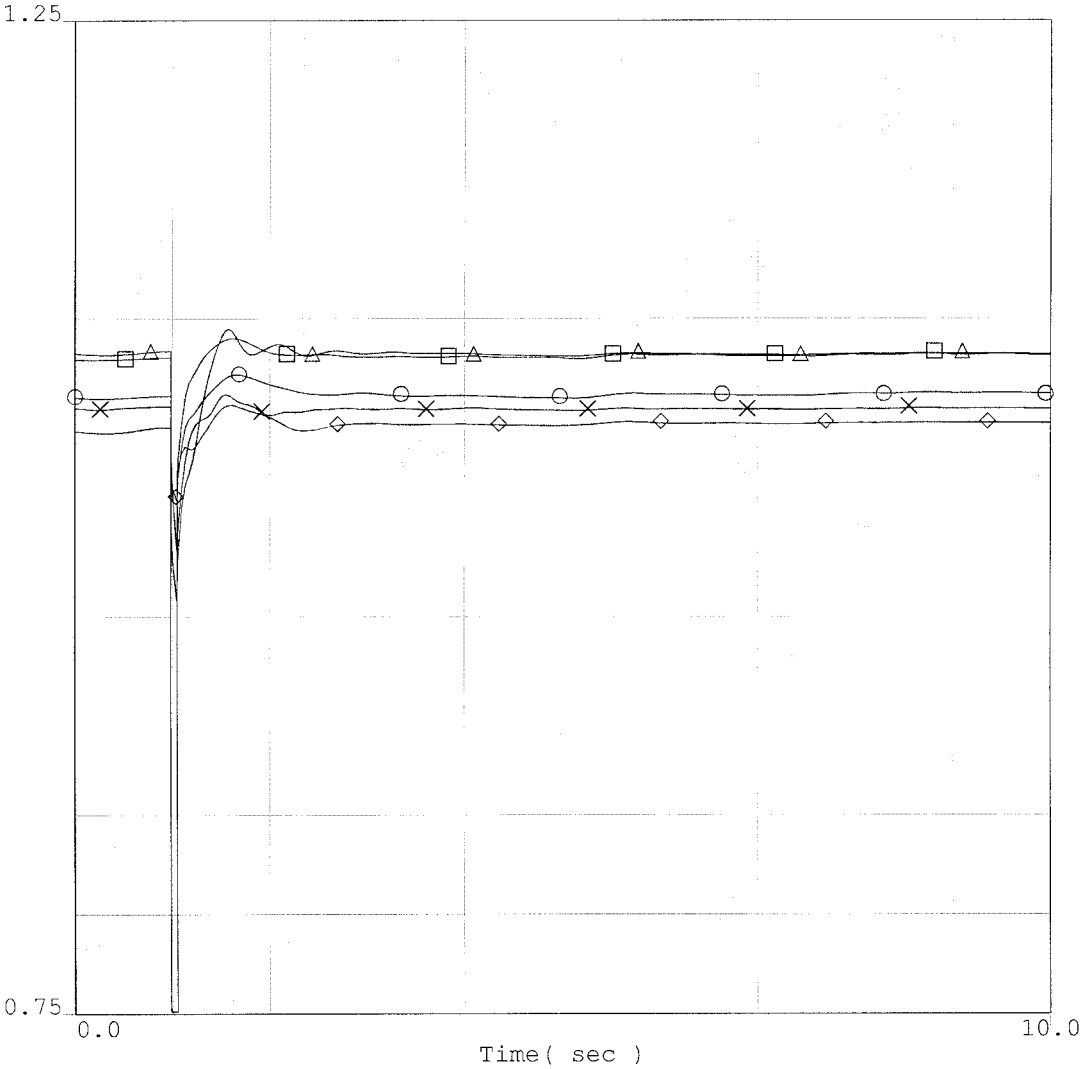
AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
14	WHITETNK	69	fbul	59.503	1.046
14	Q1COL6	34.5	fbus	57.271	1.033
20	CPC-U2	13.8	fbug	59.723	1.417

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

There were 0 violations of MORC criteria 1 (25% Voltage Dip) !
There were 0 violations of MORC criteria 2 (20% Voltage Dip for 20 Cycles)!
There were 0 violations of MORC criteria 3 (59.6 HZ for 6 Cycles)!

ARIZONA_voltages:



0.7500 vbus	15021	PALOVRDE 500.0	0	0.0	1	1	1.2500
0.7500 vbus	14001	FOURCORN 500.0	0	0.0	1	1	1.2500
0.7500 vbus	15011	KYRENE 500.0	0	0.0	1	1	1.2500
0.7500 vbus	14003	NAVAJO 500.0	0	0.0	1	1	1.2500
0.7500 vbus	26003	ADELANTO 500.0	0	0.0	1	1	1.2500

14HS-TS3:THREE PHASE FAULT CLEARING ON MOENKOPI-ELDORADO 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

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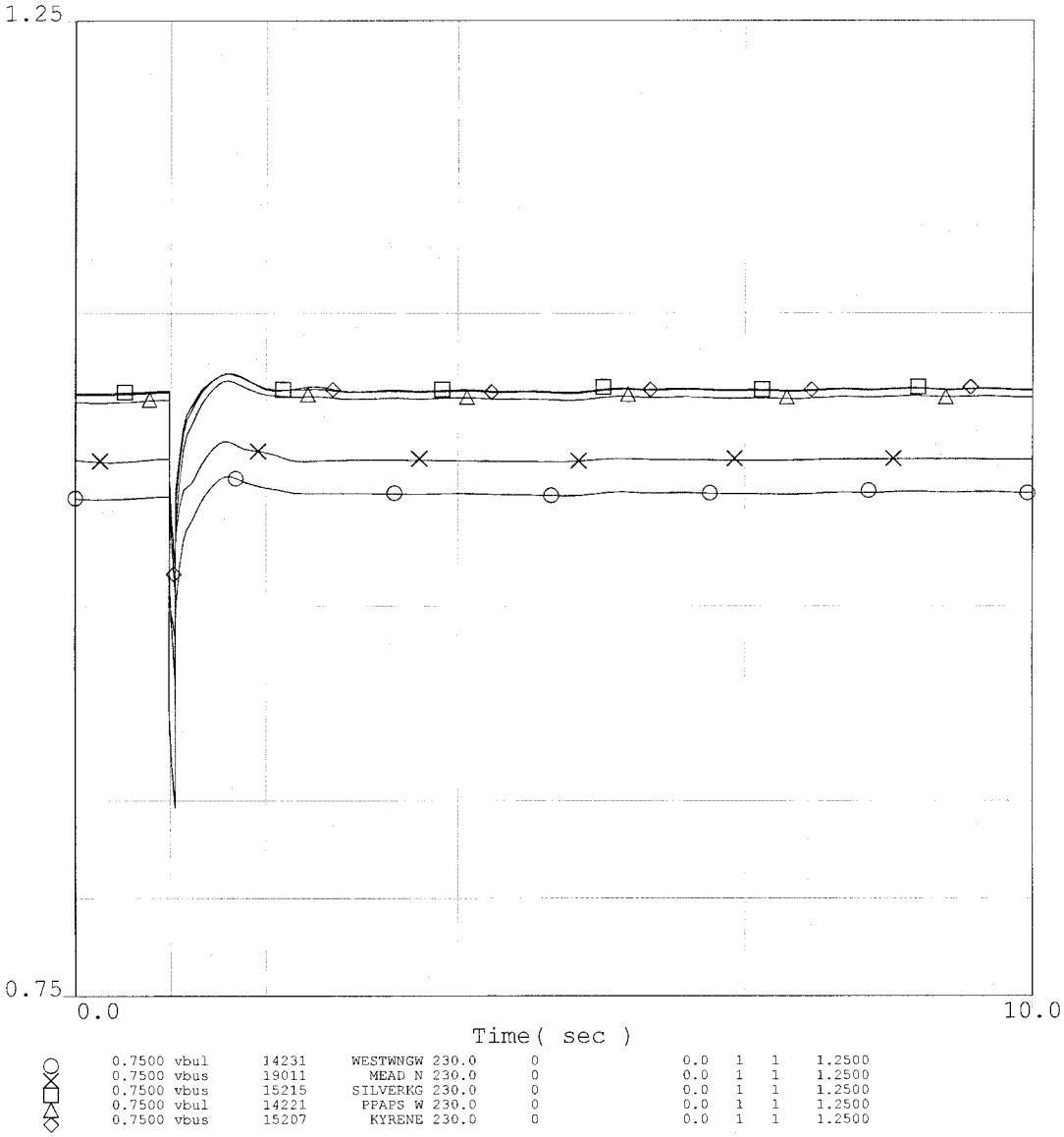
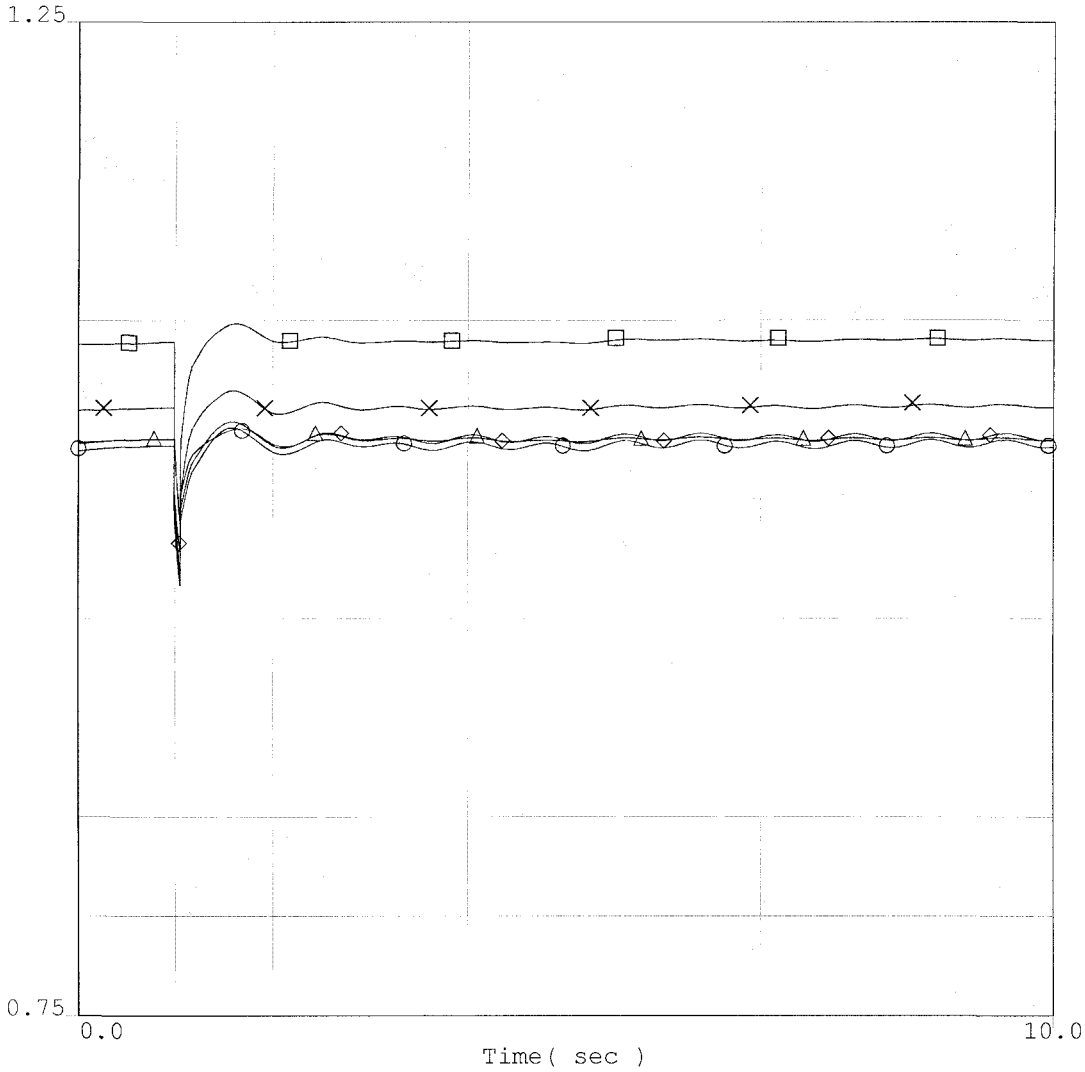
ARIZONA_voltages:



14HS-TS3:THREE PHASE FAULT CLEARING ON MOENKOPI-ELDORADO 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

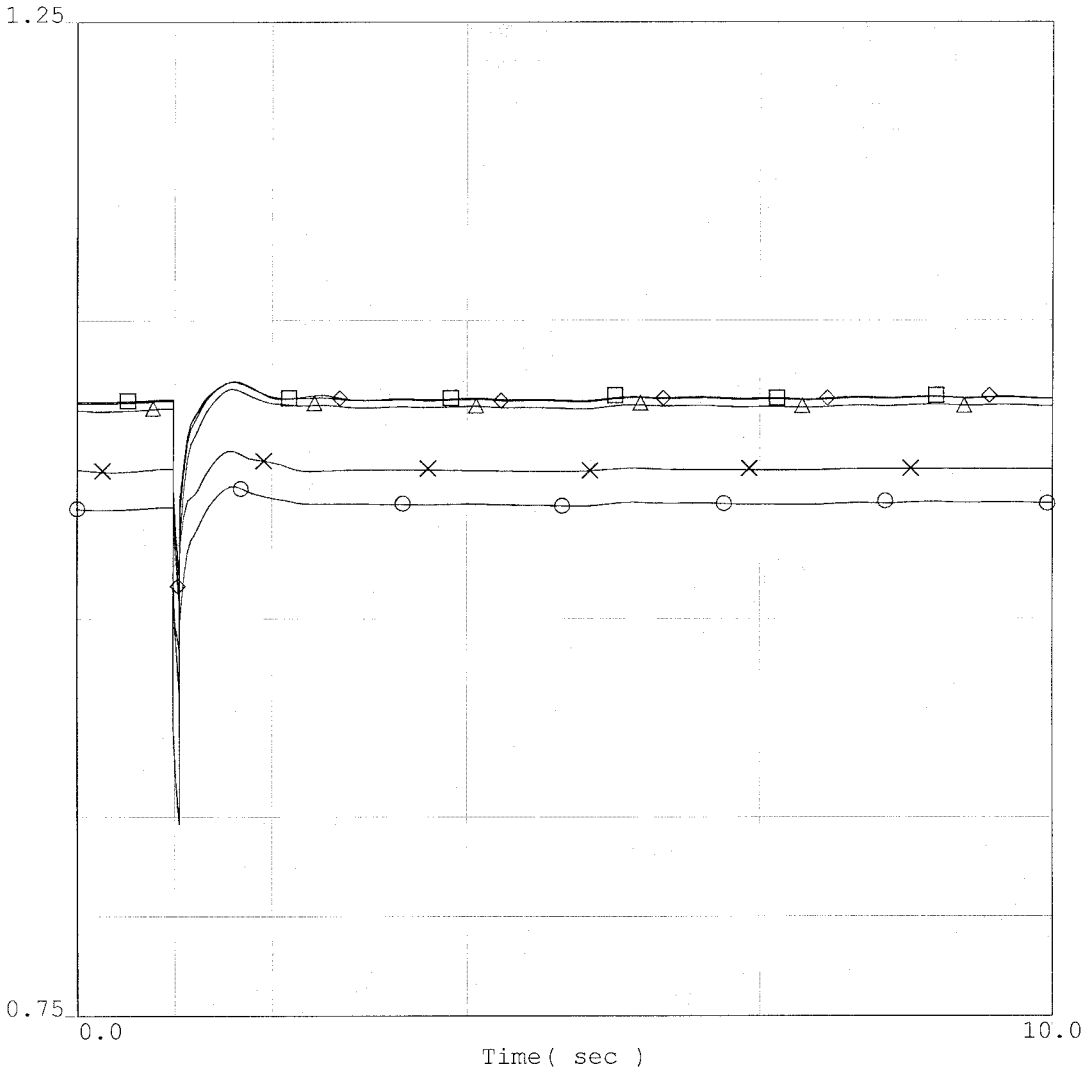
ARIZONA_voltages:



0.7500 vbus	16103	SOUTH 345.0	0	0.0	1	1	1.2500
0.7500 vbus	14000	CHOLLA 500.0	0	0.0	1	1	1.2500
0.7500 vbus	15041	SILVERKG 500.0	0	0.0	1	1	1.2500
0.7500 vbus	16104	SPRINGR 345.0	0	0.0	1	1	1.2500
0.7500 vbus	16109	WINCHSTR 345.0	0	0.0	1	1	1.2500

14HS-TS3:THREE PHASE FAULT CLEARING ON MOENKOPI-ELDORADO 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

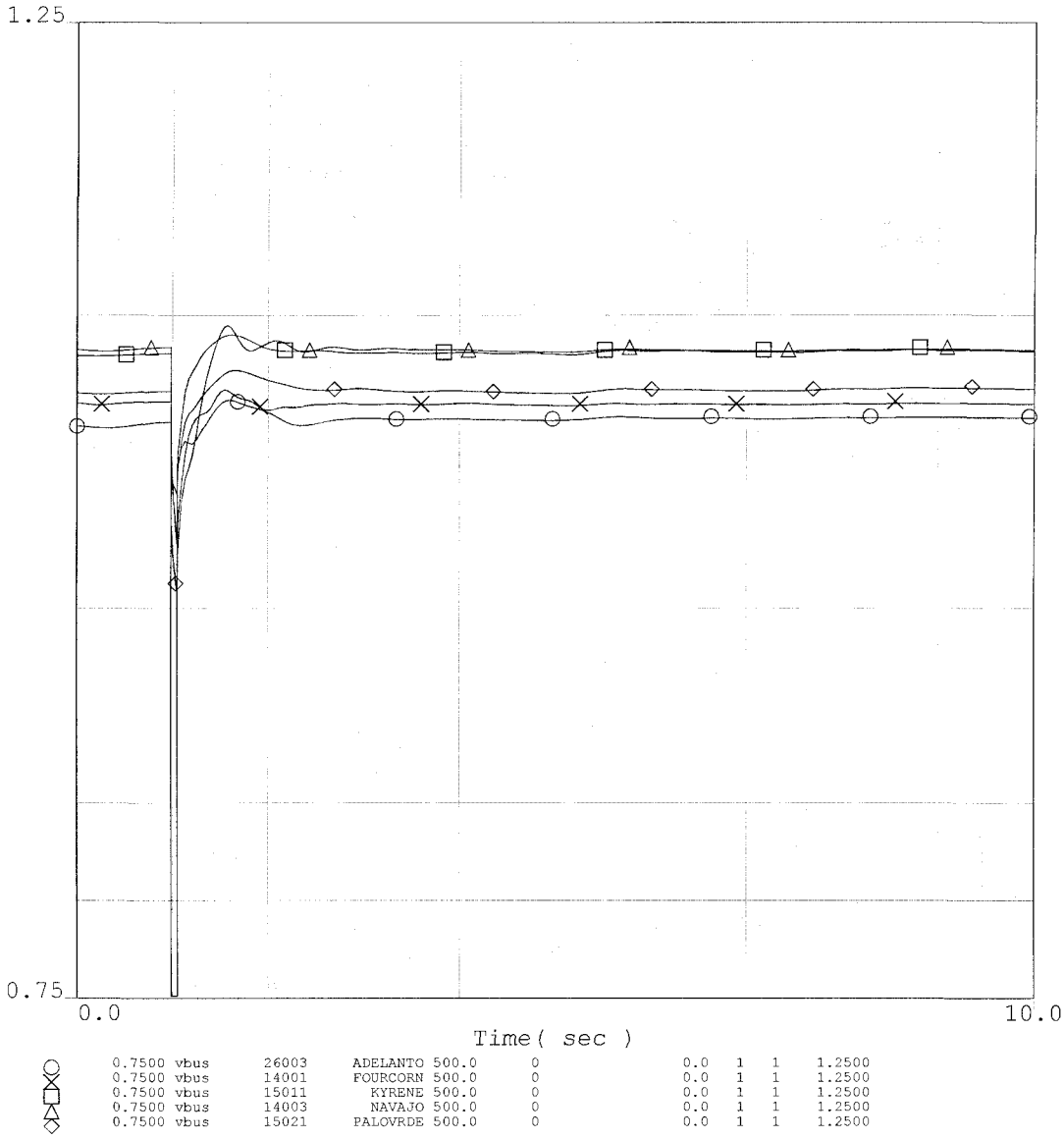
ARIZONA_voltages:



0.7500 vbul	14231	WESTWNGW 230.0	0	0.0	1	1	1.2500
0.7500 vbus	19011	MEAD N 230.0	0	0.0	1	1	1.2500
0.7500 vbus	15215	SILVERKG 230.0	0	0.0	1	1	1.2500
0.7500 vbul	14221	PPAPS W 230.0	0	0.0	1	1	1.2500
0.7500 vbus	15207	KYRENE 230.0	0	0.0	1	1	1.2500

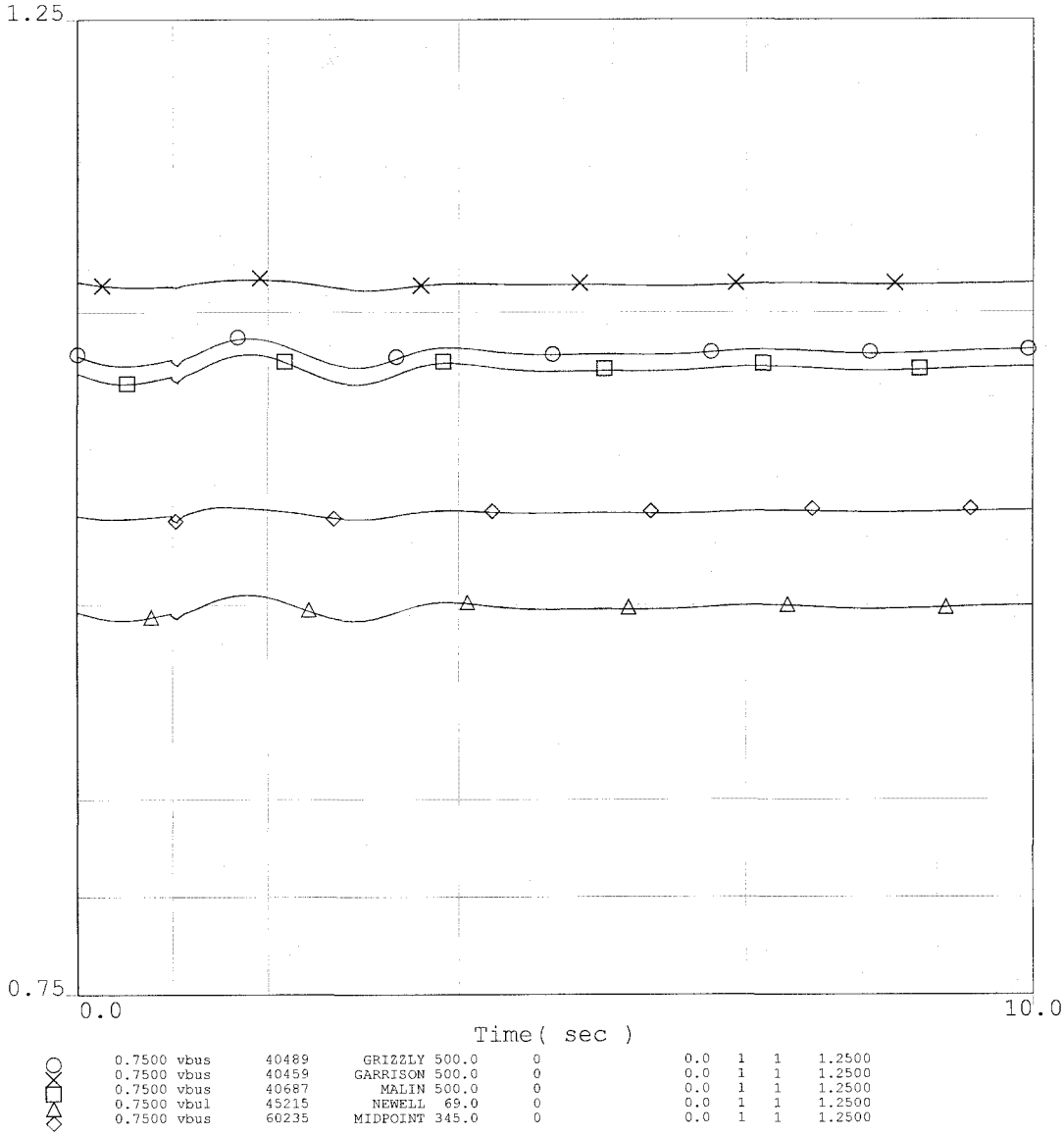
14HS-TS3:THREE PHASE FAULT CLEARING ON MOENKOPI-ELDORADO 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

ARIZONA_voltages:



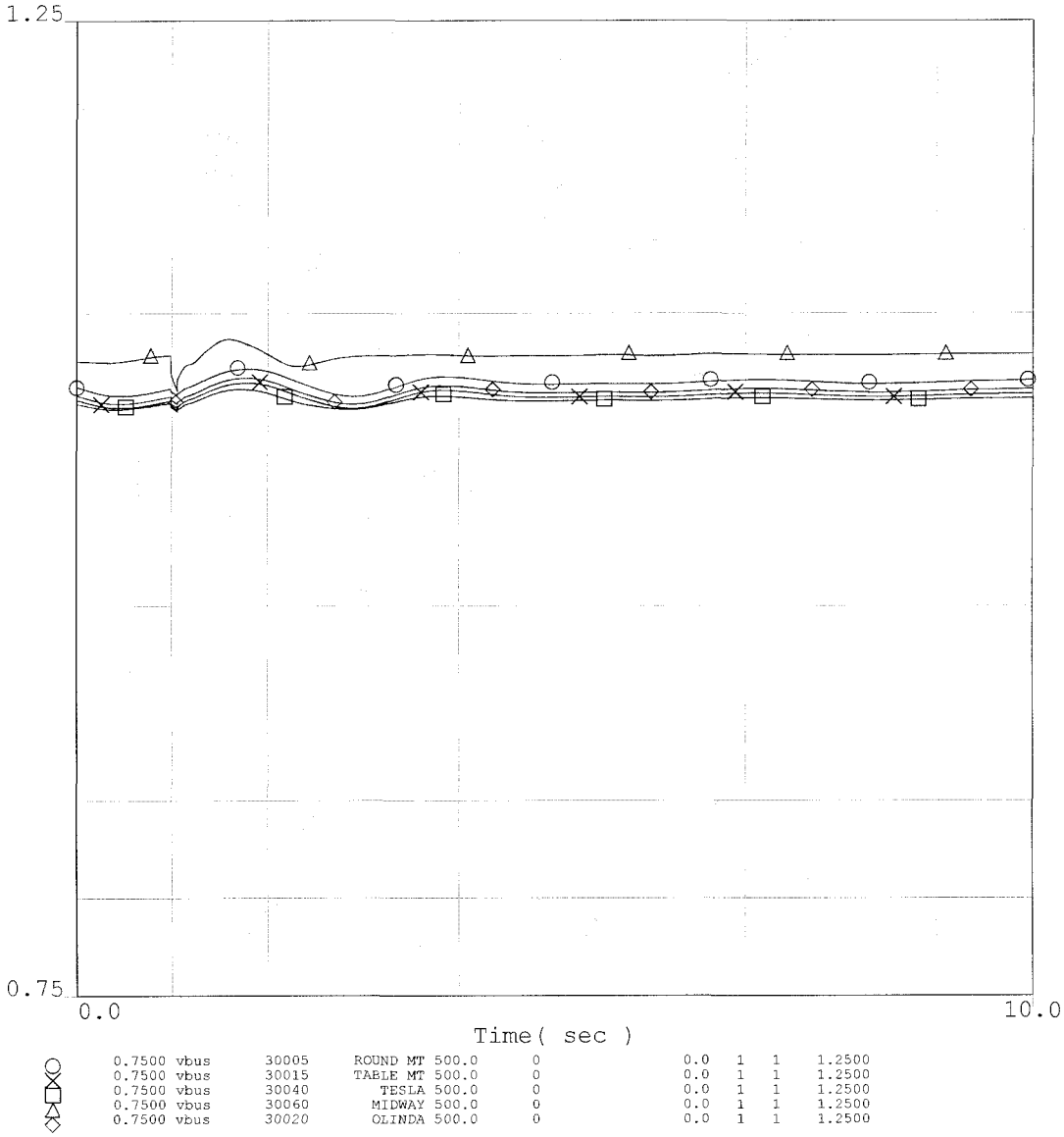
14HS-TS3:THREE PHASE FAULT CLEARING ON MOENKOPI-ELDORADO 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

NORTHWEST_voltages:



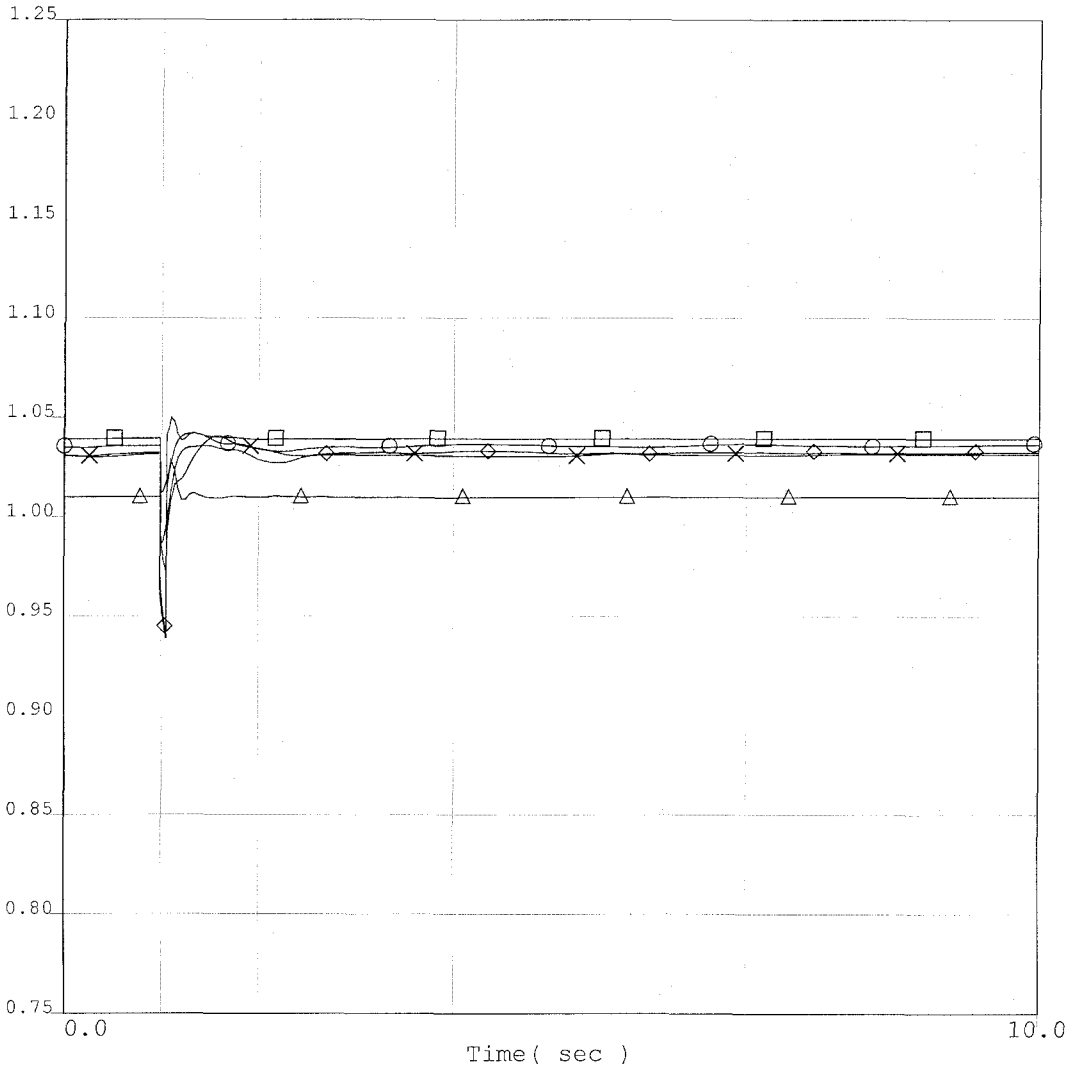
14HS-TS3:THREE PHASE FAULT CLEARING ON MOENKOPI-ELDORADO 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

CALIFORNIA_voltages:



14HS-TS3:THREE PHASE FAULT CLEARING ON MOENKOPI-ELDORADO 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

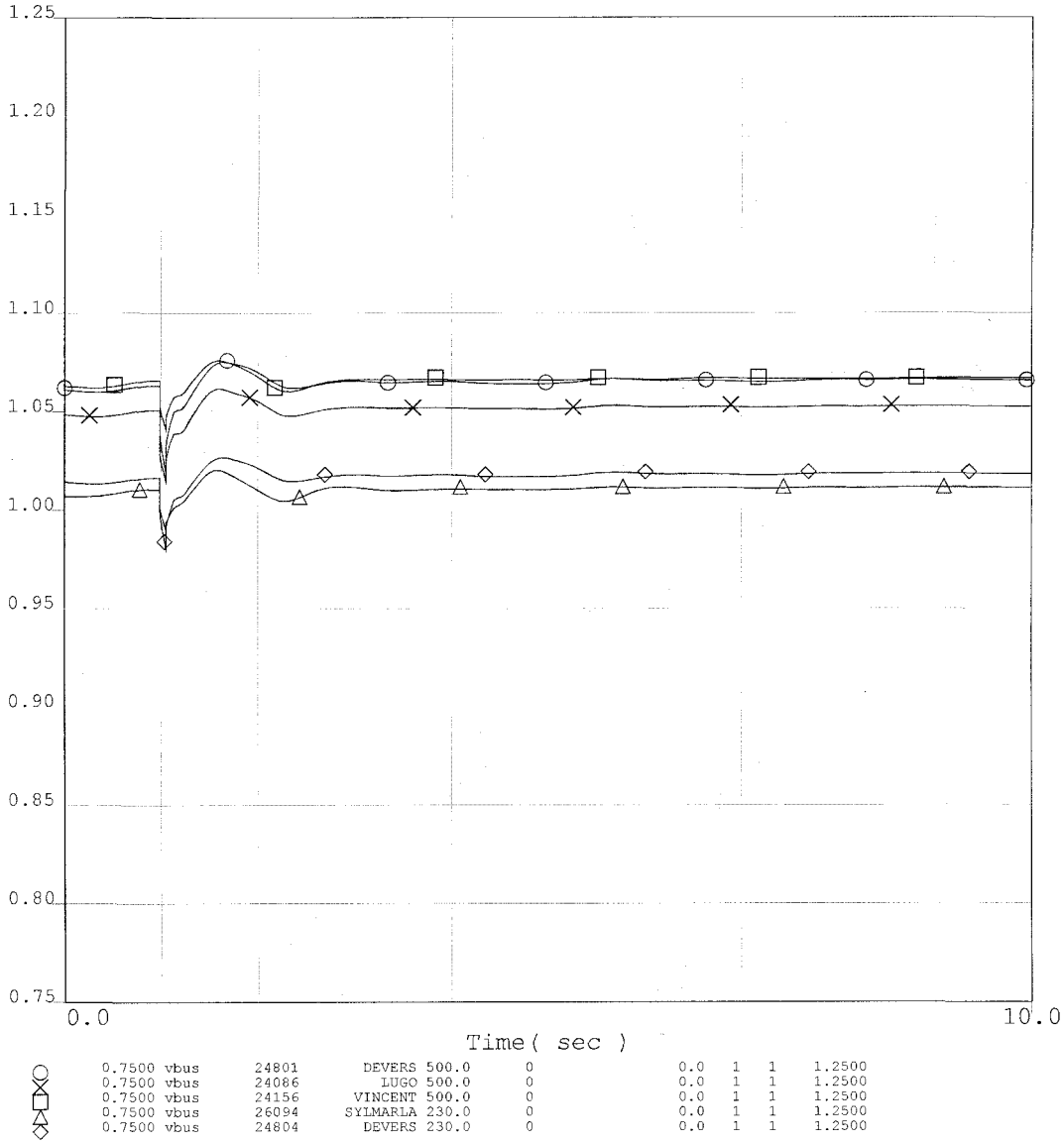
UTAH_voltages:



0.7500	vbus	66230	PINTO 138.0	0	0.0	1	1	1.2500
0.7500	vbus	18019	H ALLEN 230.0	0	0.0	1	1	1.2500
0.7500	vbus	66280	REDBUTTE 345.0	0	0.0	1	1	1.2500
0.7500	vbus	66420	SGSY 138.0	0	0.0	1	1	1.2500
0.7500	vbus	79023	DURANGO 115.0	0	0.0	1	1	1.2500

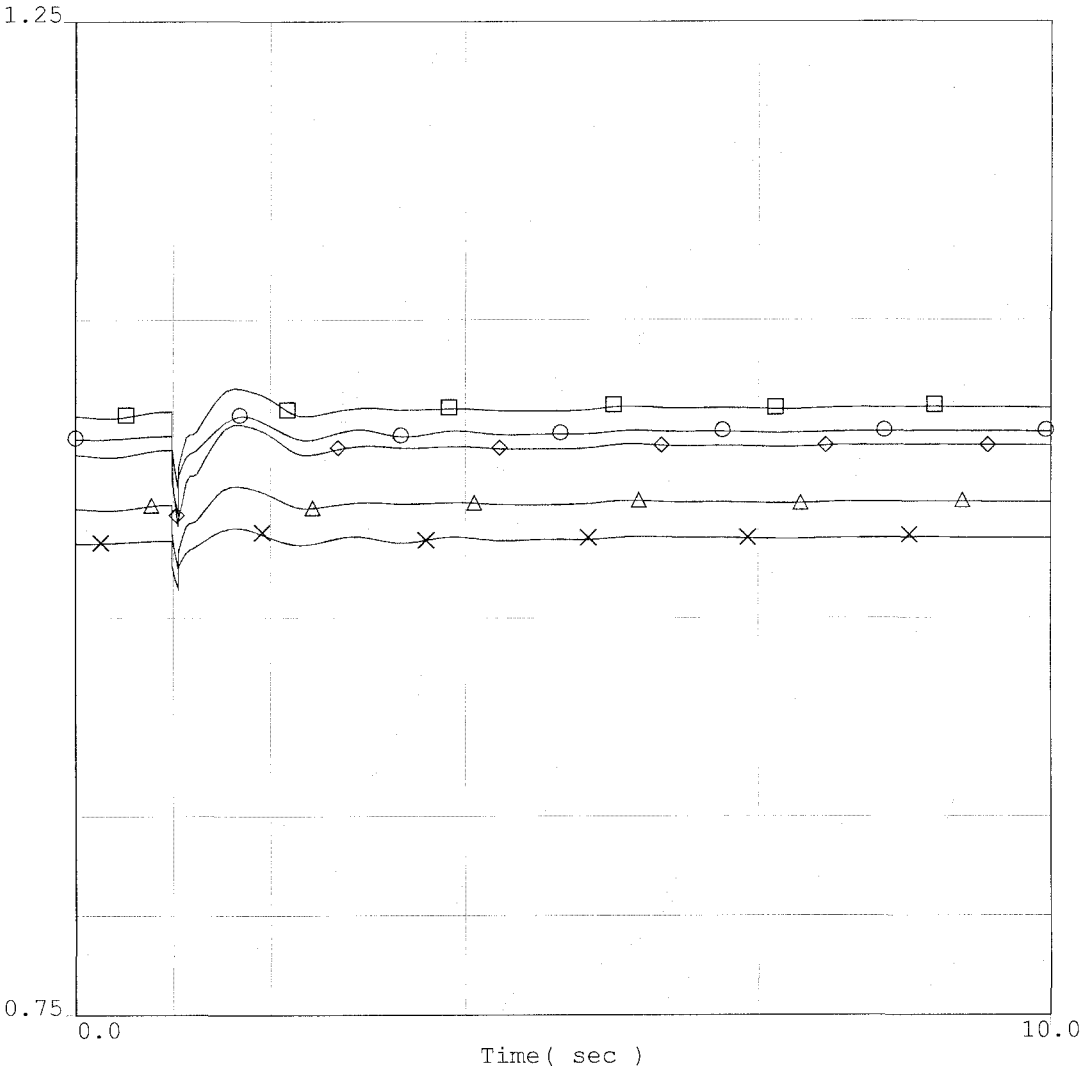
14HS-TS3:THREE PHASE FAULT CLEARING ON MOENKOPI-ELDORADO 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

CALIFORNIA_voltages:



14HS-TS3:THREE PHASE FAULT CLEARING ON MOENKOPI-ELDORADO 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

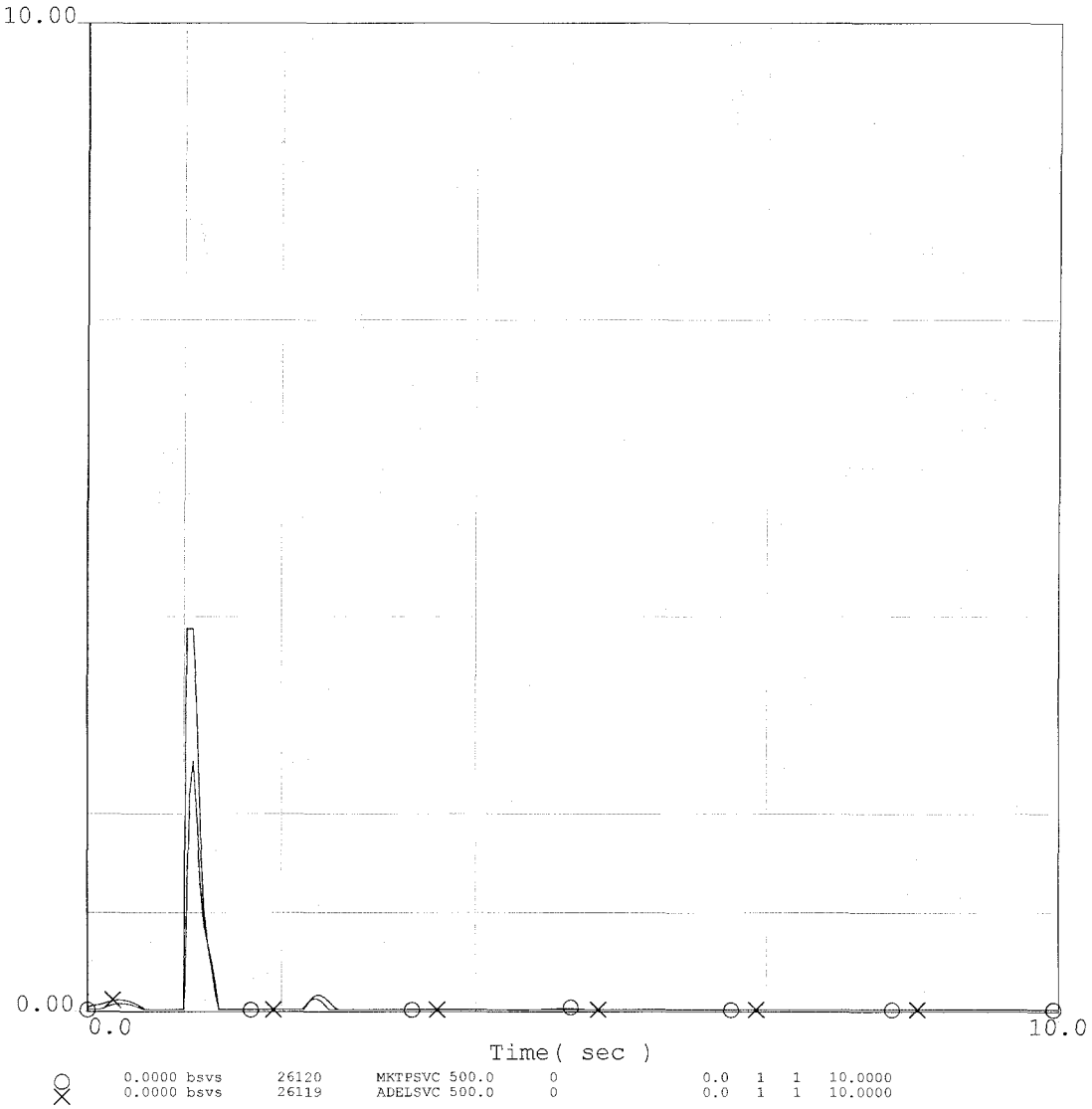
CALIFORNIA_voltages:



0.7500 vbus	22360	IMPRLVLY 500.0	0	0.0	1	1	1.2500
0.7500 vbug	22356	IMPRLVLY 230.0	0	0.0	1	1	1.2500
0.7500 vbus	24151	VALLEYSC 500.0	0	0.0	1	1	1.2500
0.7500 vbus	24805	DEVERS 115.0	0	0.0	1	1	1.2500
0.7500 vbul	24229	VALLEY-S 115.0	0	0.0	1	1	1.2500

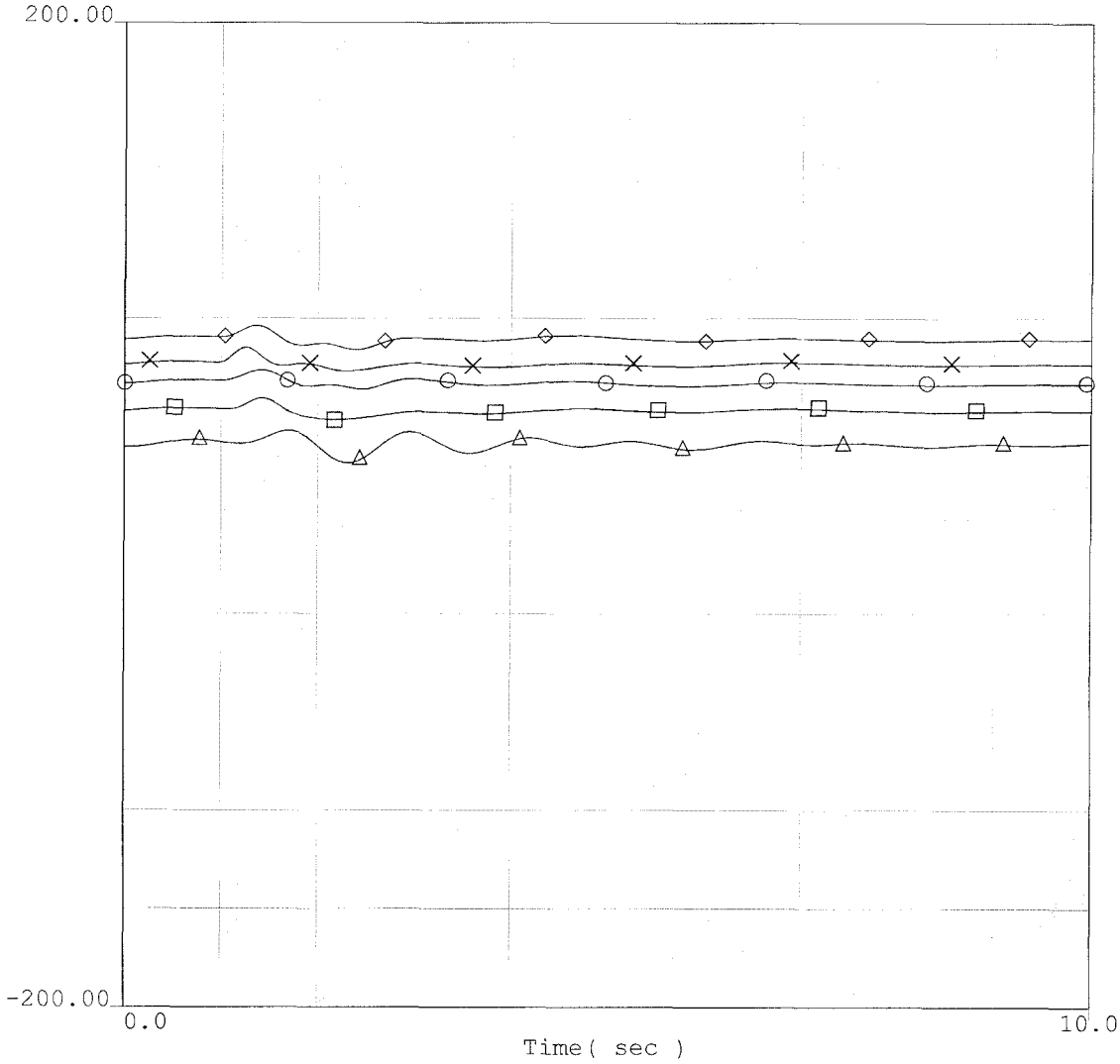
14HS-TS3:THREE PHASE FAULT CLEARING ON MOENKOPI-ELDORADO 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

SVC_output



14HS-TS3:THREE PHASE FAULT CLEARING ON MOENKOPI-ELDORADO 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

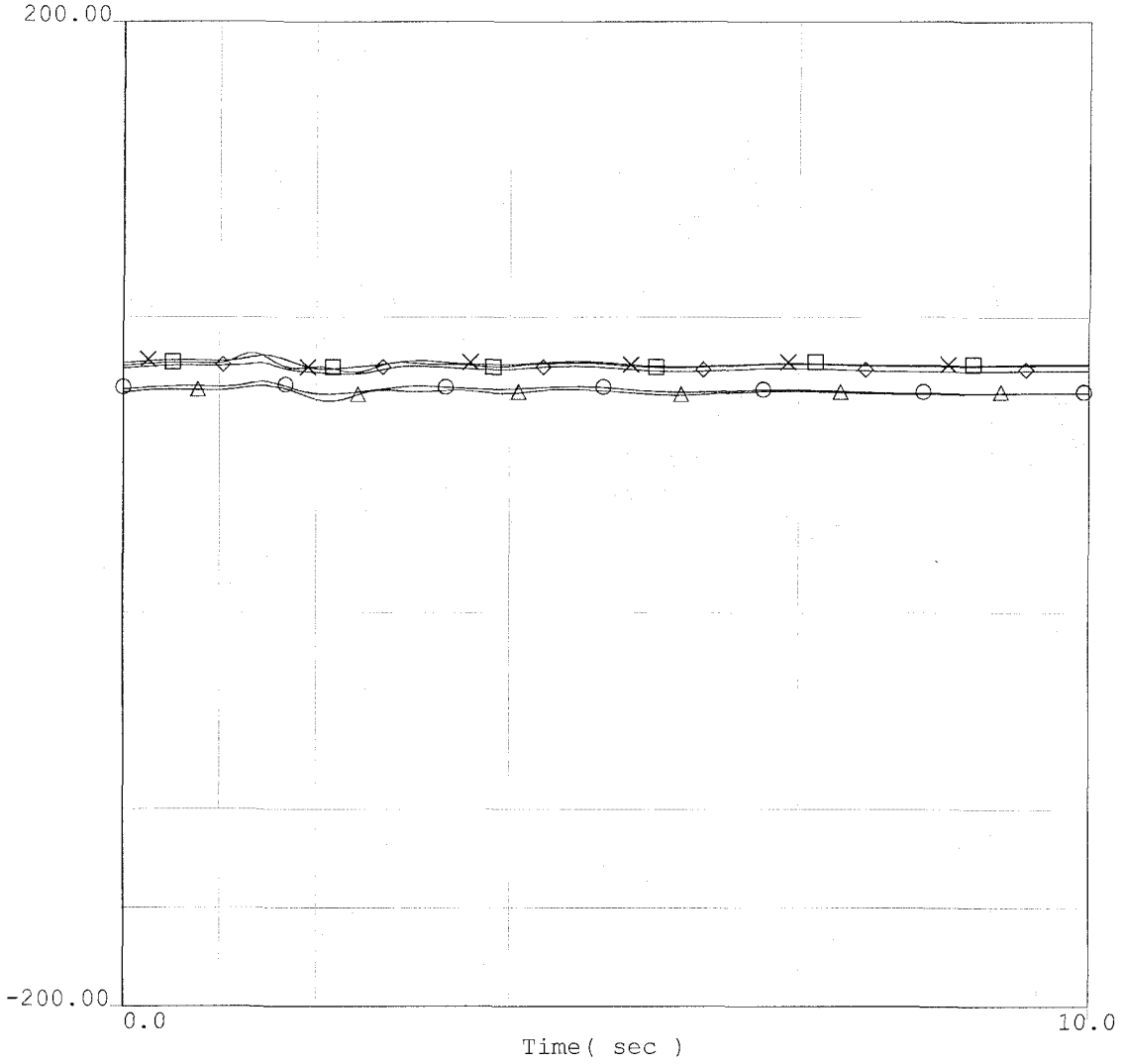
SYSTEM_Rotorangles



○	-200.0000 ang	16500	SPR GEN1	19.0	0	0.0	1	1	200.0000
⊗	-200.0000 ang	10321	SJUAN_G4	22.0	0	0.0	1	1	200.0000
□	-200.0000 ang	14942	SAGUARO2	15.5	0	0.0	1	1	200.0000
△	-200.0000 ang	17024	APACHCT1	13.8	0	0.0	1	1	200.0000
◇	-200.0000 ang	16518	SPR GEN3	21.0	0	0.0	1	1	200.0000

14HS-TS3:THREE PHASE FAULT CLEARING ON MOENKOPI-ELDORADO 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

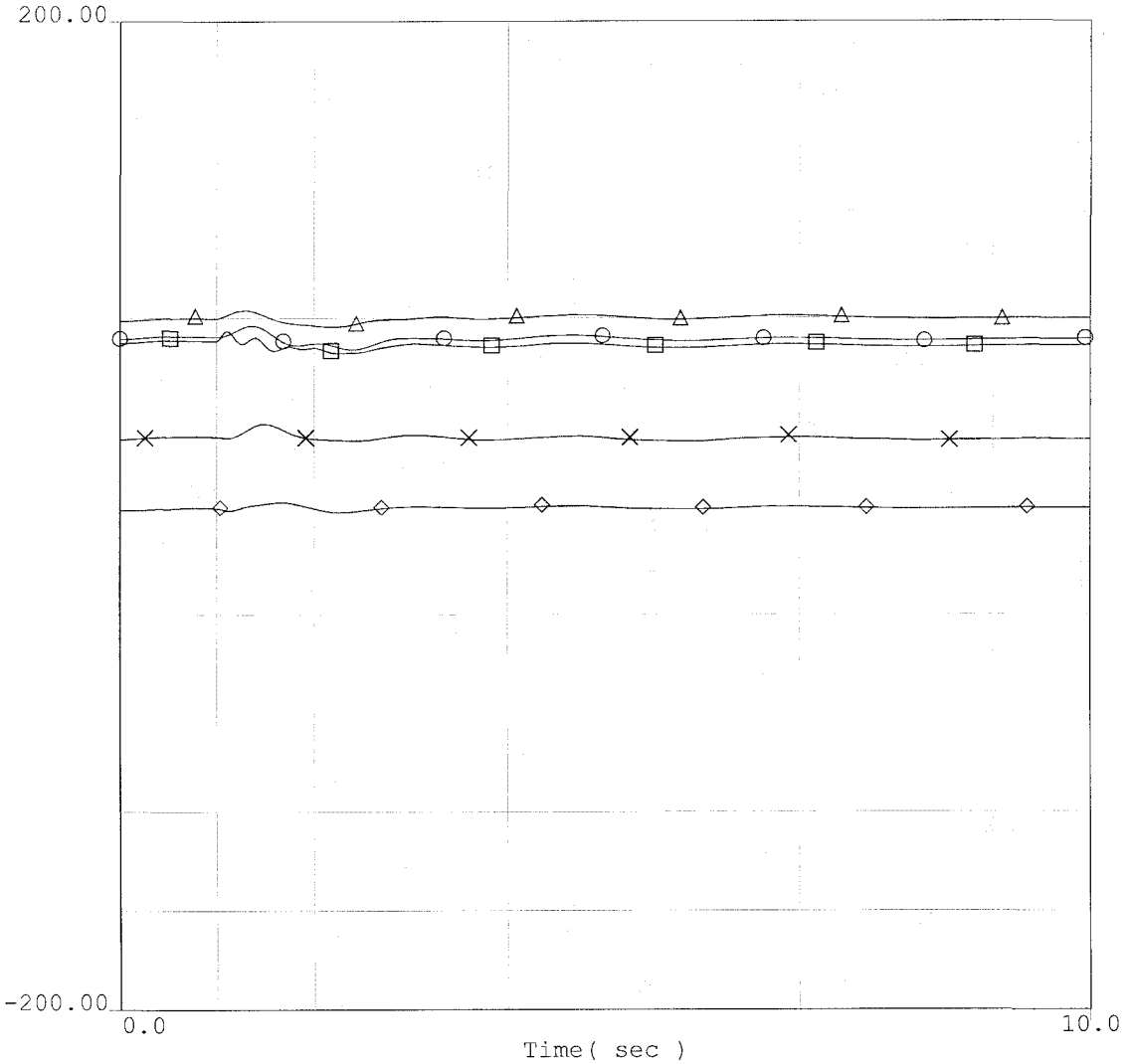
SYSTEM_Rotorangles



-200.0000 ang	15140	DBG-CT1	18.0	0	0.0	1	1	200.0000
-200.0000 ang	14945	SAG. CT3	13.8	0	0.0	1	1	200.0000
-200.0000 ang	14902	CHOLLA3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	15921	SANTAN 1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	14903	CHOLLA4	22.0	0	0.0	1	1	200.0000

14HS-TS3:THREE PHASE FAULT CLEARING ON MOENKOPI-ELDORADO 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

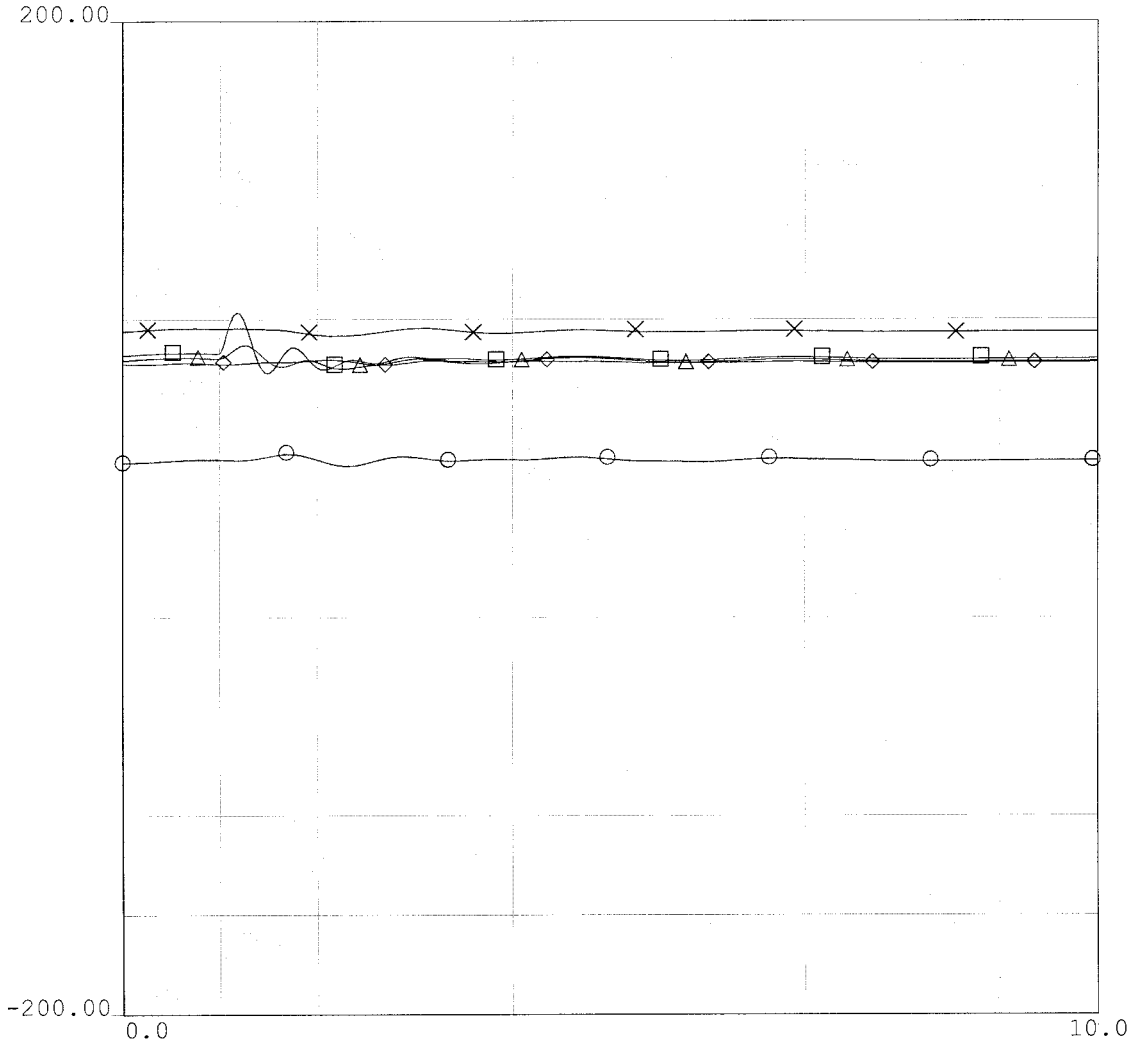
SYSTEM_Rotorangles



-200.0000 ang	16518	SPR GEN3	21.0	0	0.0	1	1	200.0000
-200.0000 ang	16503	SUNDTGE4	18.0	0	0.0	1	1	200.0000
-200.0000 ang	14914	FCNGN4CC	22.0	0	0.0	H	1	200.0000
-200.0000 ang	14931	PALOVRD1	24.0	0	0.0	1	1	200.0000
-200.0000 ang	24004	ALAMT4 G	18.0	0	0.0	H	1	200.0000

14HS-TS3:THREE PHASE FAULT CLEARING ON MOENKOPI-ELDORADO 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

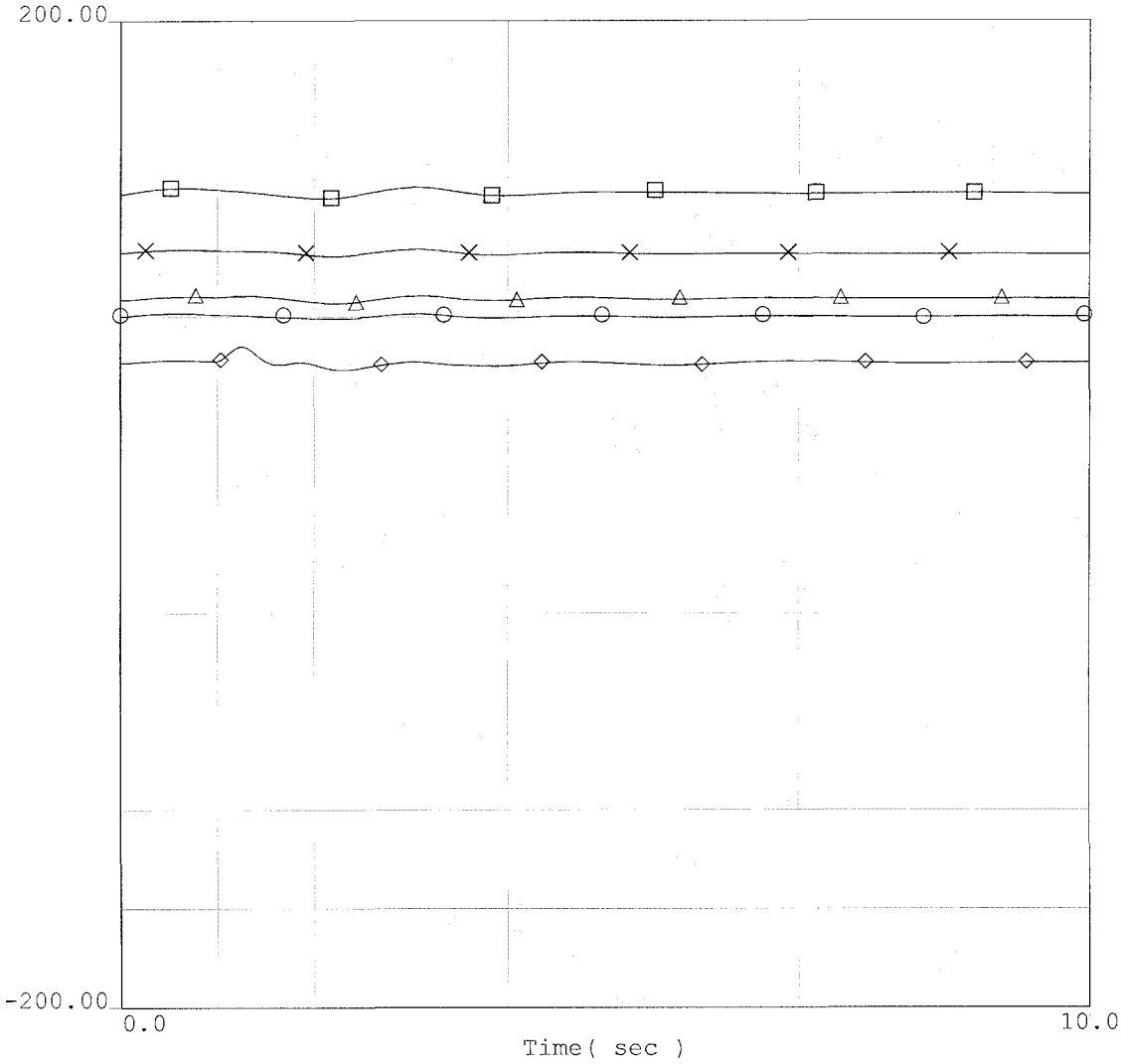
SYSTEM_Rotorangles



-200.0000 ang	24129	S.ONOFR2	22.0	0	0.0	1	1	200.0000
-200.0000 ang	26039	INTERM1G	26.0	0	0.0	1	1	200.0000
-200.0000 ang	15981	NAVAJO 1	26.0	0	0.0	1	1	200.0000
-200.0000 ang	10318	SJUAN_G1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	36411	DIABLO 1	25.0	0	0.0	1	1	200.0000

14HS-TS3:THREE PHASE FAULT CLEARING ON MOENKOPI-ELDORADO 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

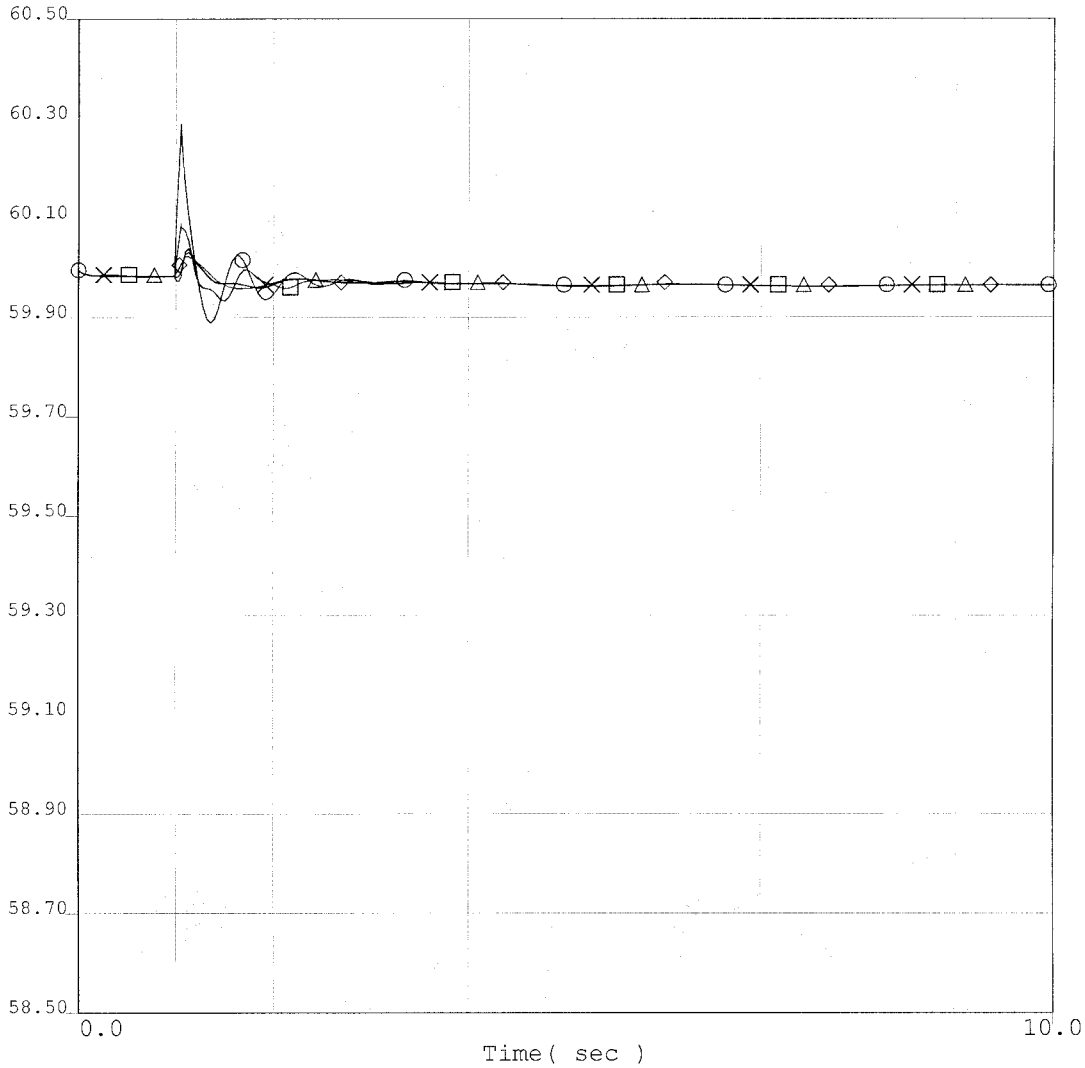
SYSTEM_Rotorangles



-200.0000 ang	73129	MBPP-1	24.0	0	0.0	1	1	200.0000
-200.0000 ang	60086	BRIDGER1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	62050	COLSTP 1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	65500	EHUNTR 3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	10321	SJUAN_G4	22.0	0	0.0	1	1	200.0000

14HS-TS3:THREE PHASE FAULT CLEARING ON MOENKOPI-ELDORADO 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

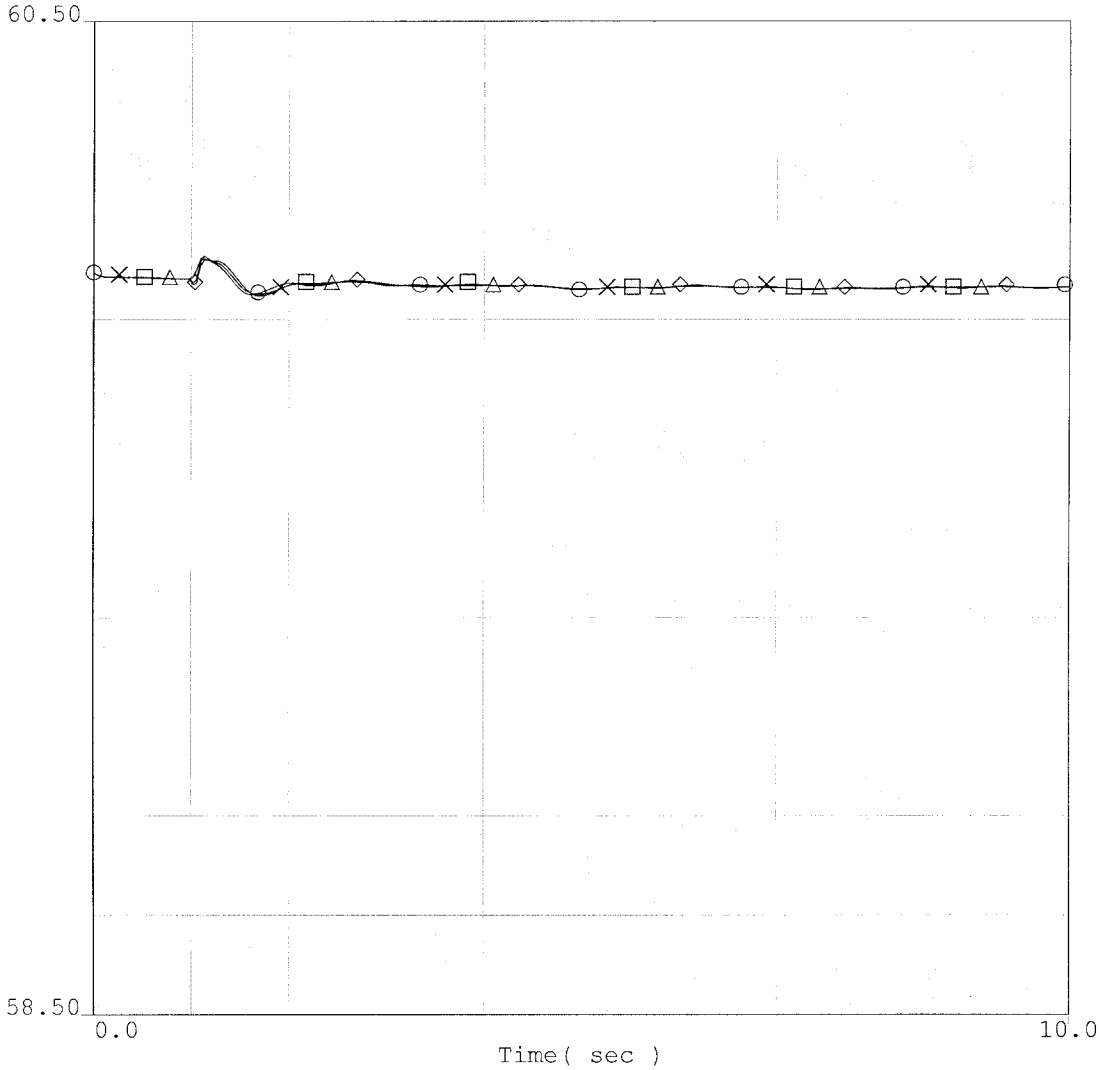
Frequencies:



58.5000 fbus	14003	NAVAJO 500.0	0	0.0	1	1	60.5000
58.5000 fbus	14005	WESTWING 500.0	0	0.0	1	1	60.5000
58.5000 fbus	14001	FOURCORN 500.0	0	0.0	1	1	60.5000
58.5000 fbus	14016	PNPKAPS 500.0	0	0.0	1	1	60.5000
58.5000 fbus	15021	PALOVRDE 500.0	0	0.0	1	1	60.5000

14HS-TS3:THREE PHASE FAULT CLEARING ON MOENKOPI-ELDORADO 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

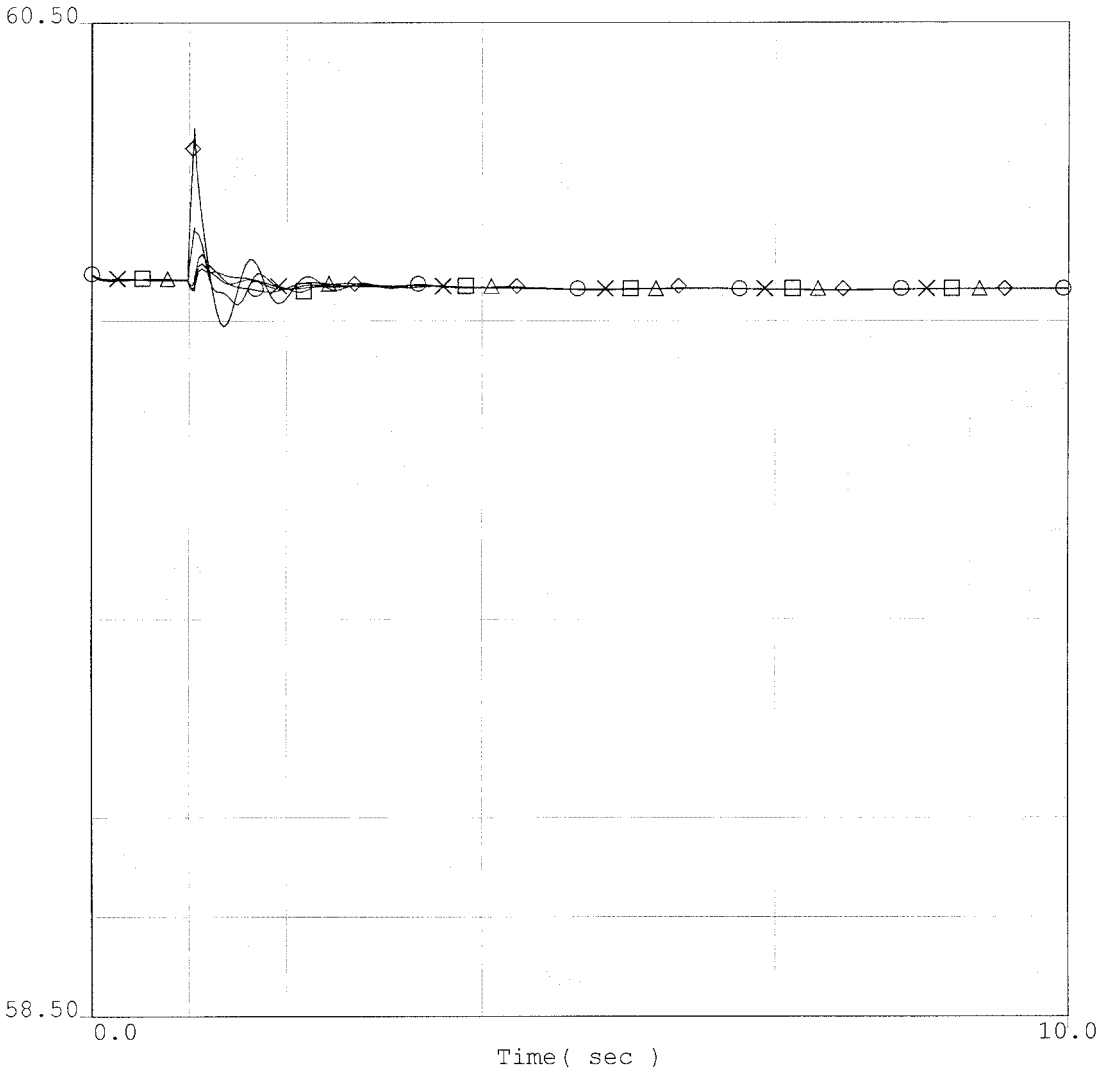
Frequencies:



58.5000	fbus	16000	TORTOLIT 500.0	0	0.0	1	1	60.5000
58.5000	fbus	16105	VAIL 345.0	0	0.0	1	1	60.5000
58.5000	fbus	16103	SOUTH 345.0	0	0.0	1	1	60.5000
58.5000	fbul	15001	CORONADO 500.0	0	0.0	1	1	60.5000
58.5000	fbus	16109	WINCHSTR 345.0	0	0.0	1	1	60.5000

14HS-TS3:THREE PHASE FAULT CLEARING ON MOENKOPI-ELDORADO 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

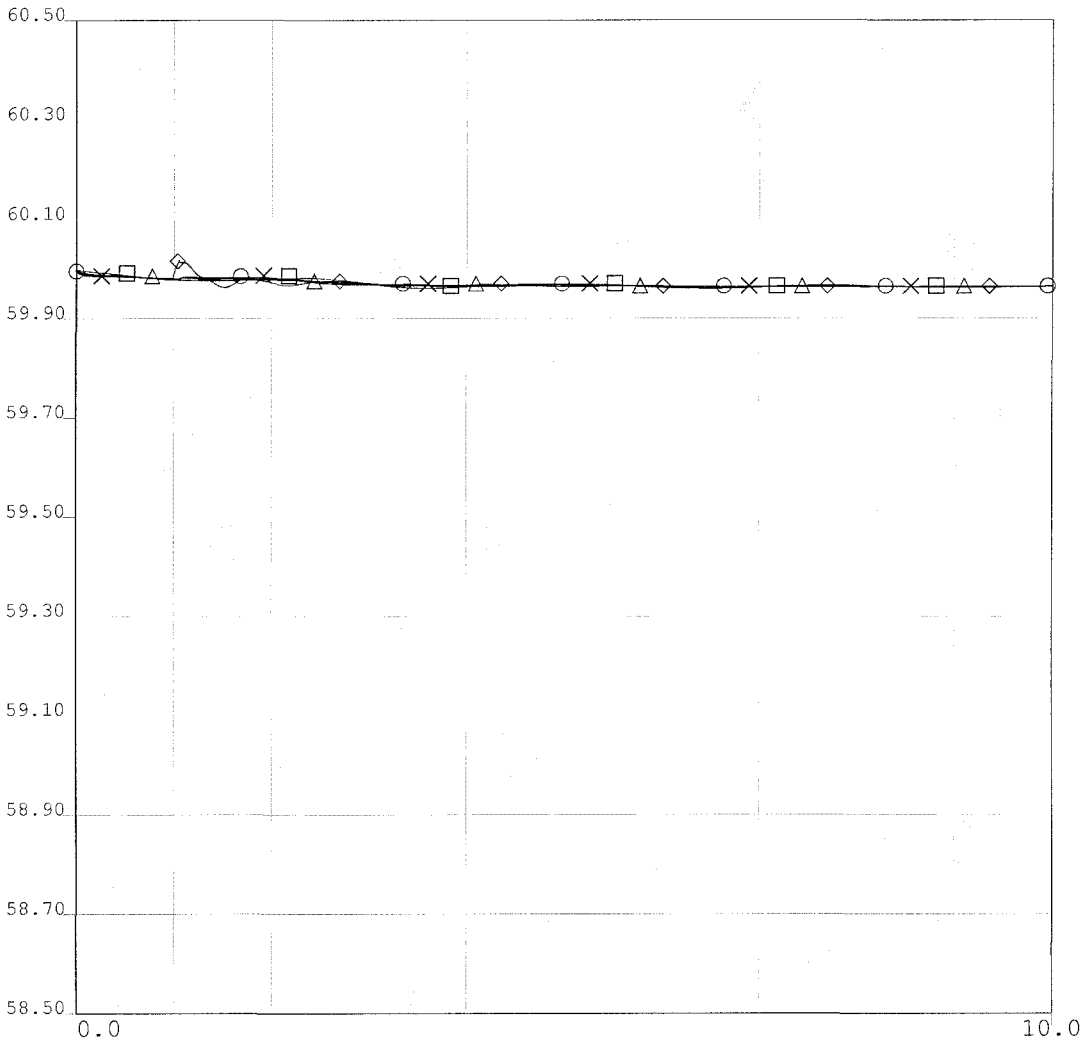
Frequencies:



58.5000	fbul	14231	WESTWNGW 230.0	0	0.0	1	1	60.5000
58.5000	fbus	26003	ADELANTO 500.0	0	0.0	1	1	60.5000
58.5000	fbus	14001	FOURCORN 500.0	0	0.0	1	1	60.5000
58.5000	fbus	26048	MCCULLGH 500.0	0	0.0	1	1	60.5000
58.5000	fbus	14003	NAVAJO 500.0	0	0.0	1	1	60.5000

14HS-TS3:THREE PHASE FAULT CLEARING ON MOENKOPI-ELDORADO 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

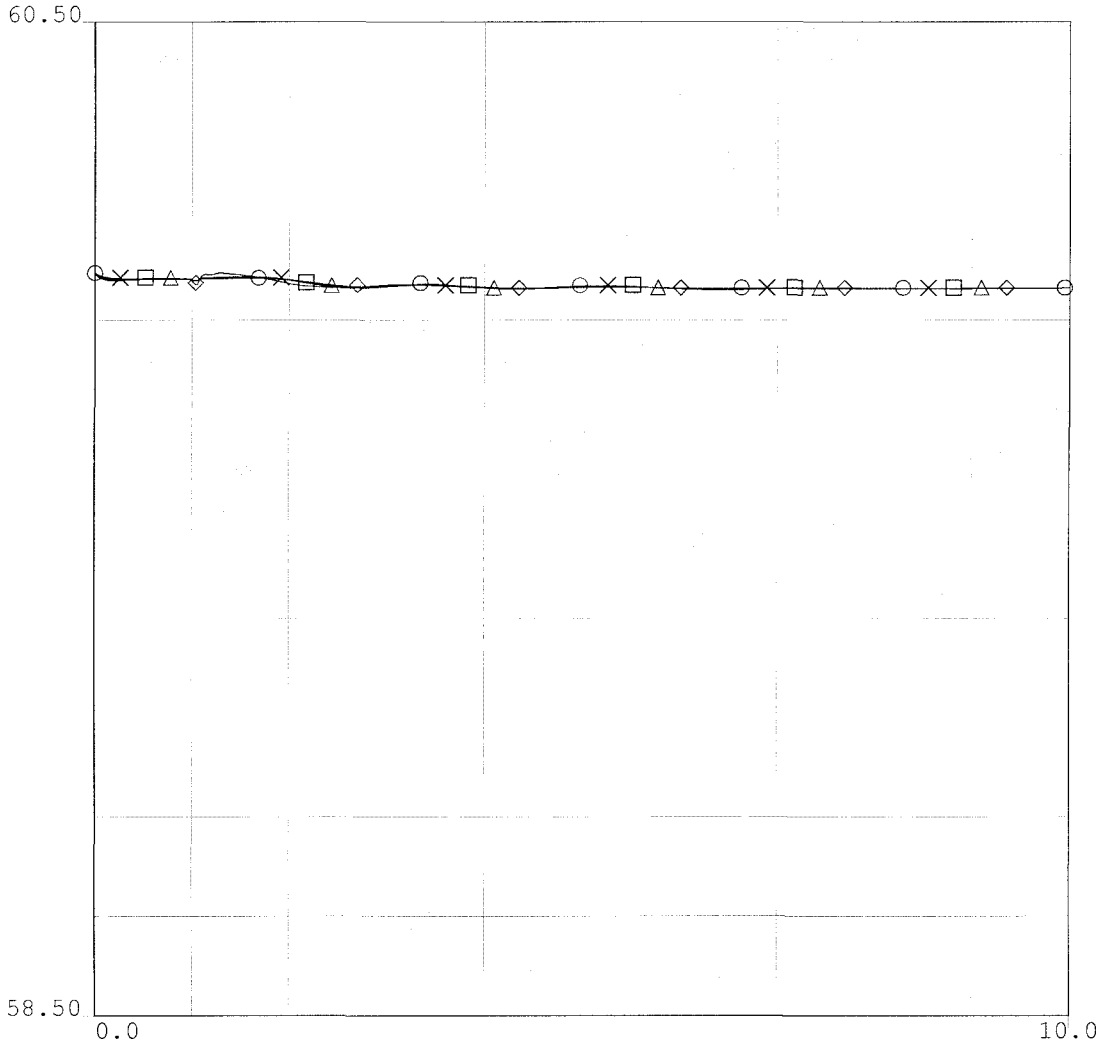
Frequencies:



58.5000	fbus	40489	GRIZZLY 500.0	0	0.0	1	1	60.5000
58.5000	fbus	40687	MALIN 500.0	0	0.0	1	1	60.5000
58.5000	fbus	40459	GARRISON 500.0	0	0.0	1	1	60.5000
58.5000	fbus	60235	MIDPOINT 345.0	0	0.0	1	1	60.5000
58.5000	fbus	66230	PINTO 138.0	0	0.0	1	1	60.5000

14HS-TS3:THREE PHASE FAULT CLEARING ON MOENKOPI-ELDORADO 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

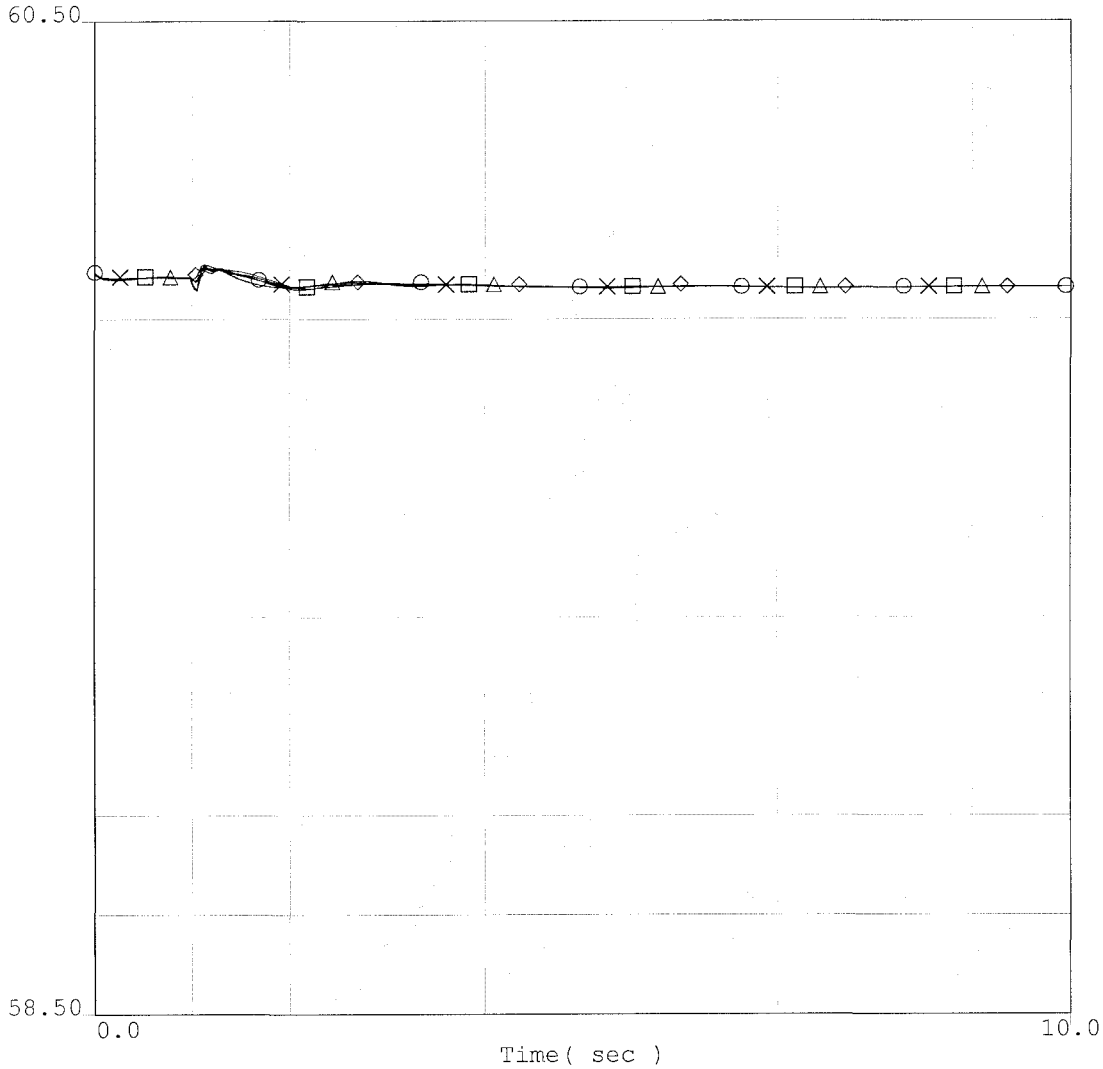
Frequencies:



○	58.5000 fbus	30005	ROUND MT 500.0	0	0.0	1	1	60.5000
×	58.5000 fbus	30015	TABLE MT 500.0	0	0.0	1	1	60.5000
□	58.5000 fbus	30035	TRACY 500.0	0	0.0	1	1	60.5000
△	58.5000 fbus	30040	TESLA 500.0	0	0.0	1	1	60.5000
◇	58.5000 fbus	30060	MIDWAY 500.0	0	0.0	1	1	60.5000

14HS-TS3:THREE PHASE FAULT CLEARING ON MOENKOPI-ELDORADO 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

Frequencies:



○	58.5000	fbus	24801	DEVERS 500.0	0	0.0	1	1	60.5000
×	58.5000	fbus	24086	LUGO 500.0	0	0.0	1	1	60.5000
□	58.5000	fbus	26094	SYLMARLA 230.0	0	0.0	1	1	60.5000
△	58.5000	fbus	22468	MIGUEL 500.0	0	0.0	1	1	60.5000
◇	58.5000	fbus	22536	N.GILA 500.0	0	0.0	1	1	60.5000

14HS-TS3:THREE PHASE FAULT CLEARING ON MOENKOPI-ELDORADO 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

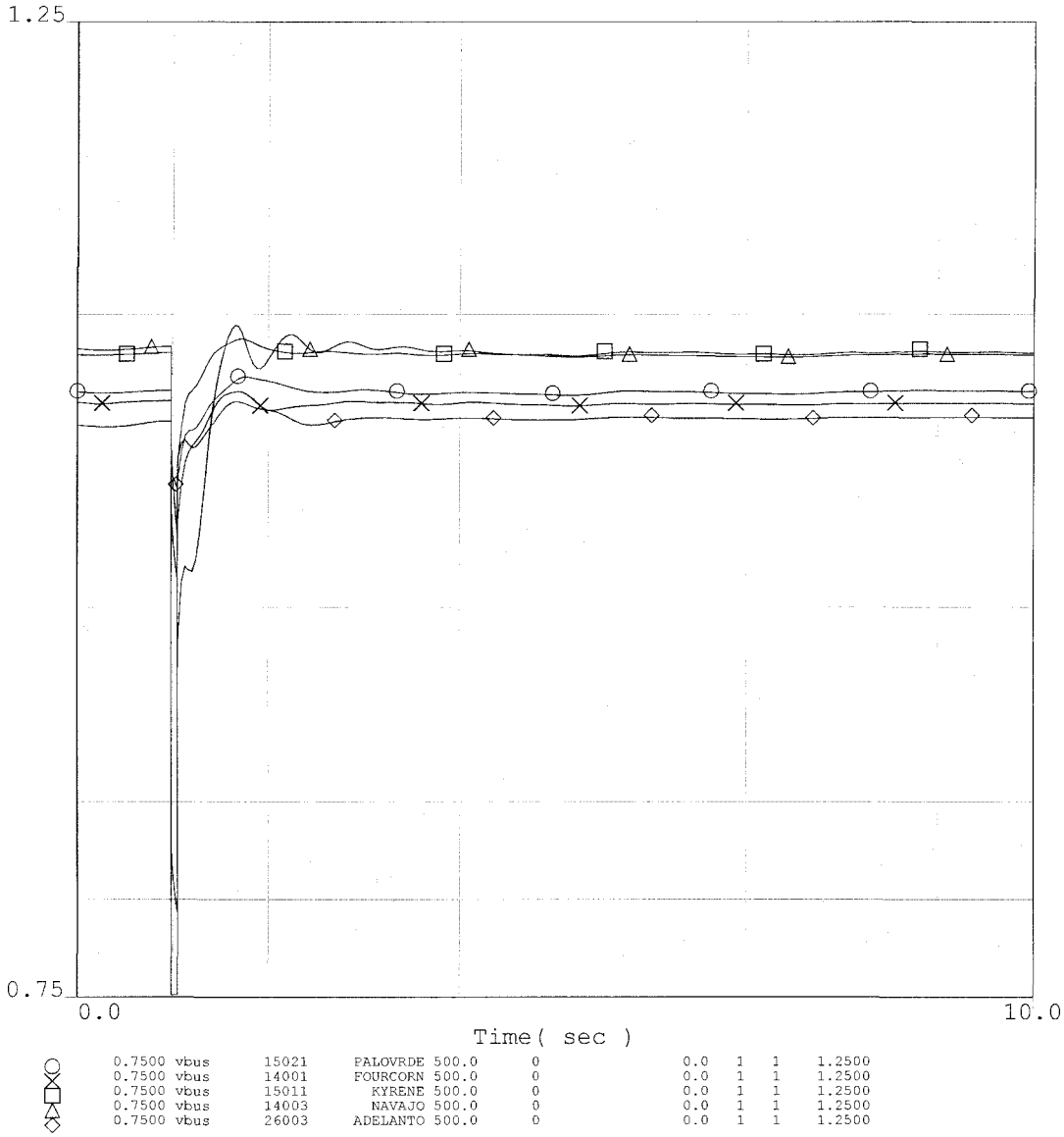
AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct	@time
40	STATELIN	69	vbul	1.003	0.987	1.6	1.521
40	VANSYCLE	69	vbus	1.005	0.988	1.6	1.521
24	PALMDALE	66	vbug	1.128	1.123	0.5	2.2

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
14	BAGDAD	115	fbul	59.855	1.054
14	NAVAJO	500	fbus	59.889	1.371
14	NAVAJO 3	26	fbug	59.786	1.371

There were 0 violations of MORC criteria 1 (25% Voltage Dip) !
There were 0 violations of MORC criteria 2 (20% Voltage Dip for 20 Cycles)!
There were 0 violations of MORC criteria 3 (59.6 HZ for 6 Cycles)!

ARIZONA_voltages:



14HS-TS4:THREE PHASE FAULT CLEARING ONNAVAJO-CRYSTAL500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

14hs_q3_nv-cr.chf

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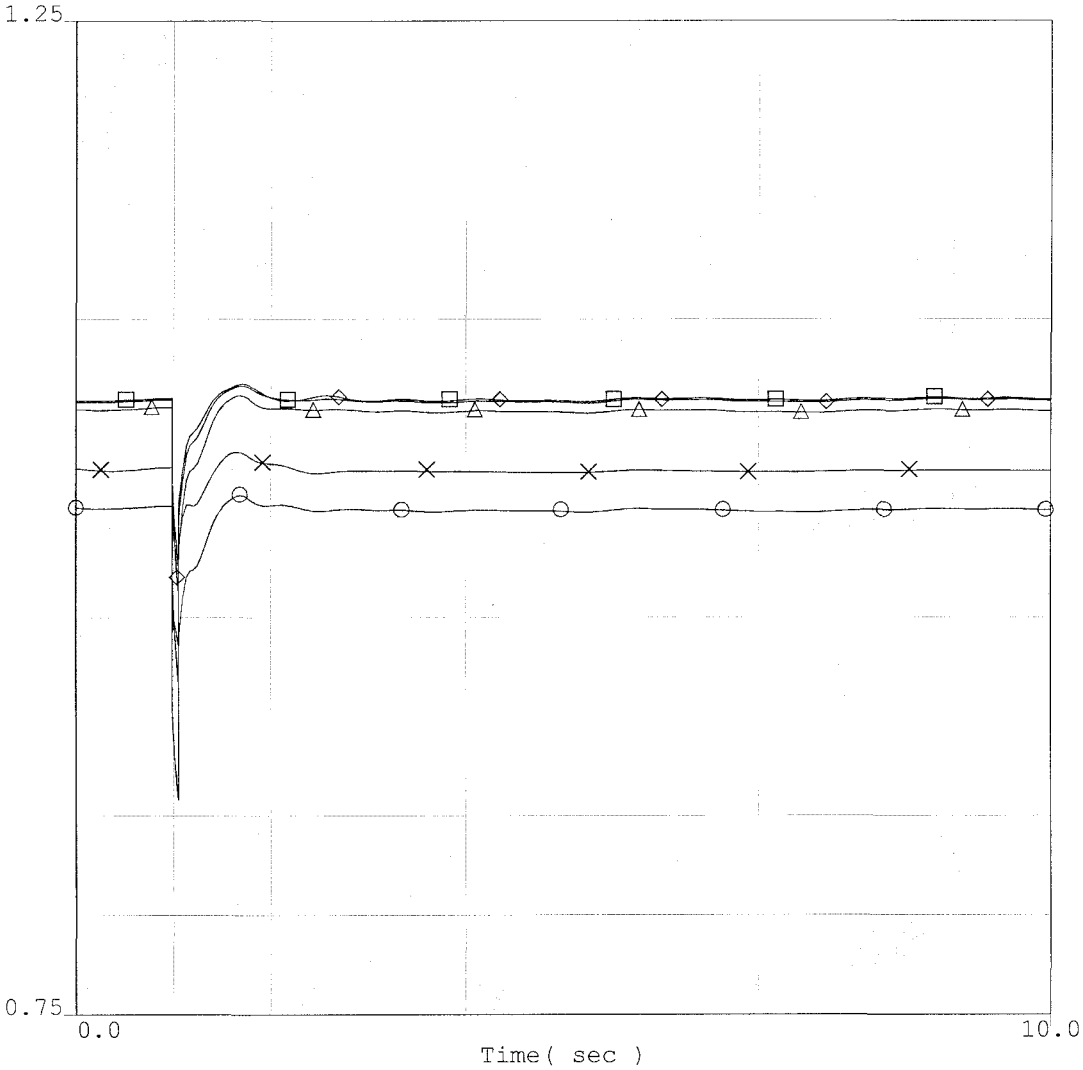
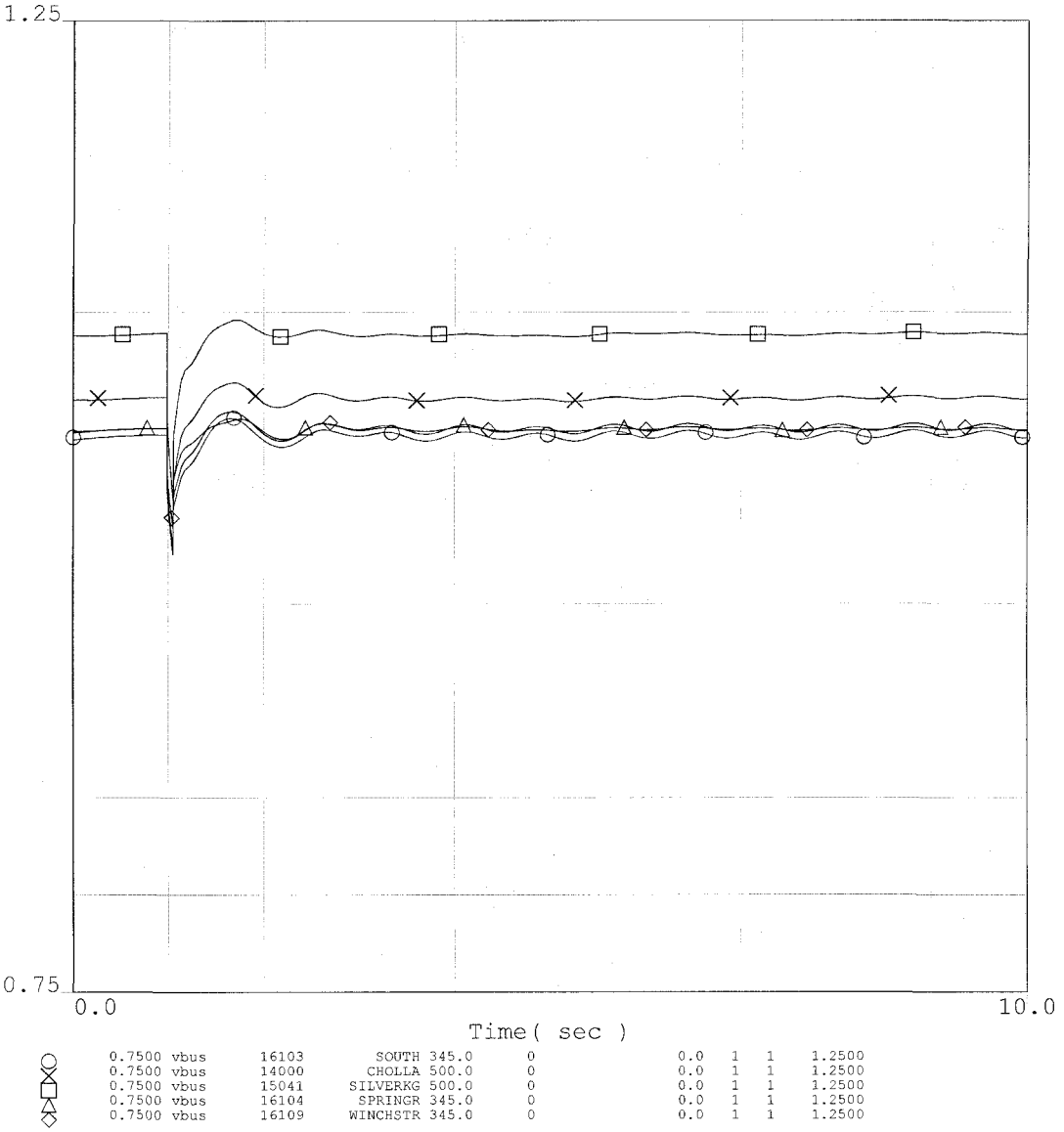
ARIZONA_voltages:



0.7500	vbul	14231	WESTWNGW 230.0	0	0.0	1	1	1.2500
0.7500	vbus	19011	MEAD N 230.0	0	0.0	1	1	1.2500
0.7500	vbus	15215	SILVERKG 230.0	0	0.0	1	1	1.2500
0.7500	vbul	14221	PPAPS W 230.0	0	0.0	1	1	1.2500
0.7500	vbus	15207	KYRENE 230.0	0	0.0	1	1	1.2500

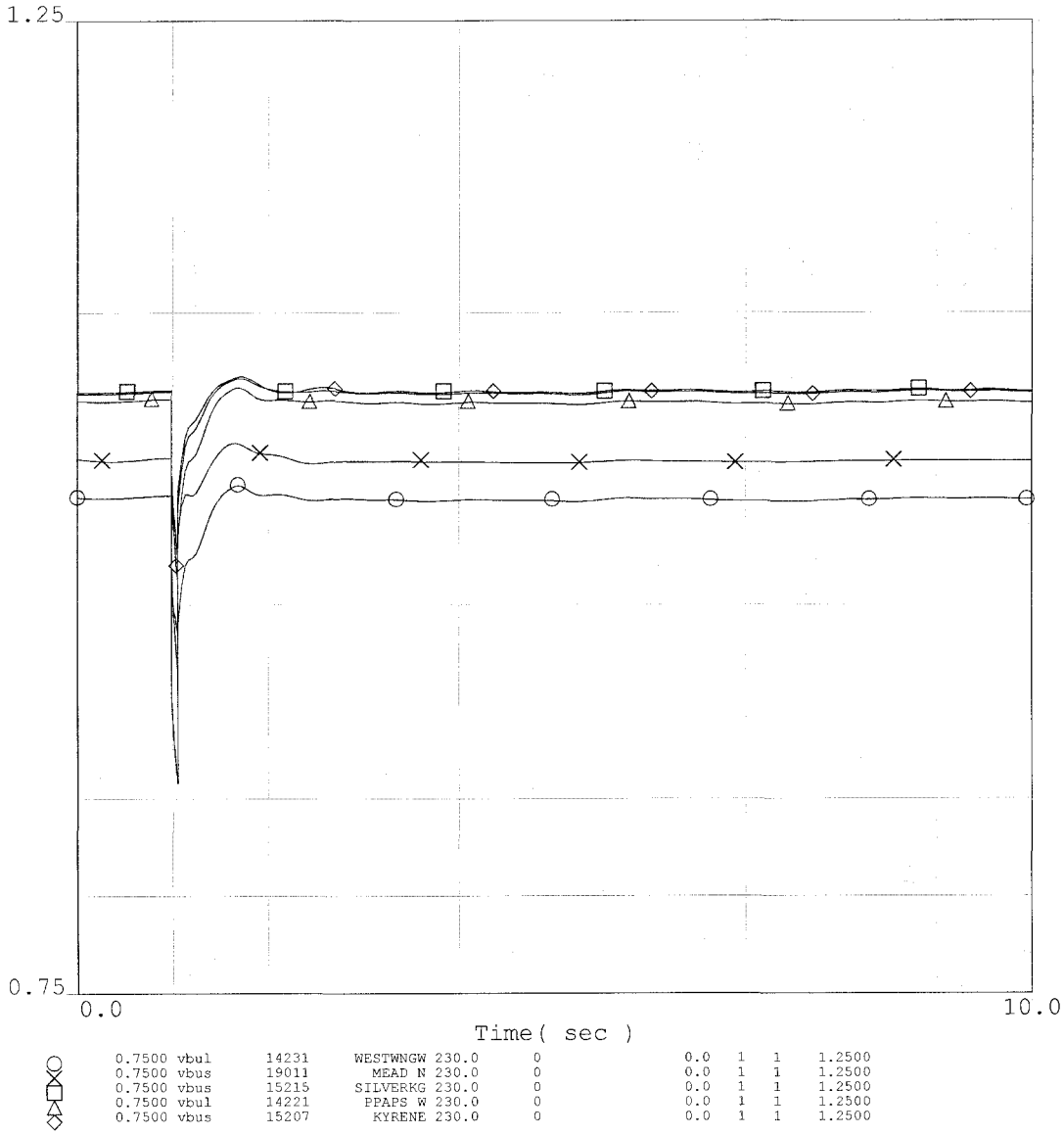
14HS-TS4:THREE PHASE FAULT CLEARING ONNAVAJO-CRYSTAL500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

ARIZONA_voltages:



14HS-TS4:THREE PHASE FAULT CLEARING ONNAVAJO-CRYSTAL500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

ARIZONA_voltages:



14HS-TS4:THREE PHASE FAULT CLEARING ONNAVAJO-CRYSTAL500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

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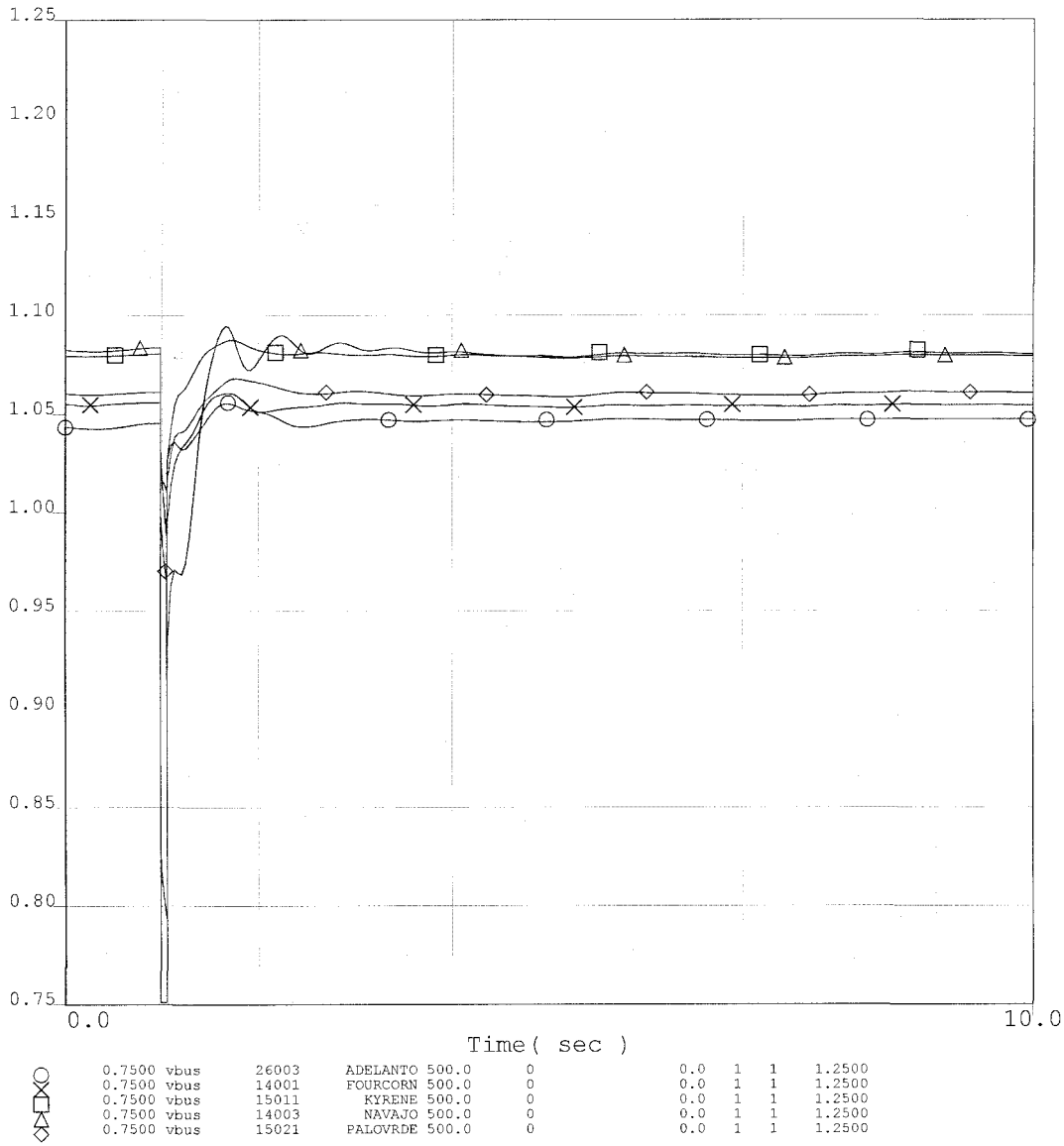
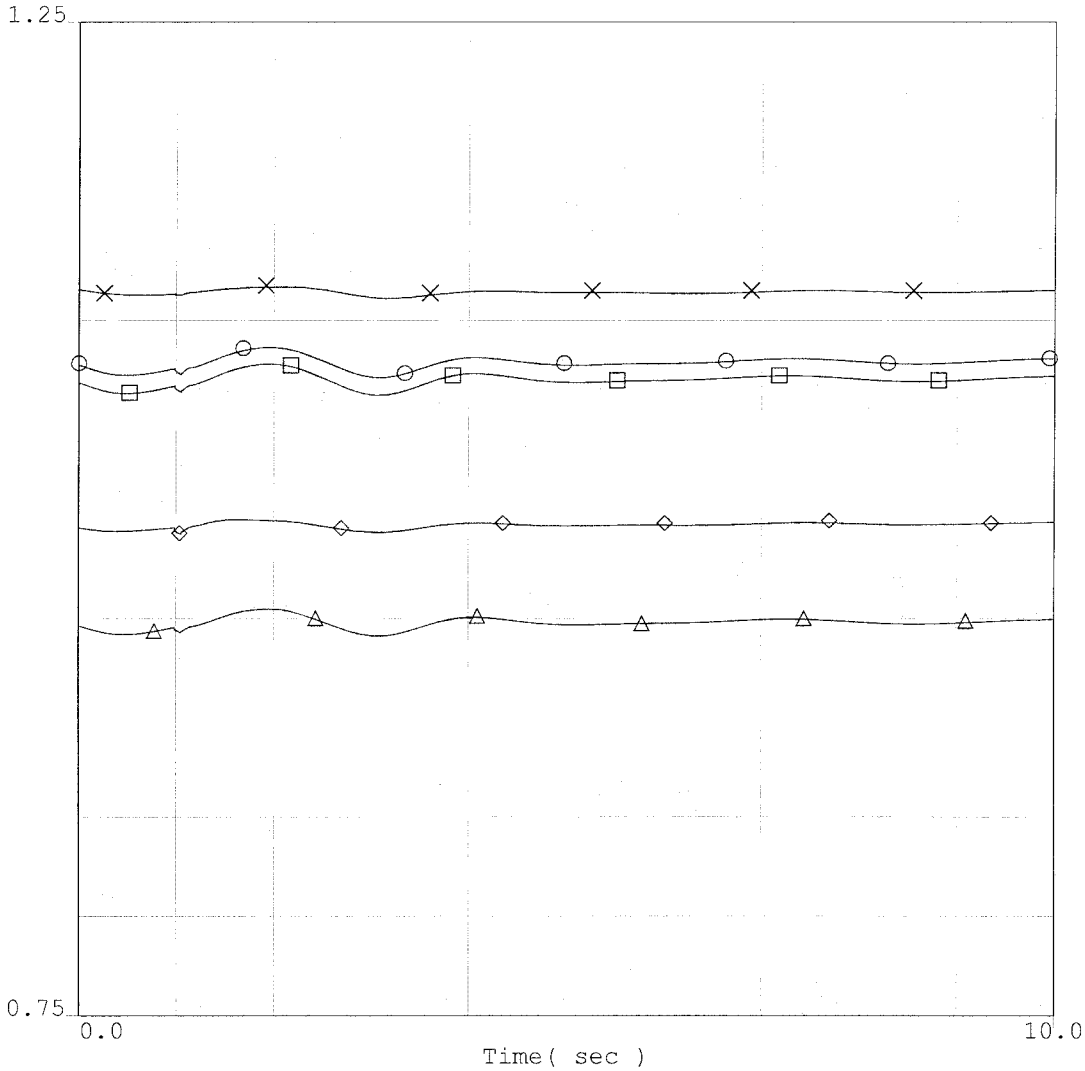


14HS-TS4:THREE PHASE FAULT CLEARING ONNAVAJO-CRYSTAL500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

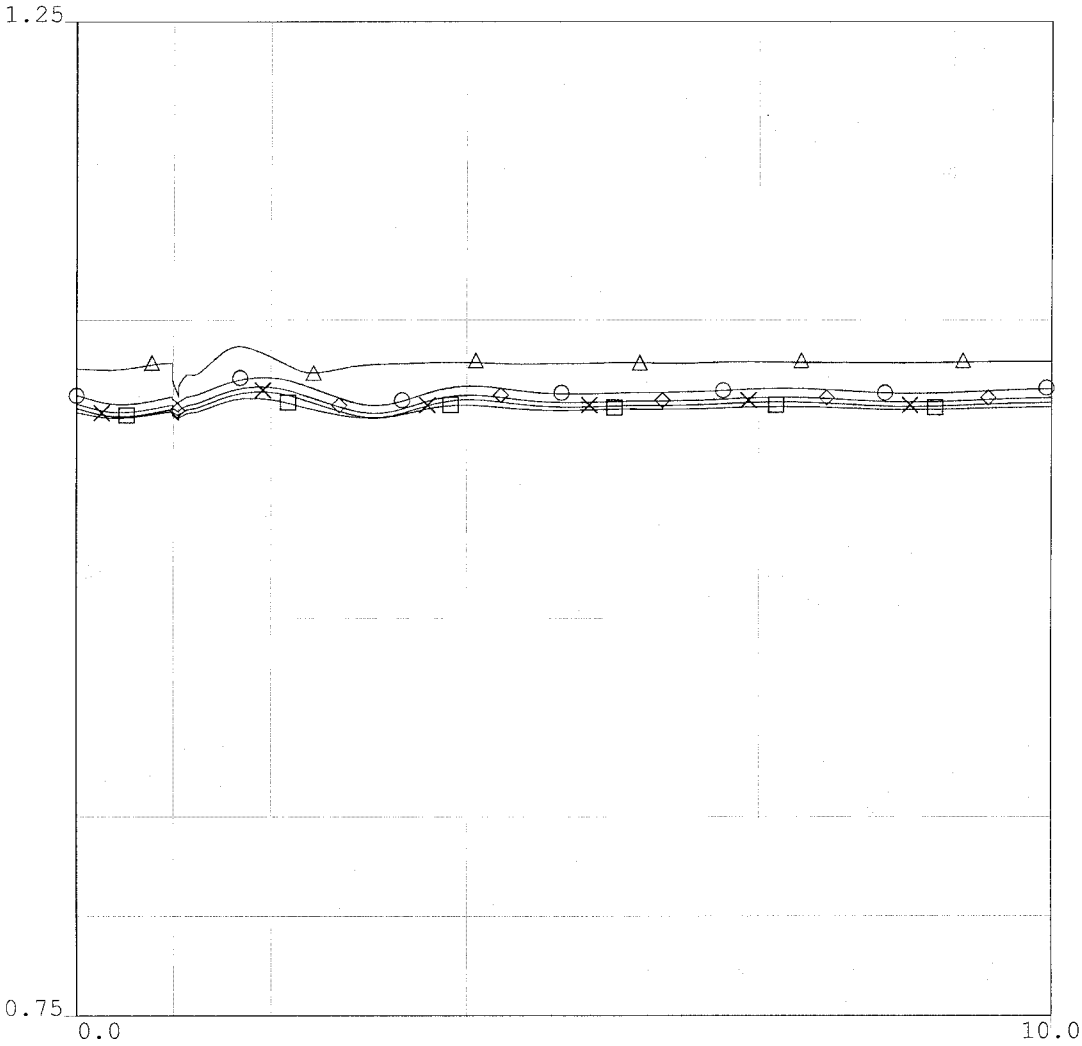
NORTHWEST_voltages:



0.7500 vbus	40489	GRIZZLY 500.0	0	0.0	1	1	1.2500
0.7500 vbus	40459	GARRISON 500.0	0	0.0	1	1	1.2500
0.7500 vbus	40687	MALIN 500.0	0	0.0	1	1	1.2500
0.7500 vbul	45215	NEWELL 69.0	0	0.0	1	1	1.2500
0.7500 vbus	60235	MIDPOINT 345.0	0	0.0	1	1	1.2500

14HS-TS4:THREE PHASE FAULT CLEARING ONNAVAJO-CRYSTAL500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

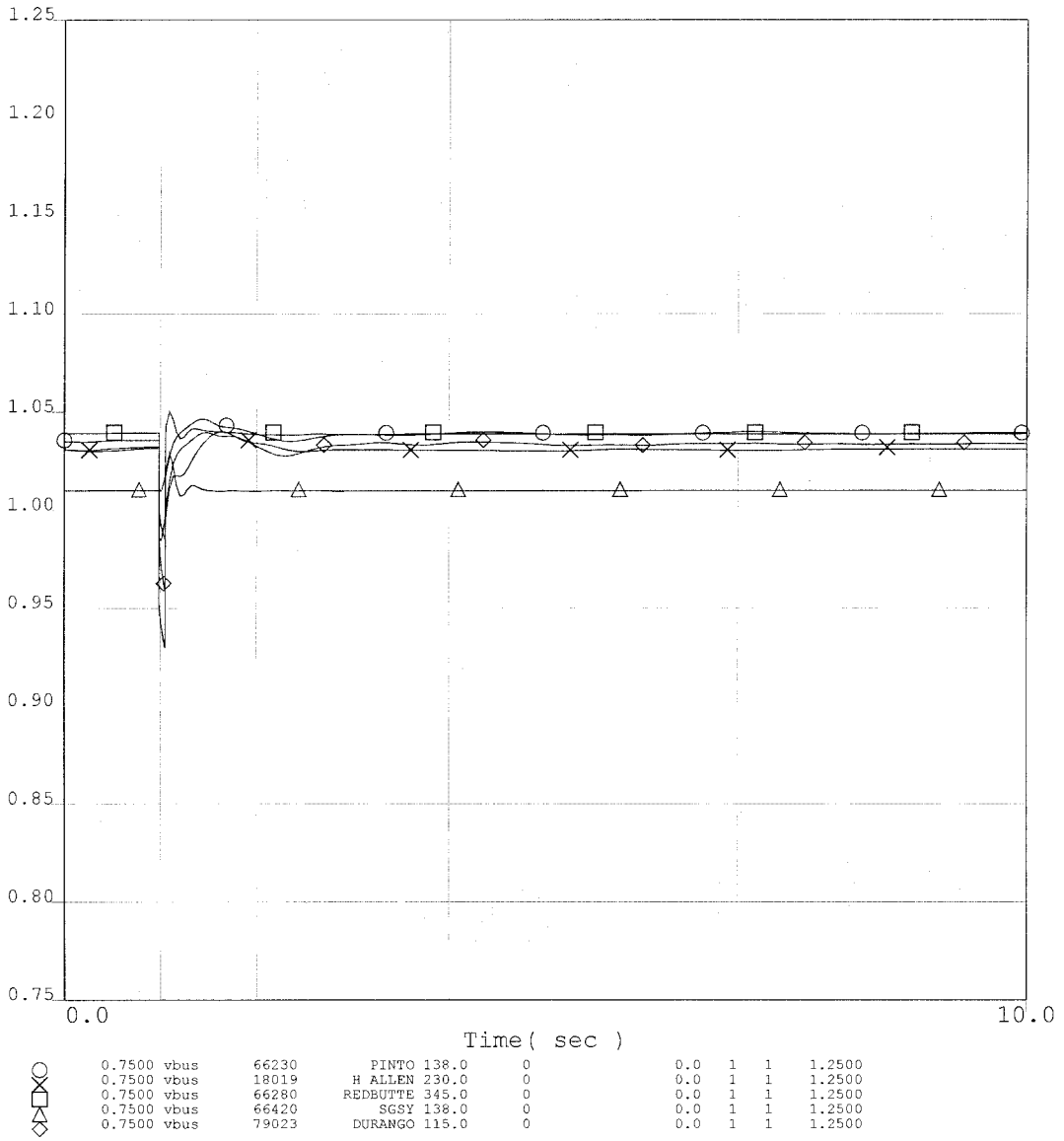
CALIFORNIA_voltages:



0.7500 vbus	30005	ROUND MT 500.0	0	0.0	1	1	1.2500
0.7500 vbus	30015	TABLE MT 500.0	0	0.0	1	1	1.2500
0.7500 vbus	30040	TESLA 500.0	0	0.0	1	1	1.2500
0.7500 vbus	30060	MIDWAY 500.0	0	0.0	1	1	1.2500
0.7500 vbus	30020	OLINDA 500.0	0	0.0	1	1	1.2500

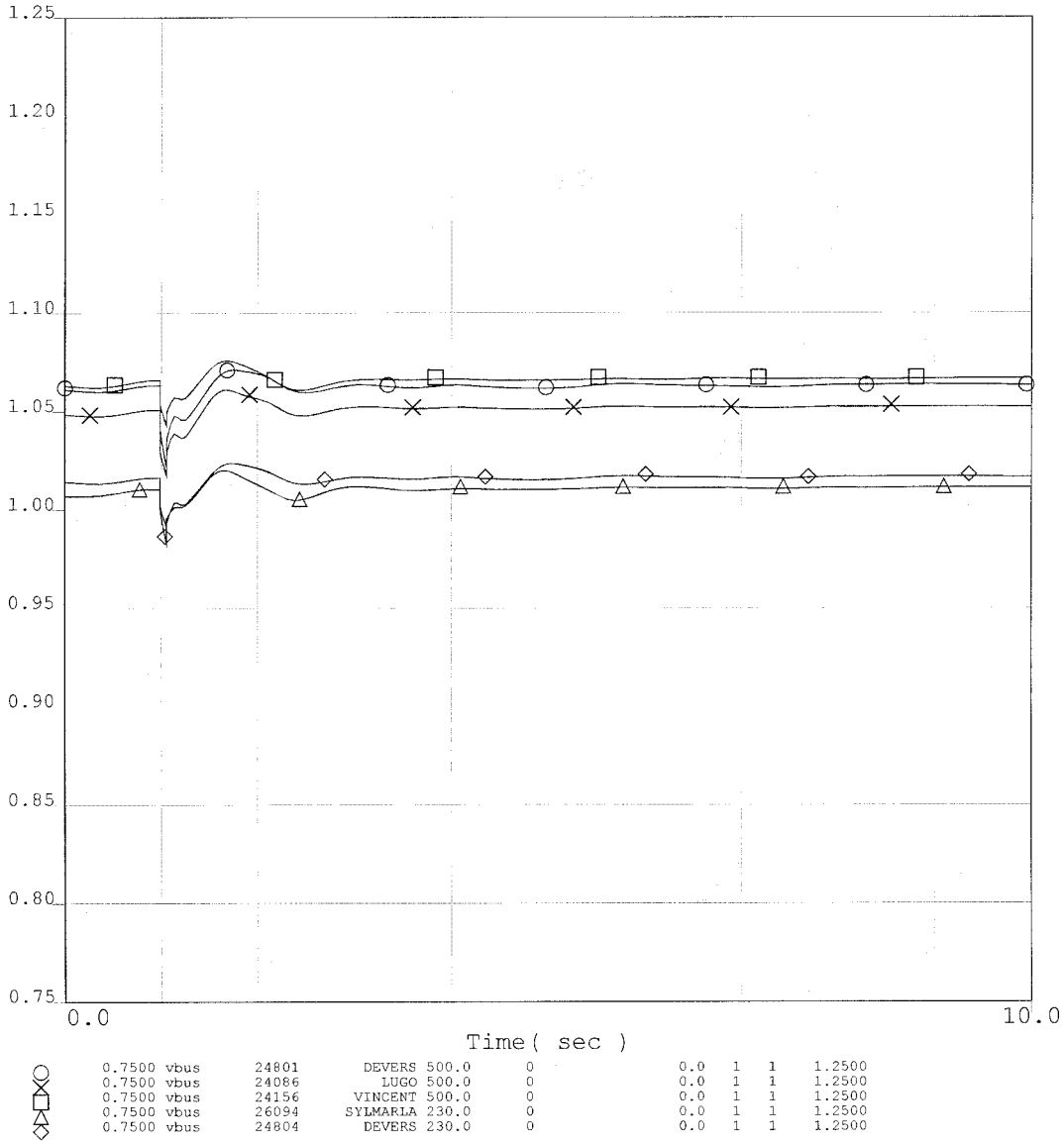
14HS-TS4:THREE PHASE FAULT CLEARING ONNAVAJO-CRYSTAL500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

UTAH_voltages:



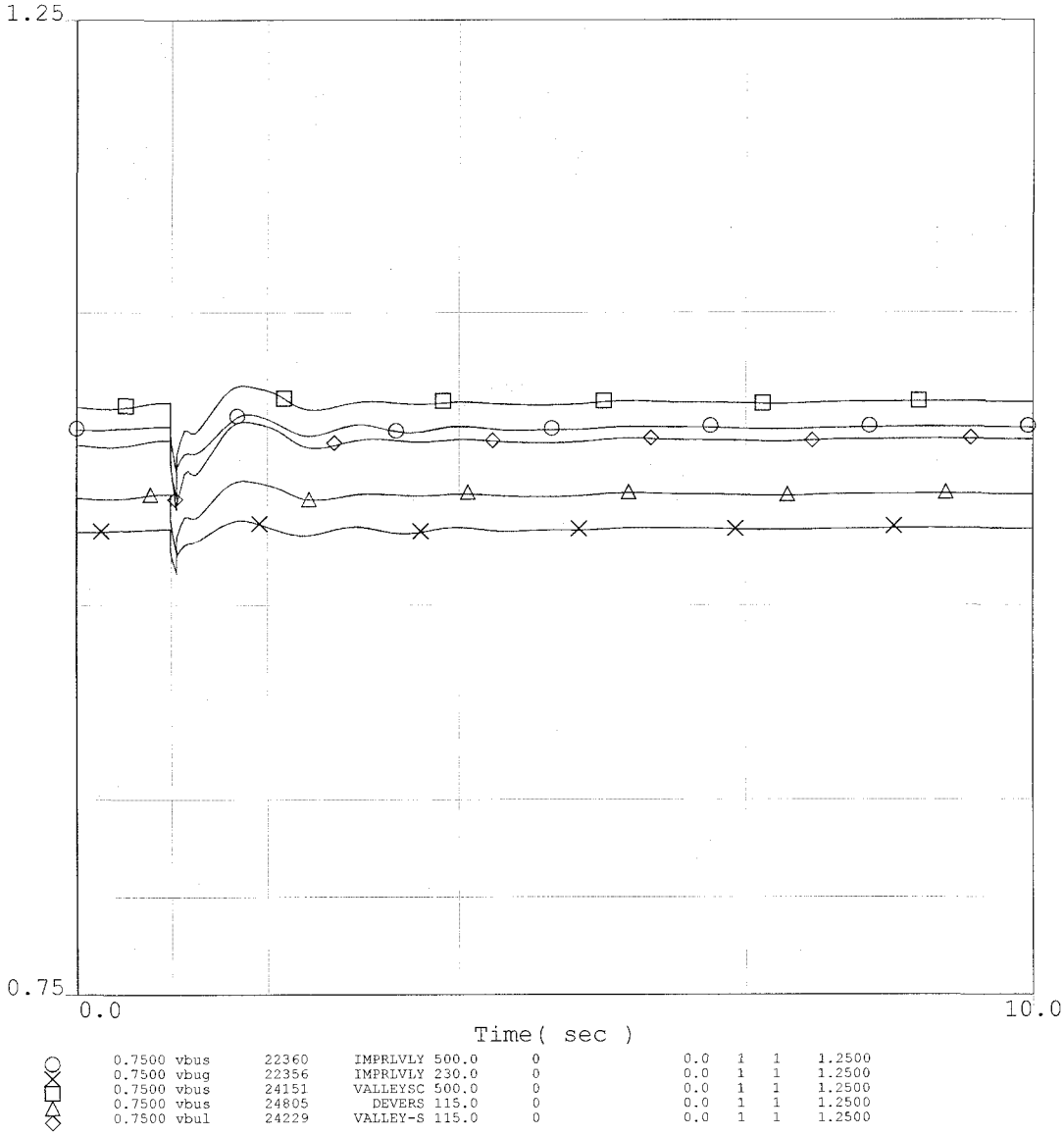
14HS-TS4:THREE PHASE FAULT CLEARING ONNAVAJO-CRYSTAL500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

CALIFORNIA_voltages:



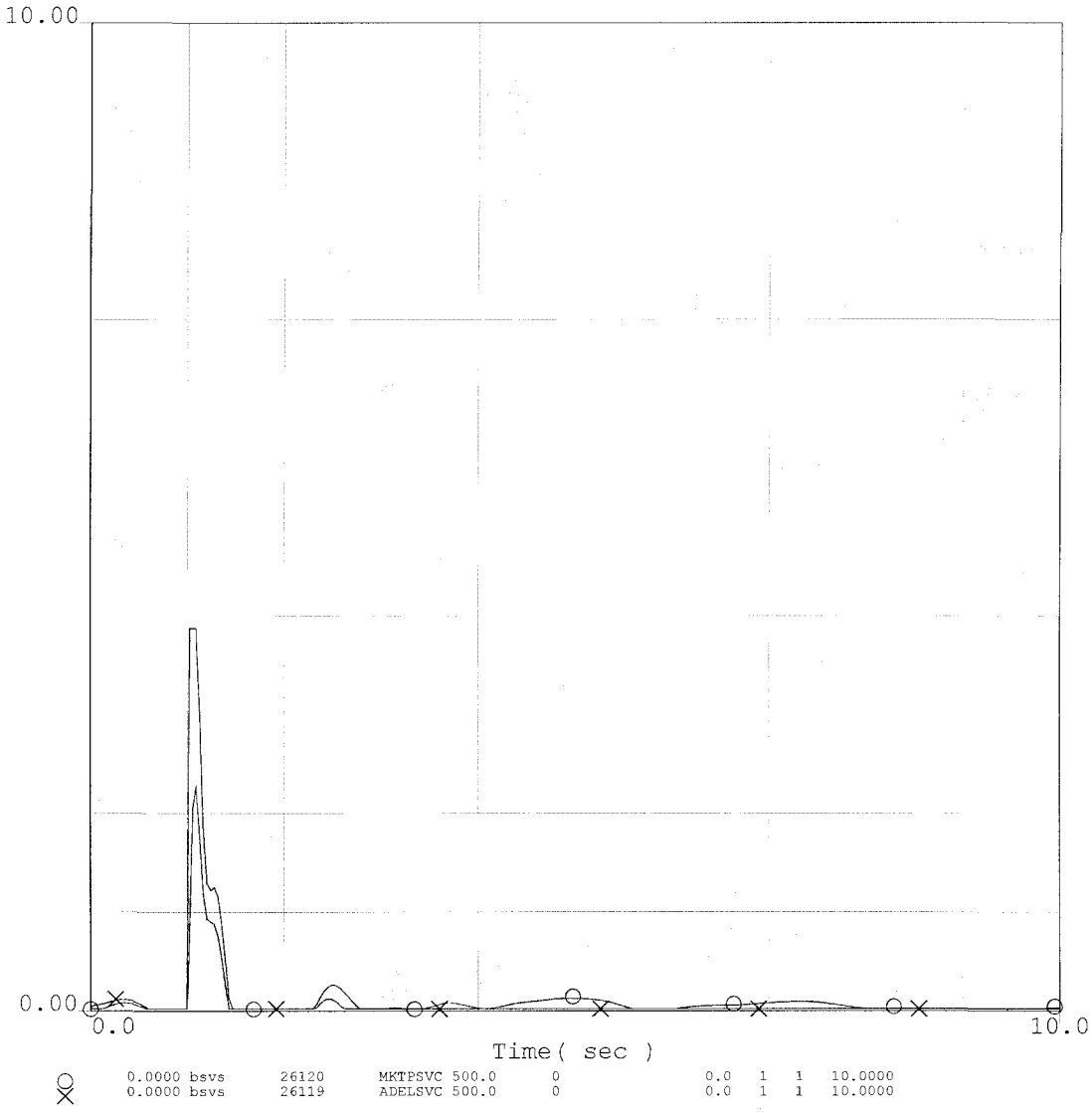
14HS-TS4:THREE PHASE FAULT CLEARING ONNAVAJO-CRYSTAL500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

CALIFORNIA_voltages:



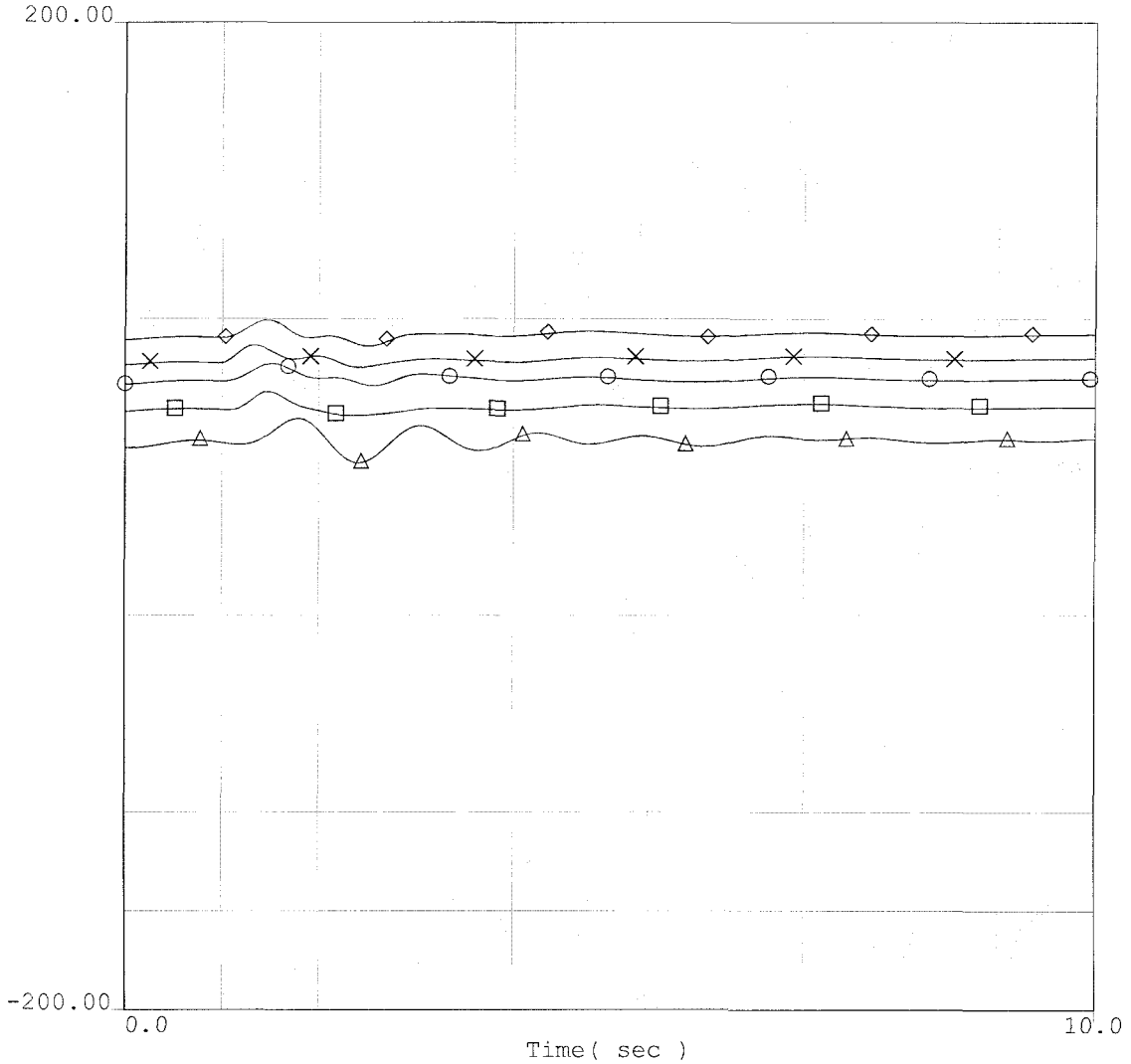
14HS-TS4:THREE PHASE FAULT CLEARING ONNAVAJO-CRYSTAL500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

SVC_output



14HS-TS4:THREE PHASE FAULT CLEARING ONNAVAJO-CRYSTAL500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

SYSTEM_Rotorangles



-200.0000 ang	16500	SPR GEN1	19.0	0	0.0	1	1	200.0000
-200.0000 ang	10321	SJUAN_G4	22.0	0	0.0	1	1	200.0000
-200.0000 ang	14942	SAGUARO2	15.5	0	0.0	1	1	200.0000
-200.0000 ang	17024	APACHCT1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	16518	SPR GEN3	21.0	0	0.0	1	1	200.0000

14HS-TS4:THREE PHASE FAULT CLEARING ONNAVAJO-CRYSTAL500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

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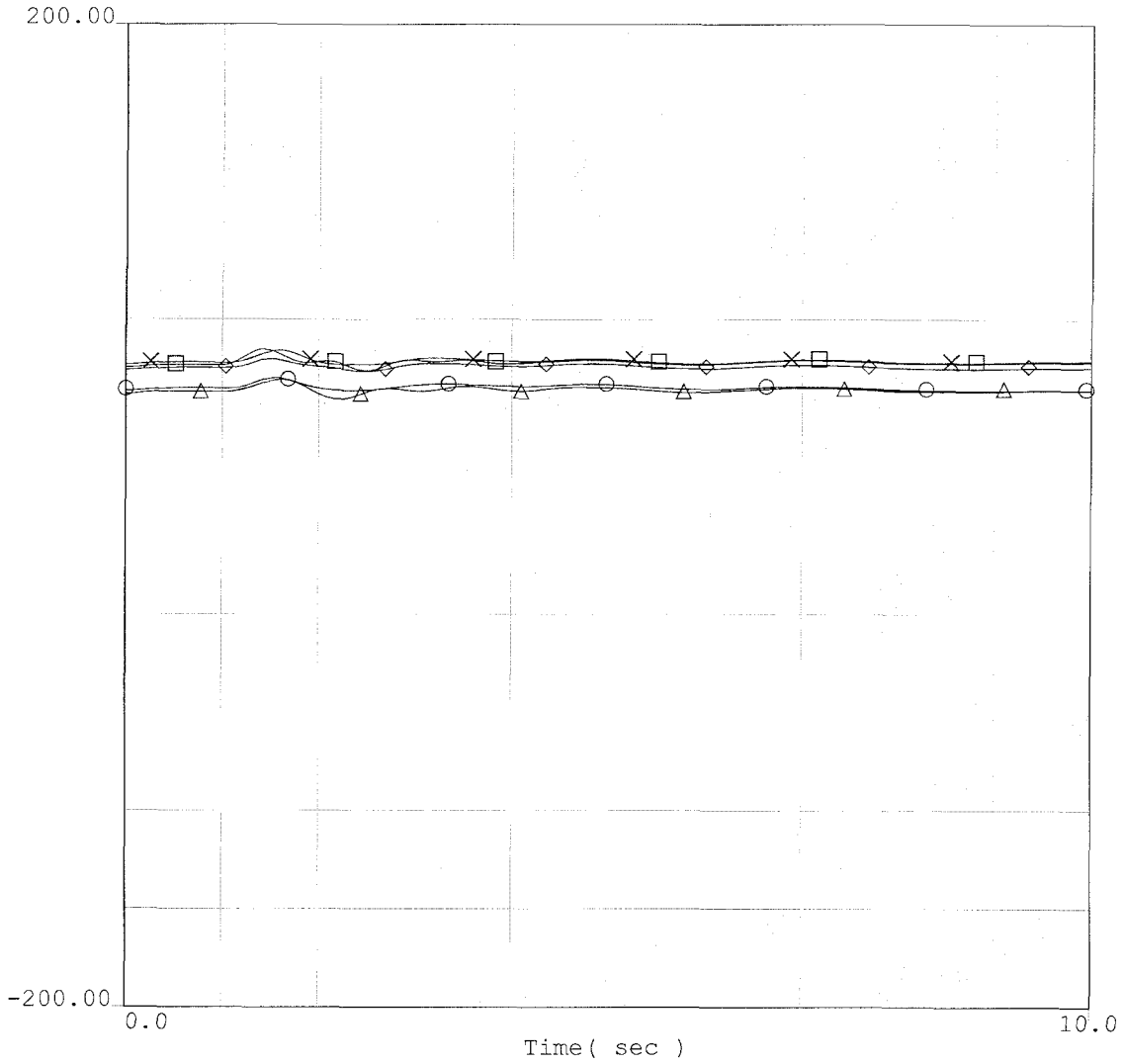
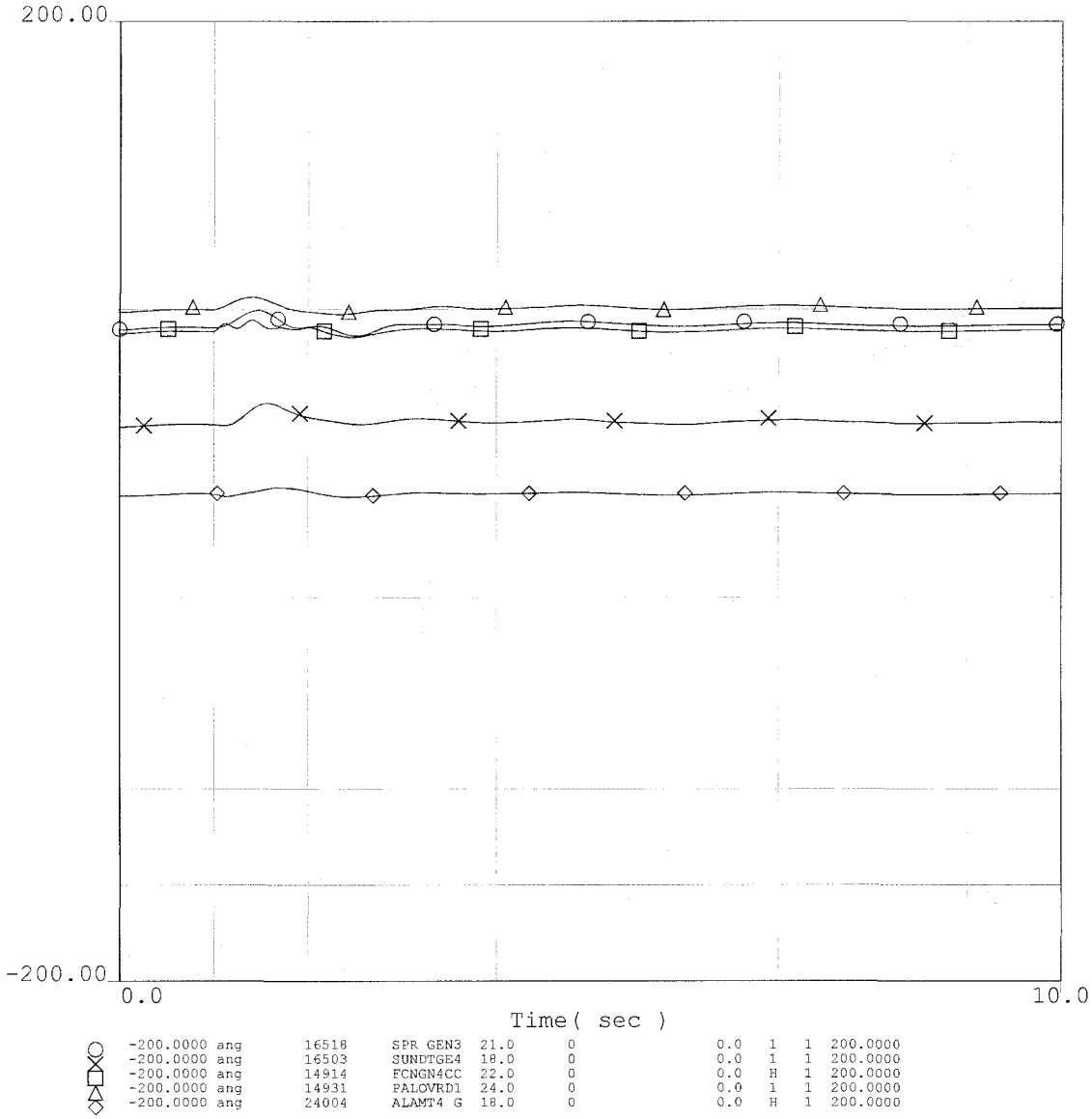
SYSTEM_Rotorangles



-200.0000 ang	15140	DBG-CT1	18.0	0	0.0	1	1	200.0000
-200.0000 ang	14945	SAG. CT3	13.8	0	0.0	1	1	200.0000
-200.0000 ang	14902	CHOLLA3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	15921	SANTAN 1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	14903	CHOLLA4	22.0	0	0.0	1	1	200.0000

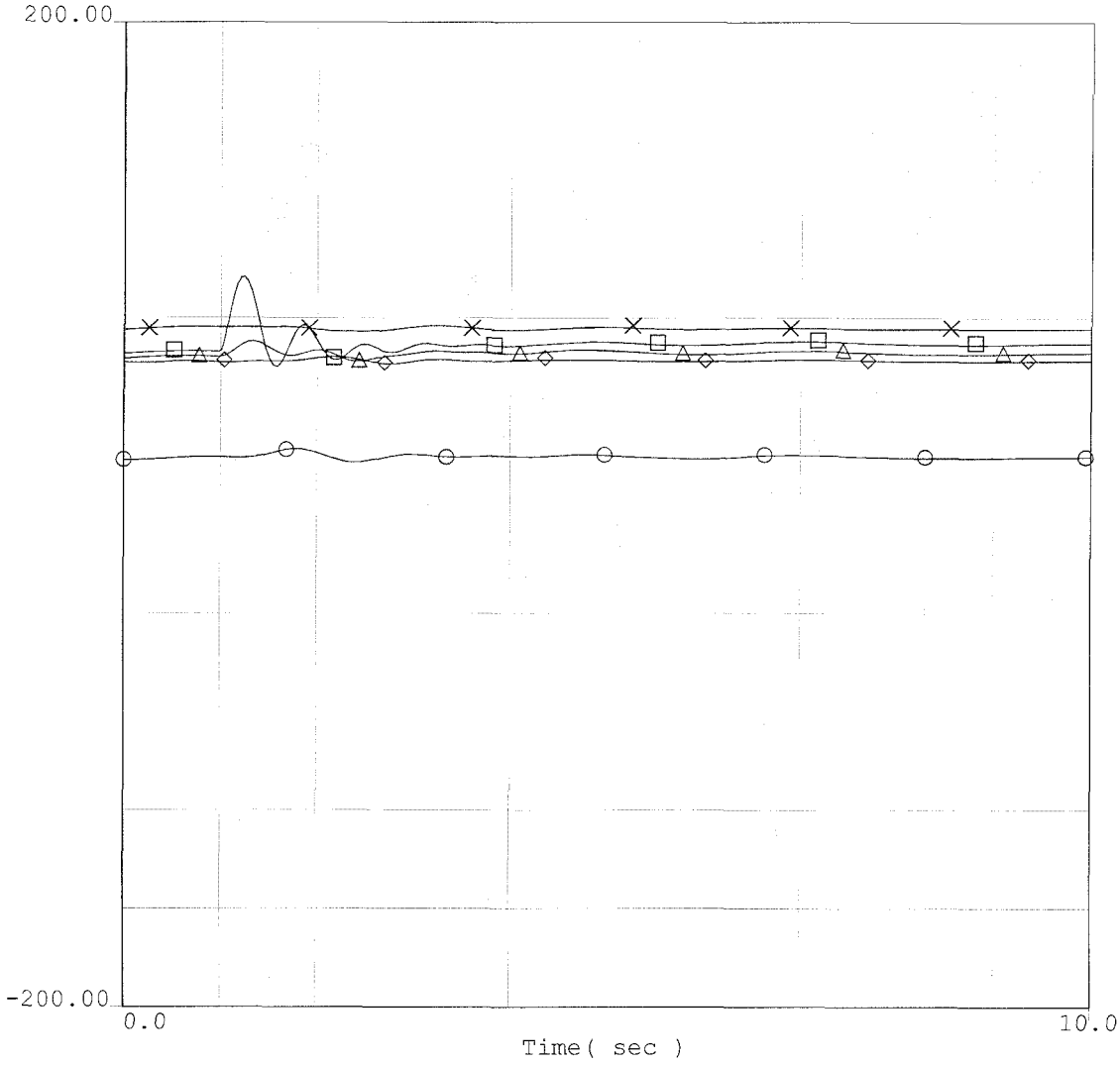
14HS-TS4:THREE PHASE FAULT CLEARING ONNAVAJO-CRYSTAL500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

SYSTEM_Rotorangles



14HS-TS4:THREE PHASE FAULT CLEARING ONNAVAJO-CRYSTAL500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

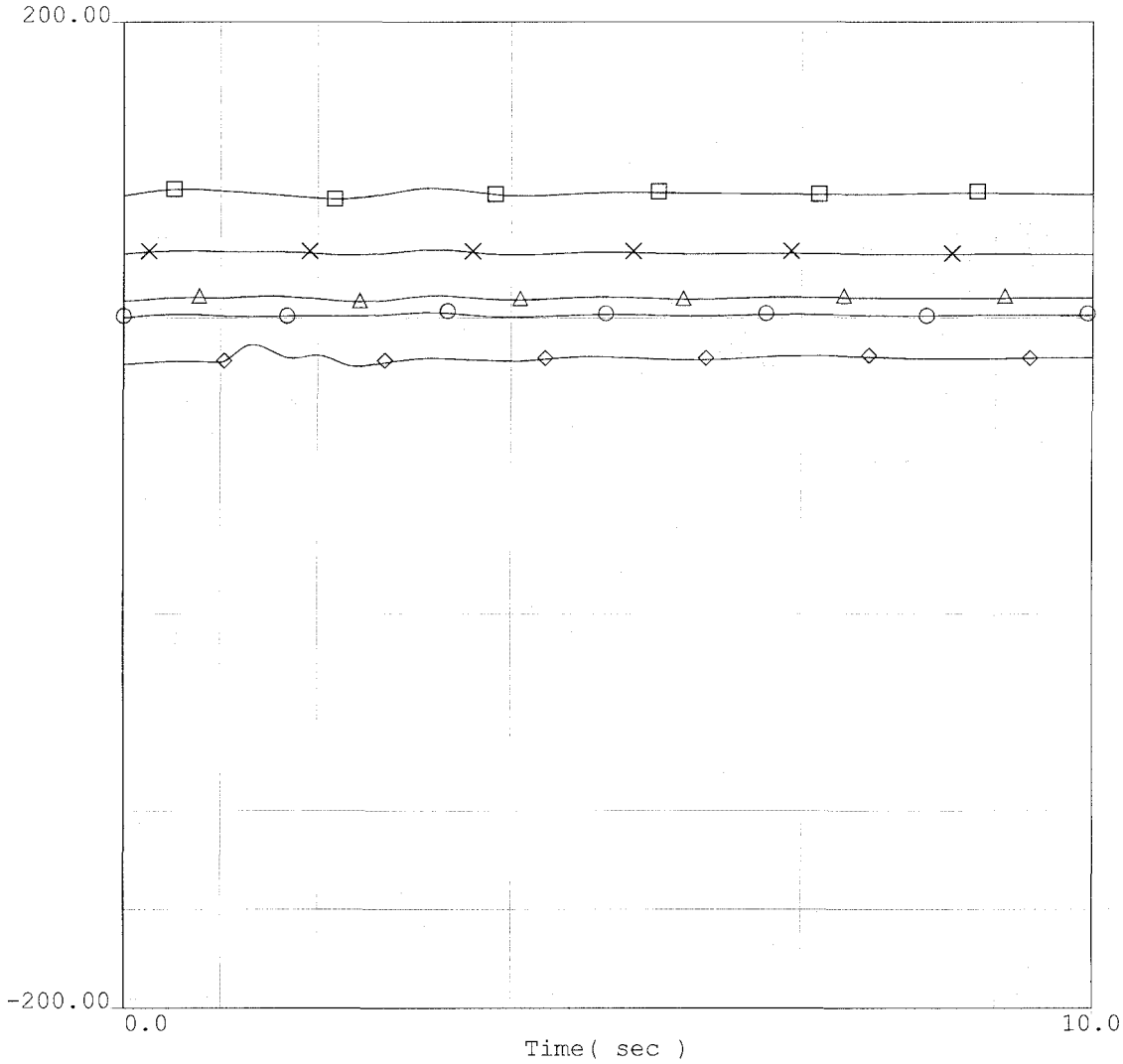
SYSTEM_Rotorangles



-200.0000 ang	24129	S.ONOFR2	22.0	0	0.0	1	1	200.0000
-200.0000 ang	26039	INTERM1G	26.0	0	0.0	1	1	200.0000
-200.0000 ang	15981	NAVAJO 1	26.0	0	0.0	1	1	200.0000
-200.0000 ang	10318	SJUAN_G1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	36411	DIABLO 1	25.0	0	0.0	1	1	200.0000

14HS-TS4:THREE PHASE FAULT CLEARING ONNAVAJO-CRYSTAL500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

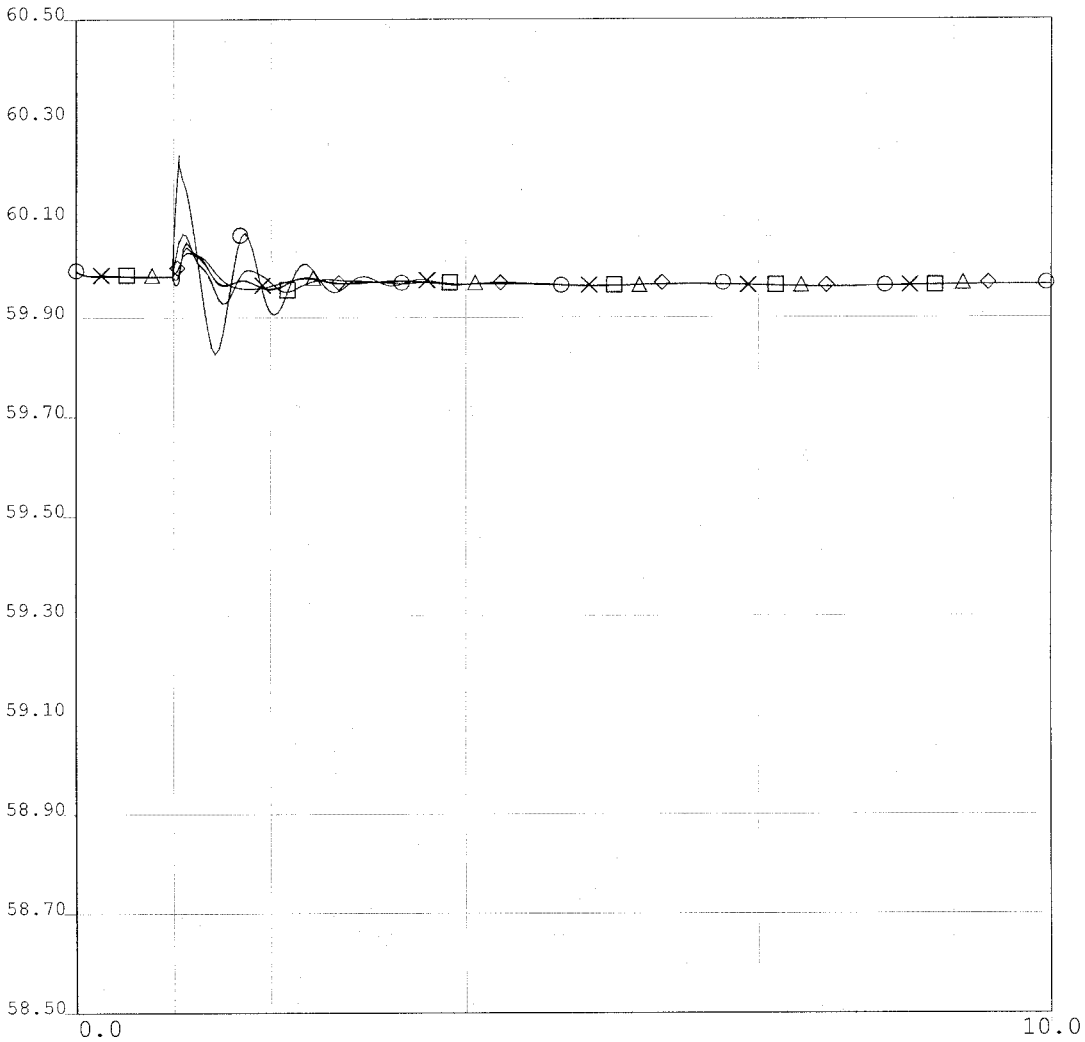
SYSTEM_Rotorangles



-200.0000 ang	73129	MBPP-1	24.0	0	0.0	1	1	200.0000
-200.0000 ang	60086	BRIDGER1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	62050	COLSTP 1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	65500	EHUNTR 3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	10321	SJUAN_G4	22.0	0	0.0	1	1	200.0000

14HS-TS4:THREE PHASE FAULT CLEARING ONNAVAJO-CRYSTAL500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

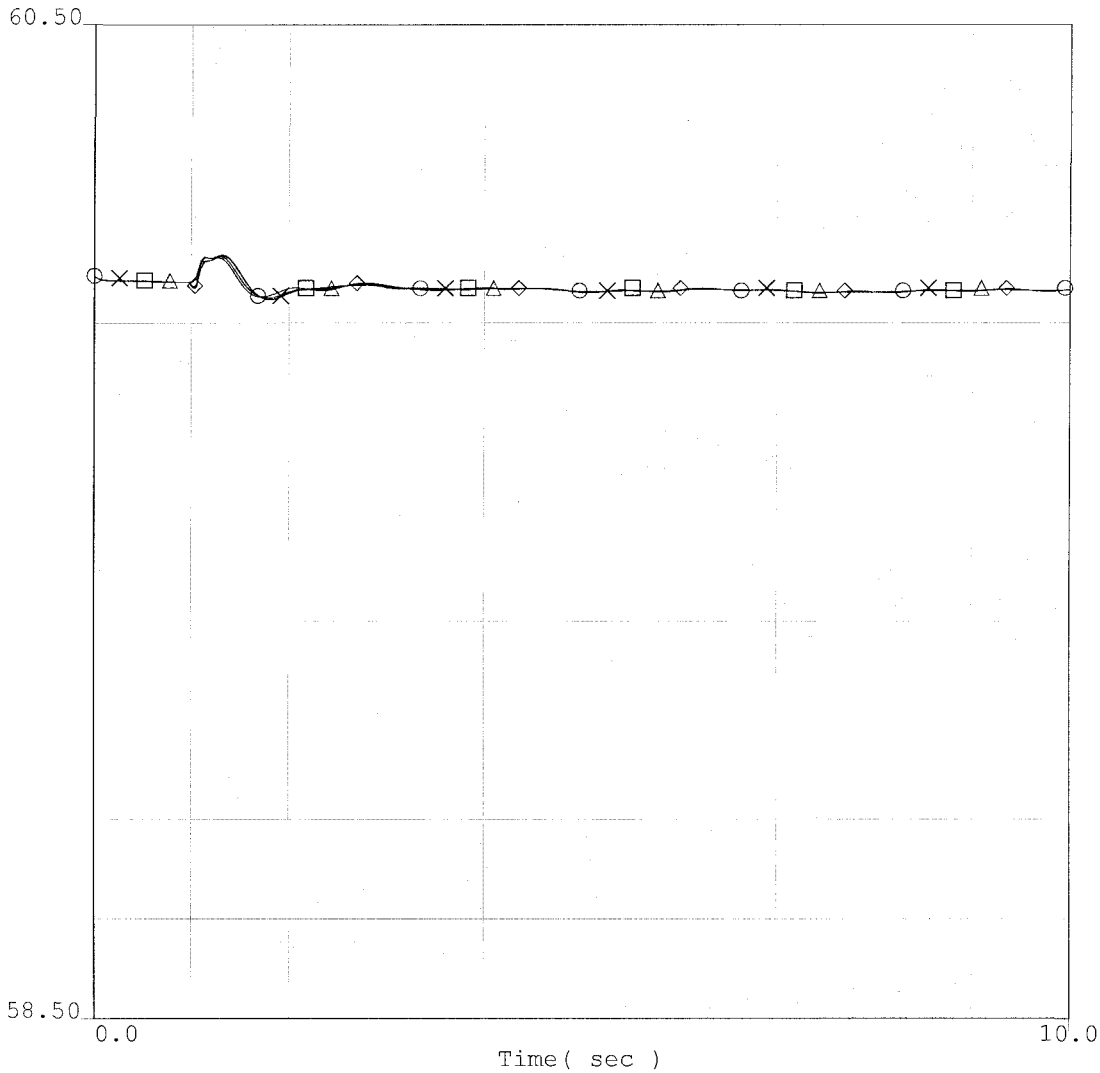
Frequencies:



○	58.5000	fbus	14003	NAVAJO	500.0	0	0.0	1	1	60.5000
×	58.5000	fbus	14005	WESTWING	500.0	0	0.0	1	1	60.5000
□	58.5000	fbus	14001	FOURCORN	500.0	0	0.0	1	1	60.5000
△	58.5000	fbus	14016	PNPKAPS	500.0	0	0.0	1	1	60.5000
◇	58.5000	fbus	15021	PALOVRDE	500.0	0	0.0	1	1	60.5000

14HS-TS4:THREE PHASE FAULT CLEARING ONNAVAJO-CRYSTAL500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

Frequencies:



58.5000 fbus	16000	TORTOLIT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	16105	VAIL 345.0	0	0.0	1	1	60.5000
58.5000 fbus	16103	SOUTH 345.0	0	0.0	1	1	60.5000
58.5000 fbul	15001	CORONADO 500.0	0	0.0	1	1	60.5000
58.5000 fbus	16109	WINCHSTR 345.0	0	0.0	1	1	60.5000

14HS-TS4:THREE PHASE FAULT CLEARING ONNAVAJO-CRYSTAL500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

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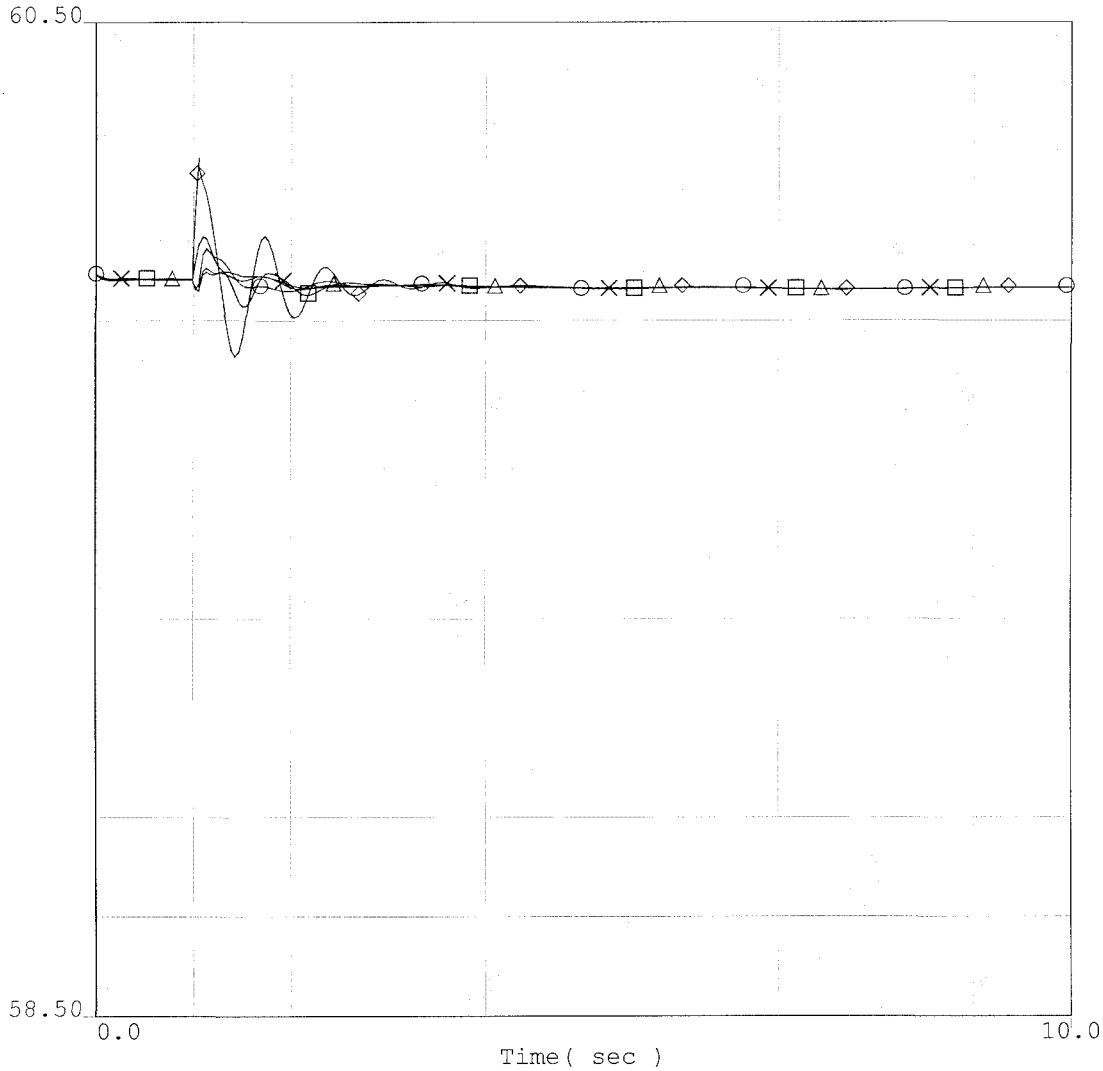
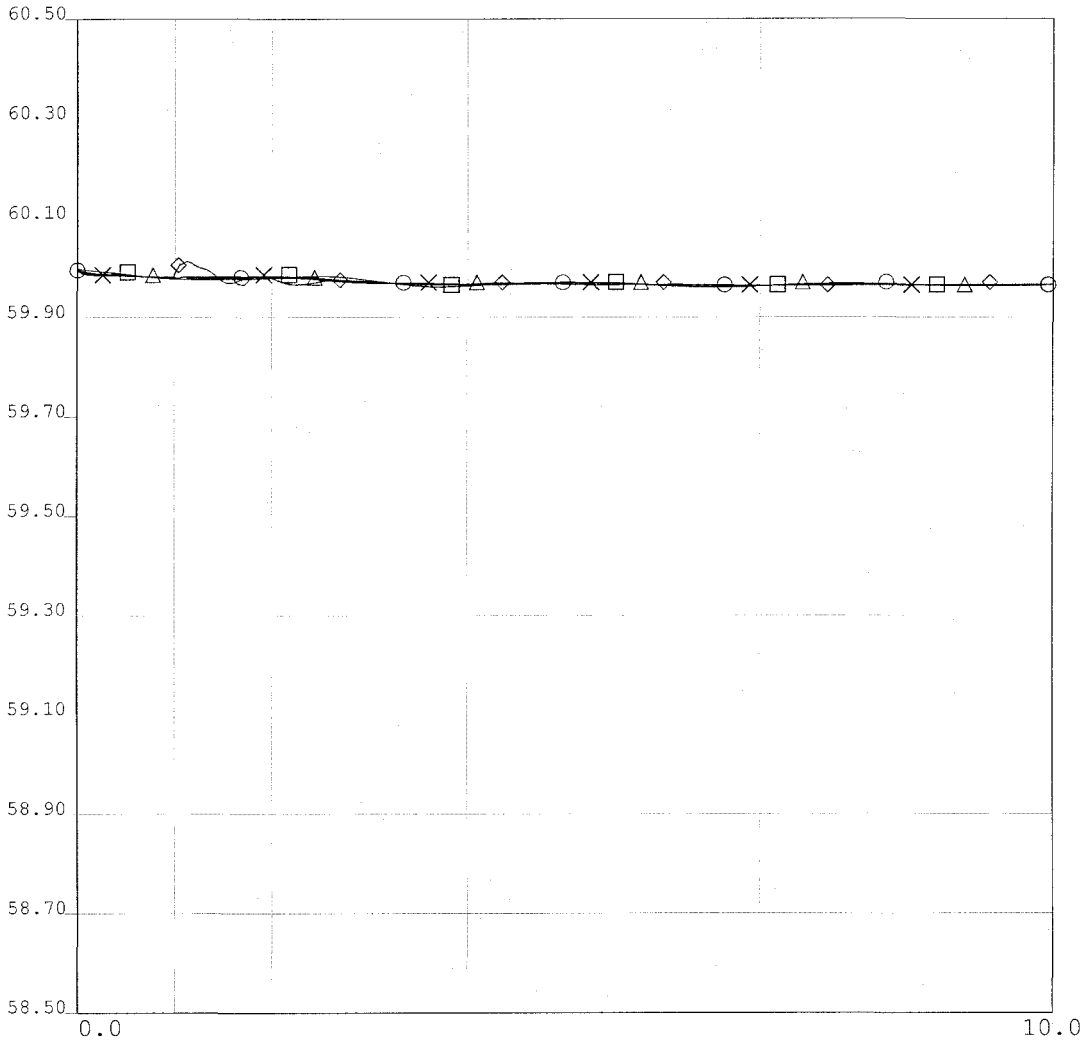
Frequencies:



58.5000	fbul	14231	WESTWNGW 230.0	0	0.0	1	1	60.5000
58.5000	fbus	26003	ADELANTO 500.0	0	0.0	1	1	60.5000
58.5000	fbus	14001	FOURCORN 500.0	0	0.0	1	1	60.5000
58.5000	fbus	26048	MCCULLGH 500.0	0	0.0	1	1	60.5000
58.5000	fbus	14003	NAVAJO 500.0	0	0.0	1	1	60.5000

14HS-TS4:THREE PHASE FAULT CLEARING ONNAVAJO-CRYSTAL500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

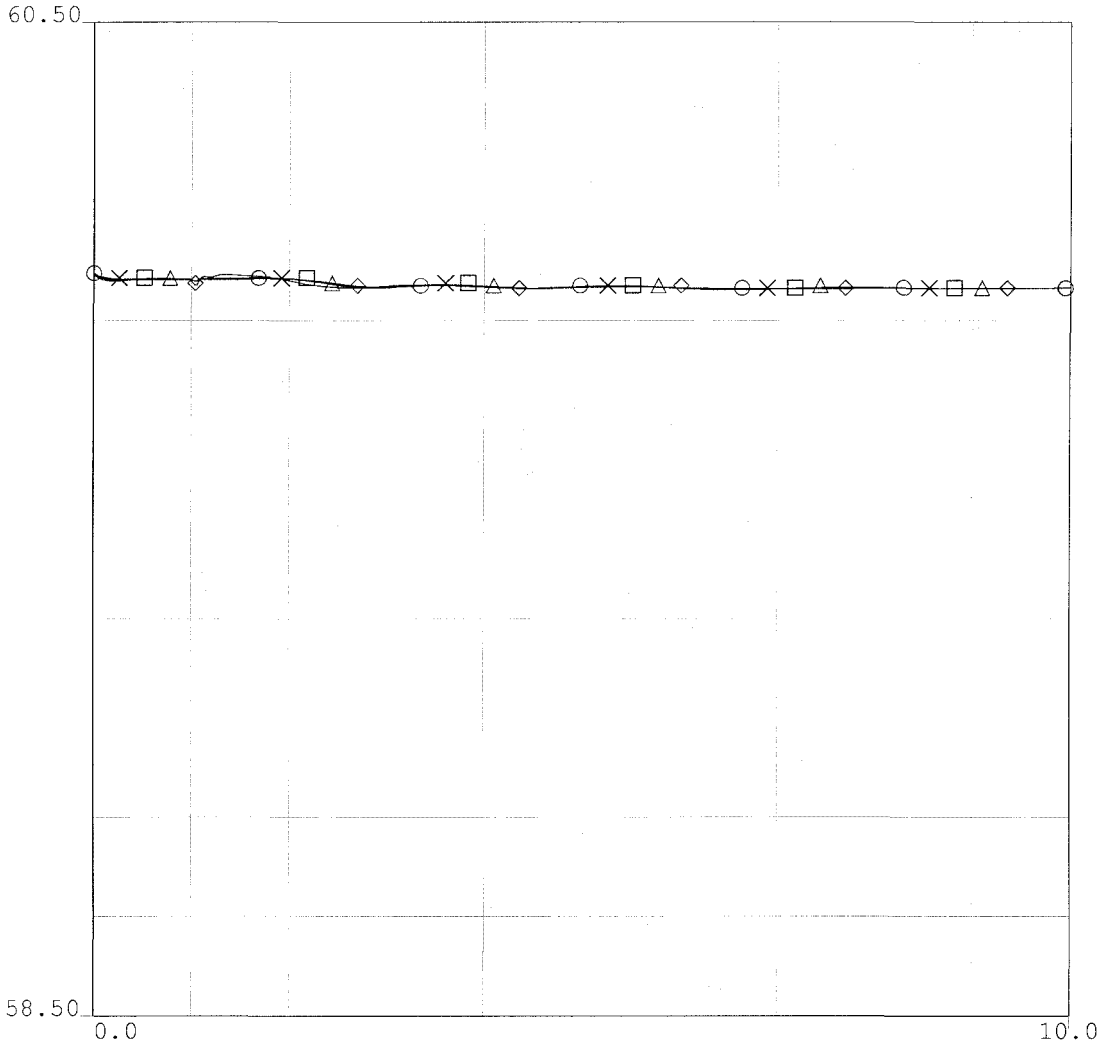
Frequencies:



58.5000 fbus	40489	GRIZZLY 500.0	0	0.0	1	1	60.5000
58.5000 fbus	40687	MALIN 500.0	0	0.0	1	1	60.5000
58.5000 fbus	40459	GARRISON 500.0	0	0.0	1	1	60.5000
58.5000 fbus	60235	MIDPOINT 345.0	0	0.0	1	1	60.5000
58.5000 fbus	66230	PINTO 138.0	0	0.0	1	1	60.5000

14HS-TS4:THREE PHASE FAULT CLEARING ONNAVAJO-CRYSTAL500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

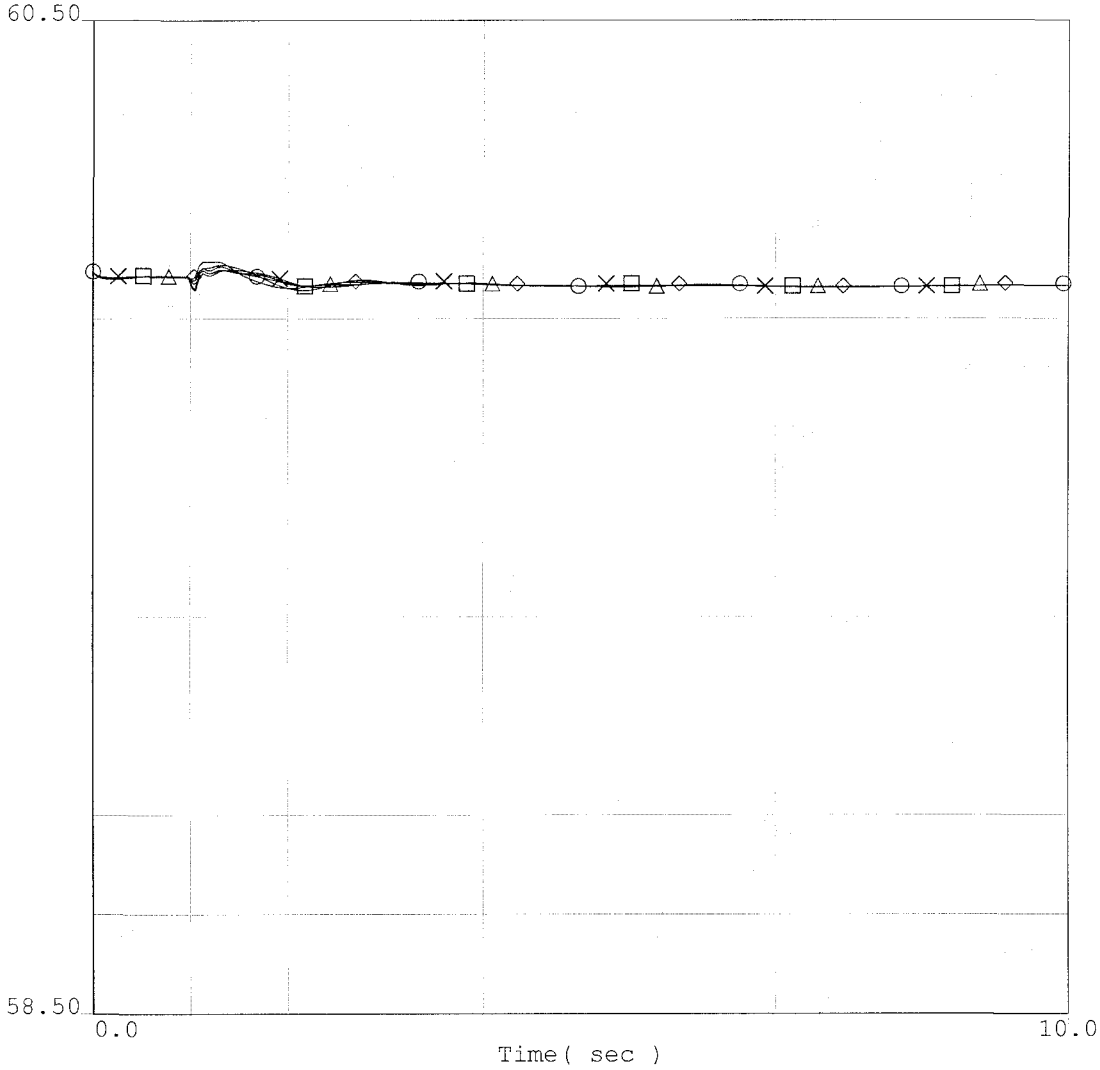
Frequencies:



58.5000 fbus	30005	ROUND MT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30015	TABLE MT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30035	TRACY 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30040	TESLA 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30060	MIDWAY 500.0	0	0.0	1	1	60.5000

14HS-TS4:THREE PHASE FAULT CLEARING ONNAVAJO-CRYSTAL500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

Frequencies:



58.5000 fbus	24801	DEVERS 500.0	0	0.0	1	1	60.5000
58.5000 fbus	24086	LUGO 500.0	0	0.0	1	1	60.5000
58.5000 fbus	26094	SYLMARLA 230.0	0	0.0	1	1	60.5000
58.5000 fbus	22468	MIGUEL 500.0	0	0.0	1	1	60.5000
58.5000 fbus	22536	N.GILA 500.0	0	0.0	1	1	60.5000

14HS-TS4:THREE PHASE FAULT CLEARING ONNAVAJO-CRYSTAL500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/29/11)

HIGHEST VOLTAGE DIP

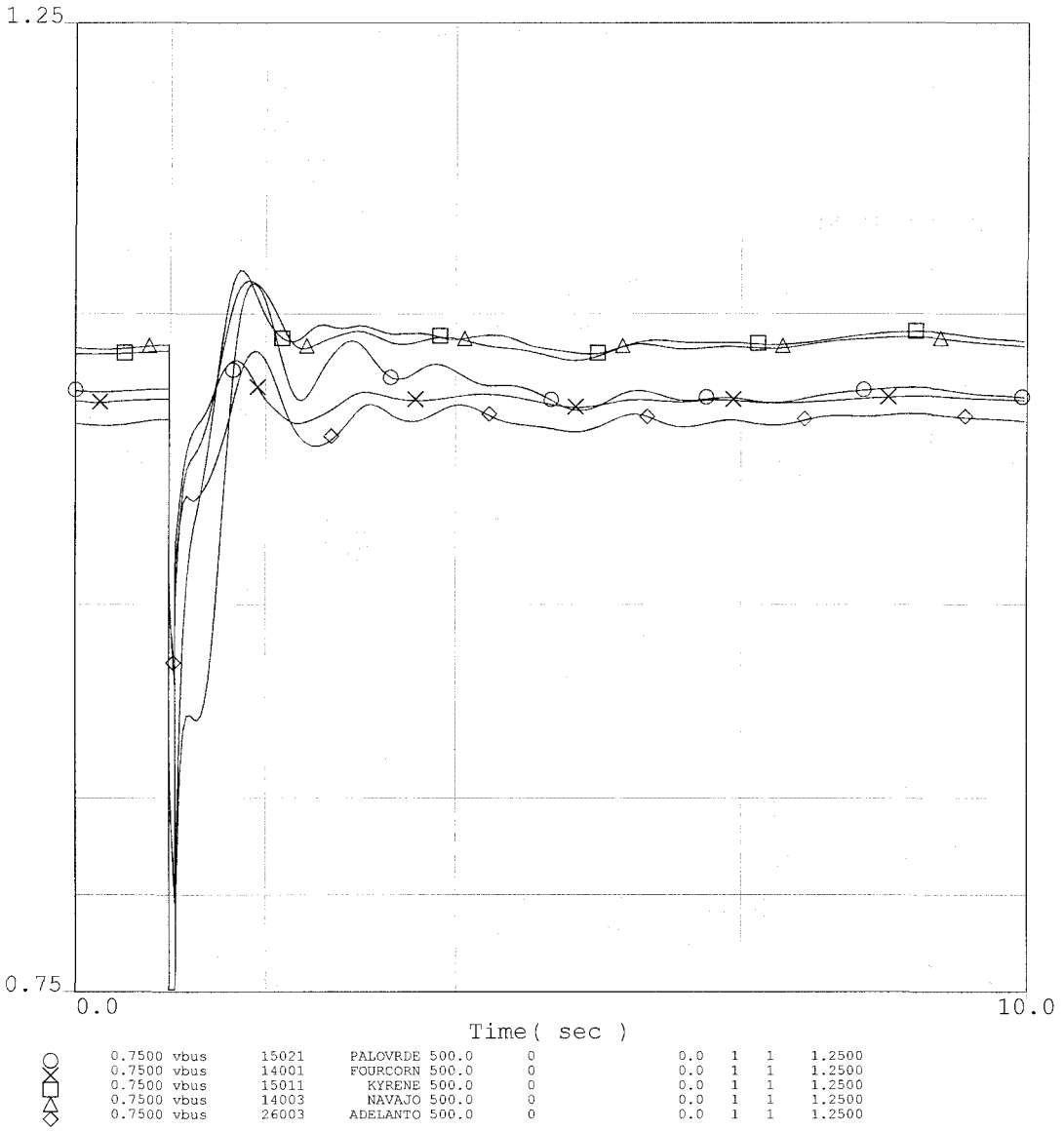
AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct	@time
40	STATELIN	69	vbul	1.003	0.986	1.8	1.521
40	VANSYCLE	69	vbus	1.005	0.987	1.8	1.521
40	ENTERPRS	69	vbug	1.036	1.031	0.5	1.521

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
14	BAGDAD	115	fbul	59.825	1.054
14	NAVAJO	500	fbus	59.827	1.446
14	NAVAJO 3	26	fbug	59.7	1.446

There were 0 violations of MORC criteria 1 (25% Voltage Dip) !
There were 0 violations of MORC criteria 2 (20% Voltage Dip for 20 Cycles)!
There were 0 violations of MORC criteria 3 (59.6 HZ for 6 Cycles)!

ARIZONA_voltages:



14HS-TS5:THREE PHASE FAULT CLEARING ON HASSAYAMPA-JOJOBA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

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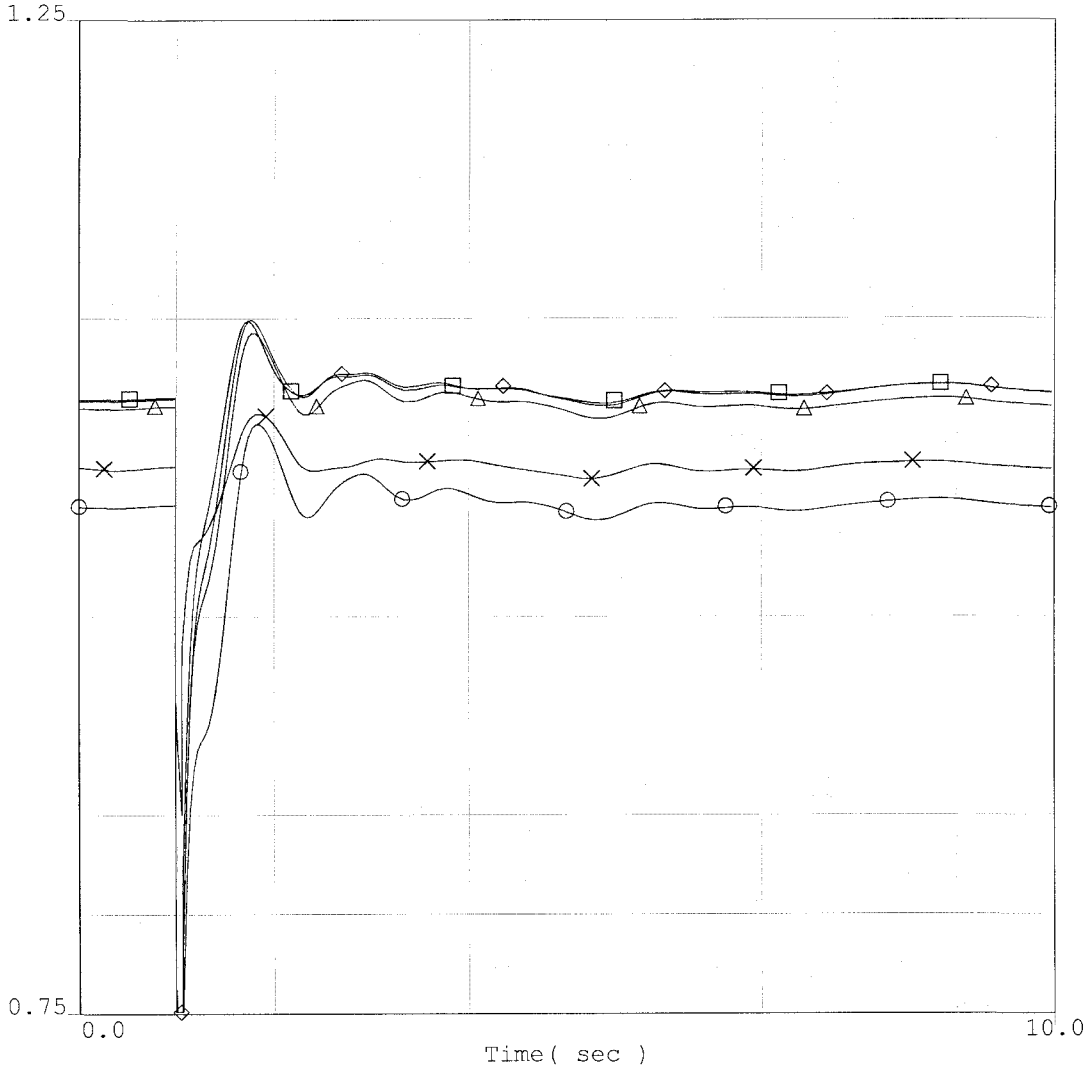
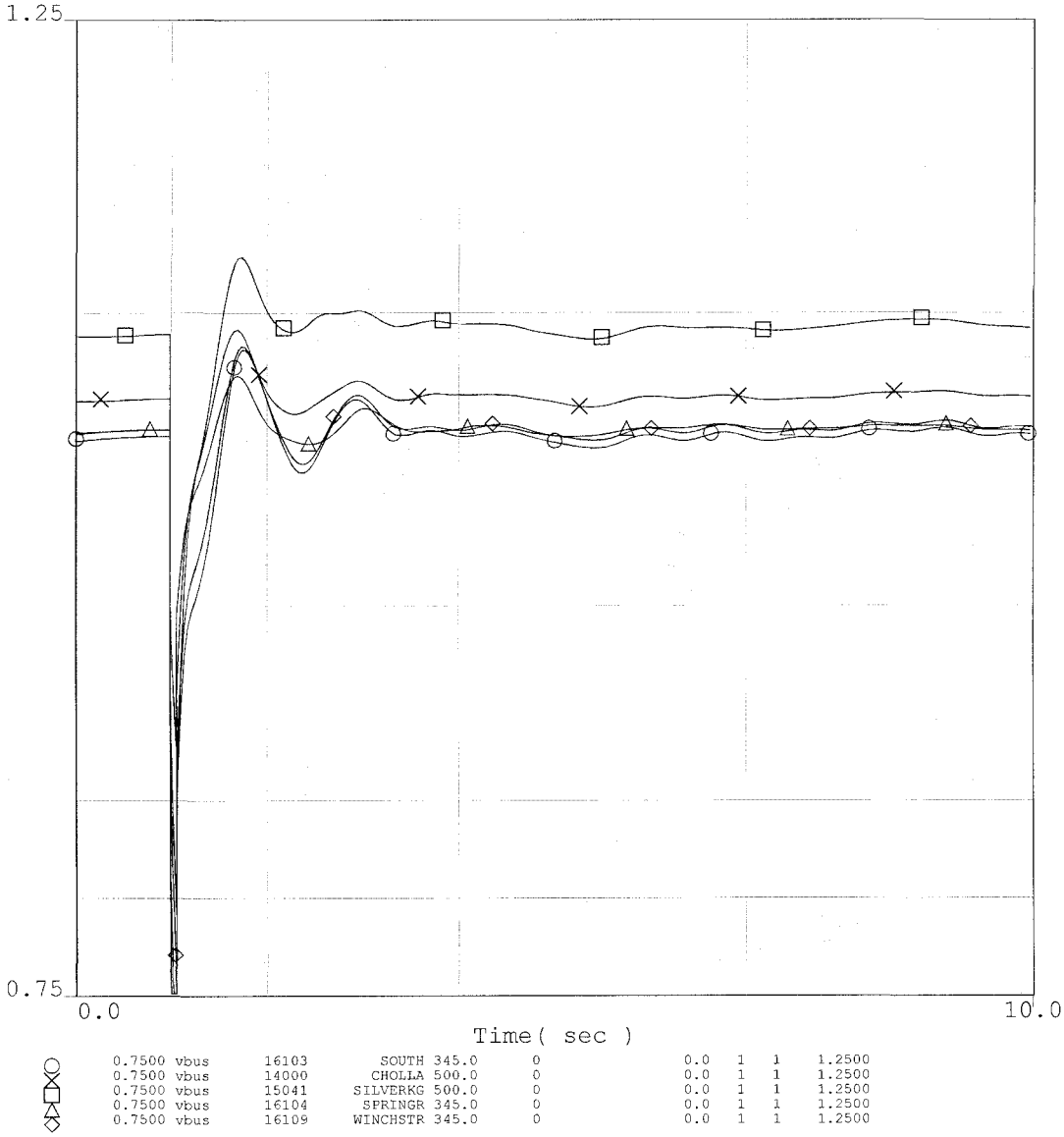
ARIZONA_voltages:



○	0.7500 vbul	14231	WESTWNGW 230.0	0	0.0	1	1	1.2500
×	0.7500 vbus	19011	MEAD N 230.0	0	0.0	1	1	1.2500
□	0.7500 vbus	15215	SILVERKG 230.0	0	0.0	1	1	1.2500
△	0.7500 vbul	14221	PPAPS W 230.0	0	0.0	1	1	1.2500
◇	0.7500 vbus	15207	KYRENE 230.0	0	0.0	1	1	1.2500

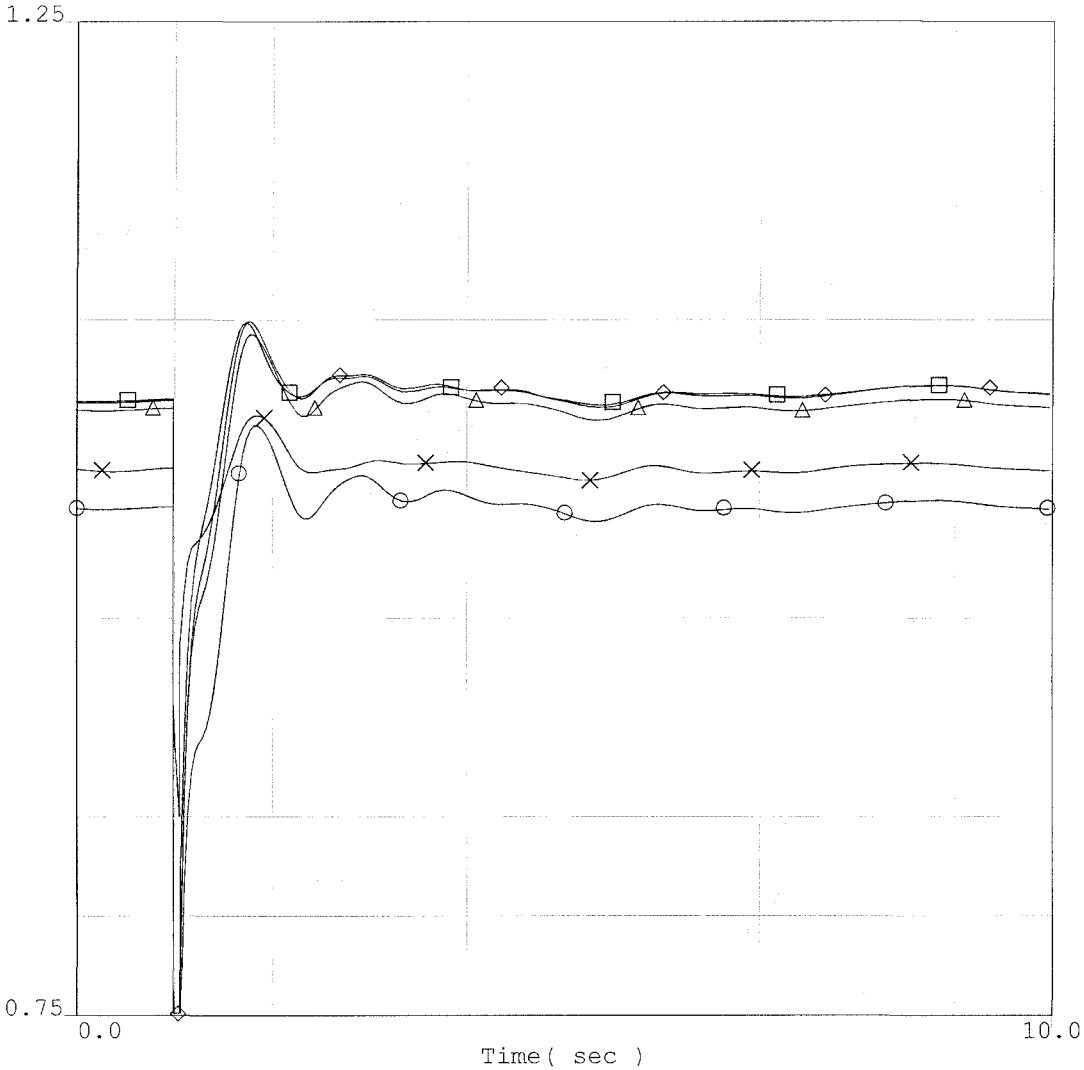
14HS-TS5:THREE PHASE FAULT CLEARING ON HASSAYAMPA-JOJOBA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

ARIZONA_voltages:



14HS-TS5:THREE PHASE FAULT CLEARING ON HASSAYAMPA-JOJOBA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

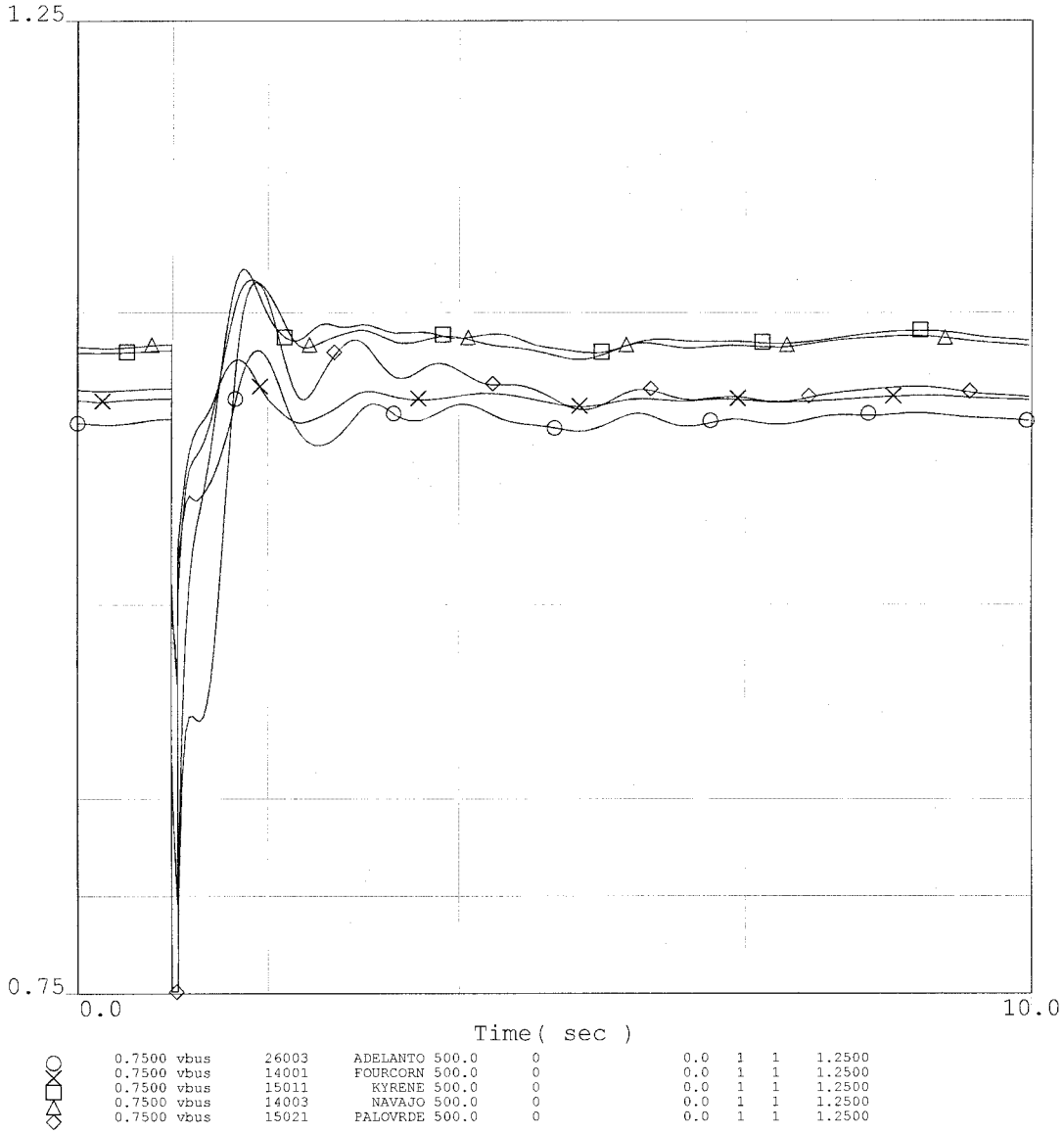
ARIZONA_voltages:



0.7500 vbul	14231	WESTWNGW 230.0	0	0.0	1	1	1.2500
0.7500 vbus	19011	MEAD N 230.0	0	0.0	1	1	1.2500
0.7500 vbus	15215	SILVERKG 230.0	0	0.0	1	1	1.2500
0.7500 vbul	14221	PPAPS W 230.0	0	0.0	1	1	1.2500
0.7500 vbus	15207	KYRENE 230.0	0	0.0	1	1	1.2500

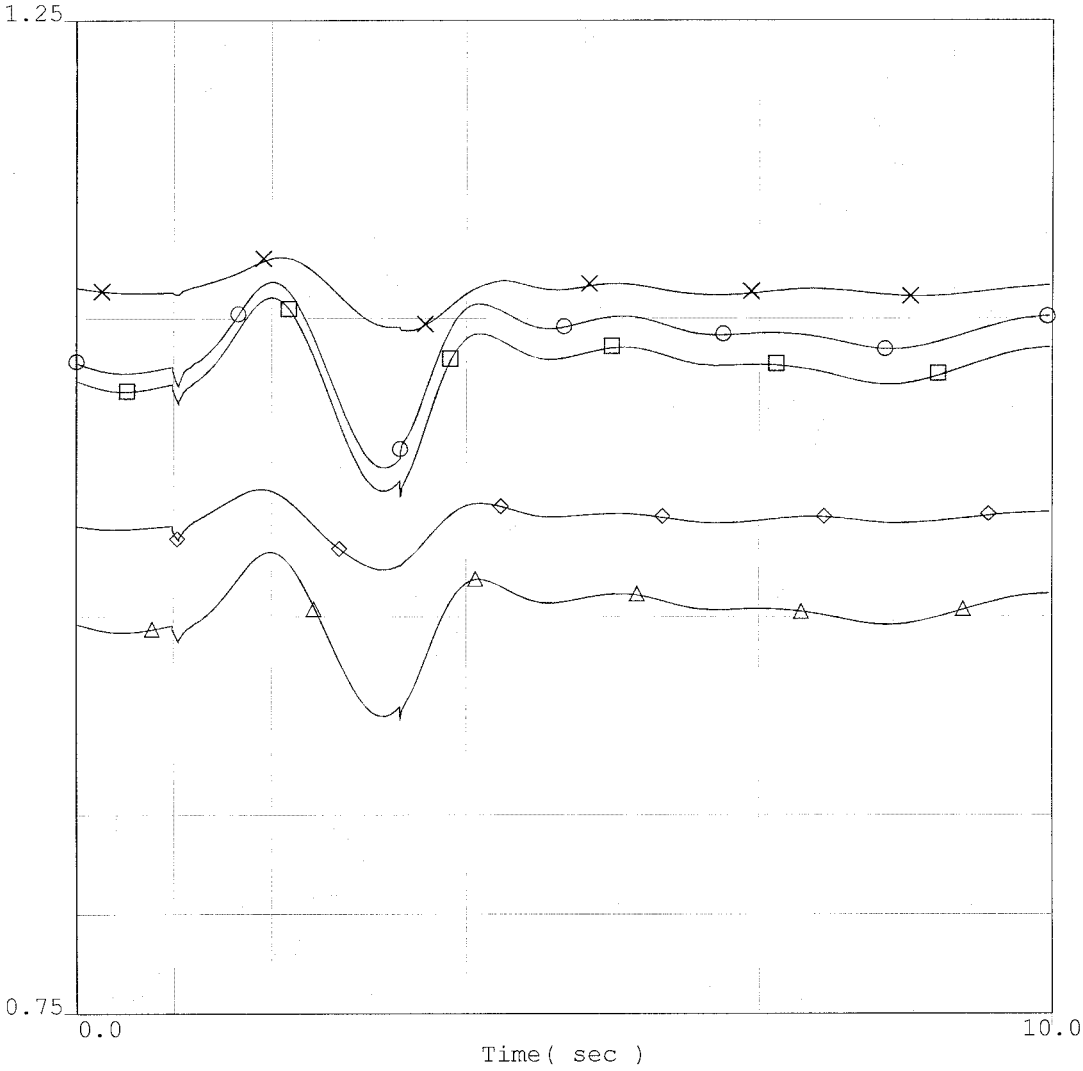
14HS-TS5:THREE PHASE FAULT CLEARING ON HASSAYAMPA-JOJOBA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

ARIZONA_voltages:



14HS-TS5:THREE PHASE FAULT CLEARING ON HASSAYAMPA-JOJOBA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

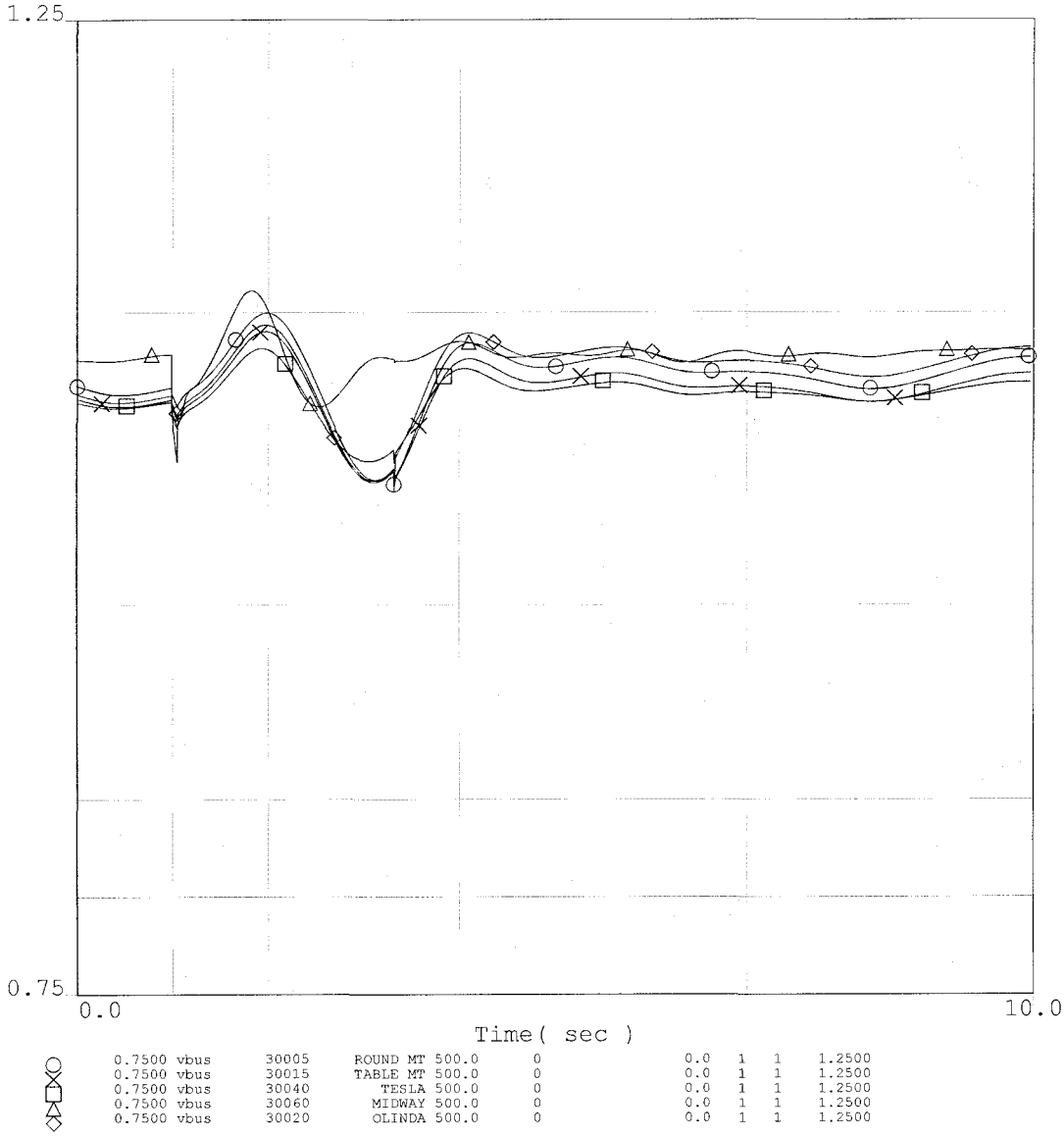
NORTHWEST_voltages:



0.7500 vbus	40489	GRIZZLY 500.0	0	0.0	1	1	1.2500
0.7500 vbus	40459	GARRISON 500.0	0	0.0	1	1	1.2500
0.7500 vbus	40687	MALIN 500.0	0	0.0	1	1	1.2500
0.7500 vbul	45215	NEWELL 69.0	0	0.0	1	1	1.2500
0.7500 vbus	60235	MIDPOINT 345.0	0	0.0	1	1	1.2500

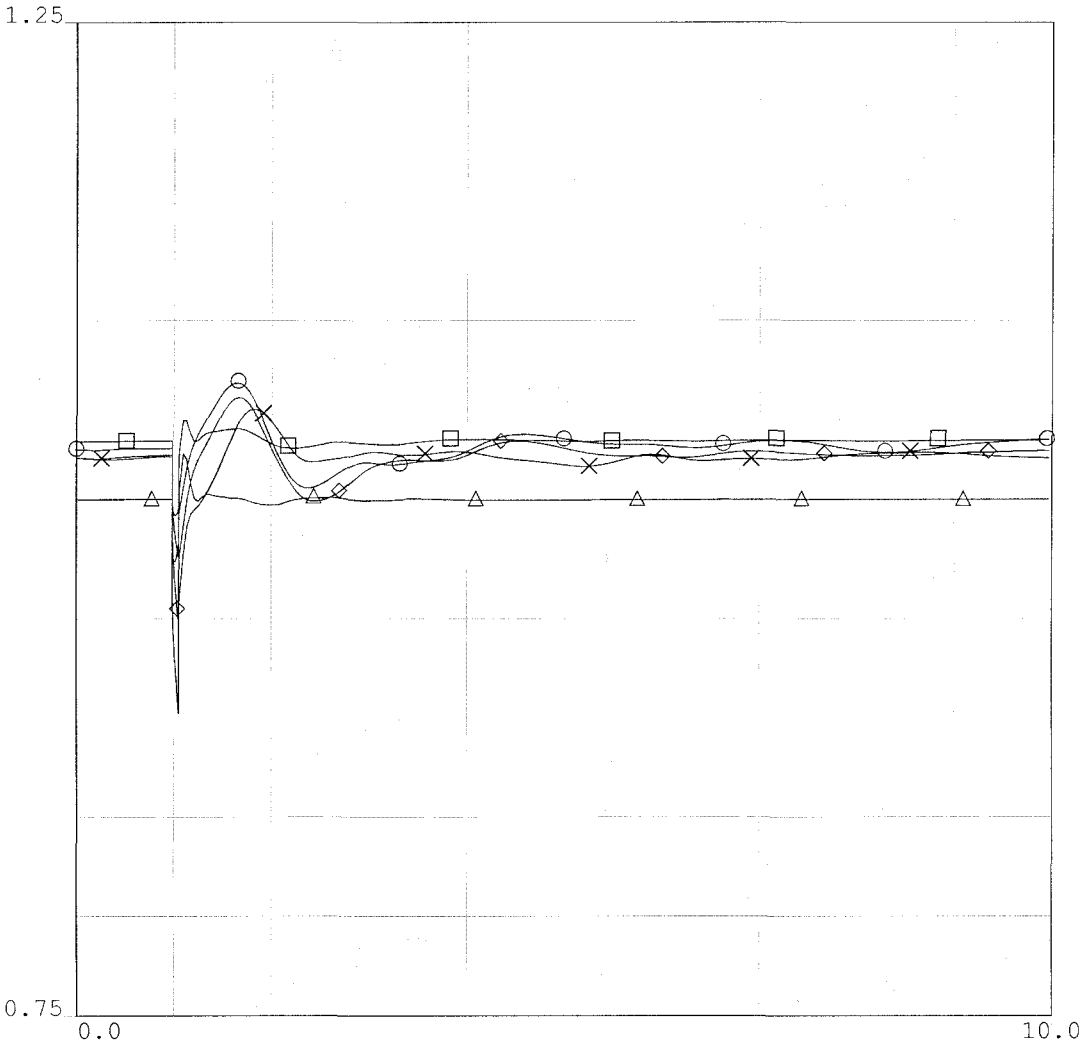
14HS-TS5:THREE PHASE FAULT CLEARING ON HASSAYAMPA-JOJOBA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

CALIFORNIA_voltages:



14HS-TS5:THREE PHASE FAULT CLEARING ON HASSAYAMPA-JOJOBA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

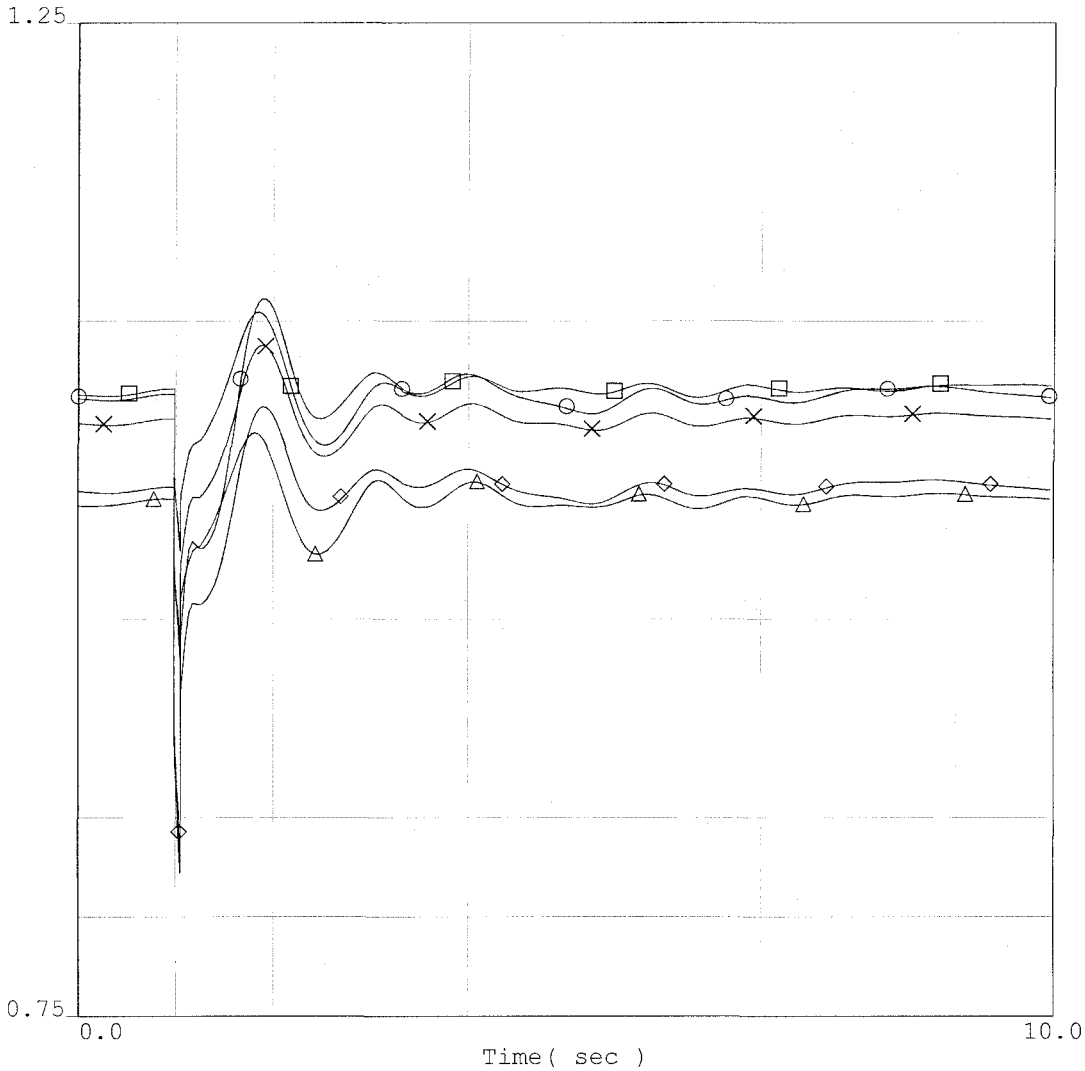
UTAH_voltages:



0.7500 vbus	66230	PINTO 138.0	0	0.0	1	1	1.2500
0.7500 vbus	18019	H ALLEN 230.0	0	0.0	1	1	1.2500
0.7500 vbus	66280	REDBUTTE 345.0	0	0.0	1	1	1.2500
0.7500 vbus	66420	SGSY 138.0	0	0.0	1	1	1.2500
0.7500 vbus	79023	DURANGO 115.0	0	0.0	1	1	1.2500

14HS-TS5:THREE PHASE FAULT CLEARING ON HASSAYAMPA-JOJOBA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

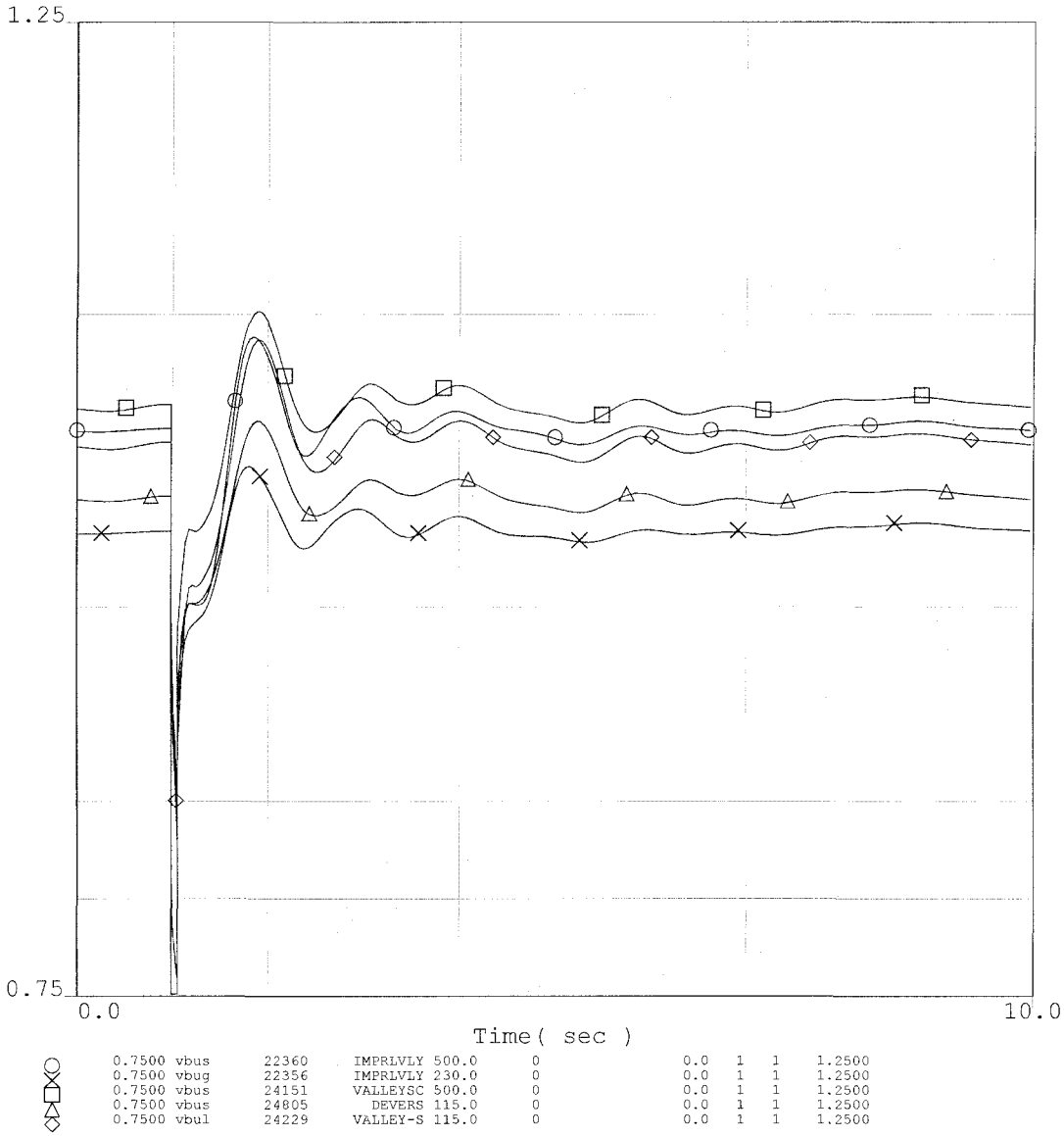
CALIFORNIA_voltages:



0.7500 vbus	24801	DEVERS 500.0	0	0.0	1	1	1.2500
0.7500 vbus	24086	LUGO 500.0	0	0.0	1	1	1.2500
0.7500 vbus	24156	VINCENT 500.0	0	0.0	1	1	1.2500
0.7500 vbus	26094	SYLMARLA 230.0	0	0.0	1	1	1.2500
0.7500 vbus	24804	DEVERS 230.0	0	0.0	1	1	1.2500

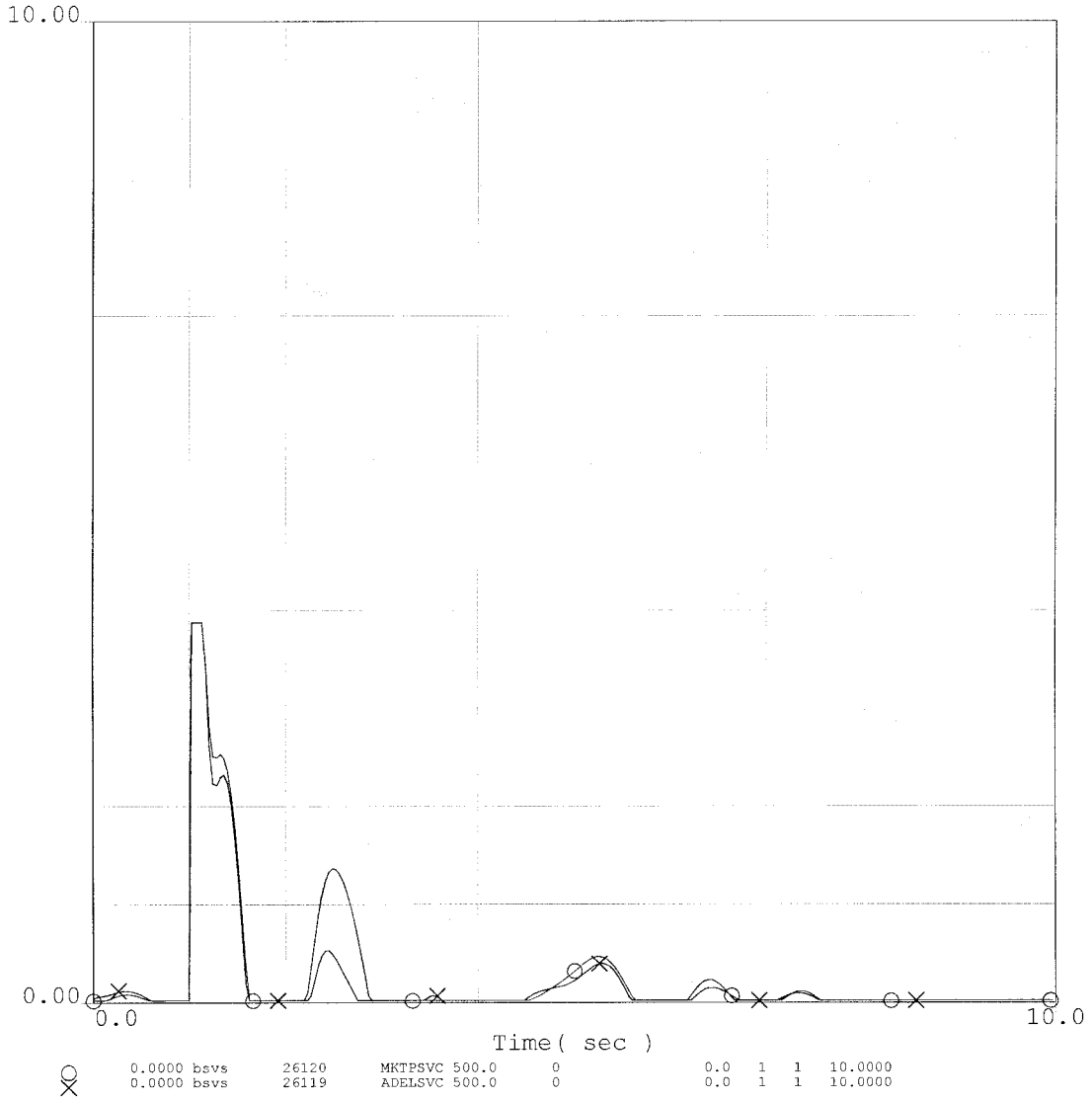
14HS-TS5:THREE PHASE FAULT CLEARING ON HASSAYAMPA-JOJOBA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

CALIFORNIA_voltages:



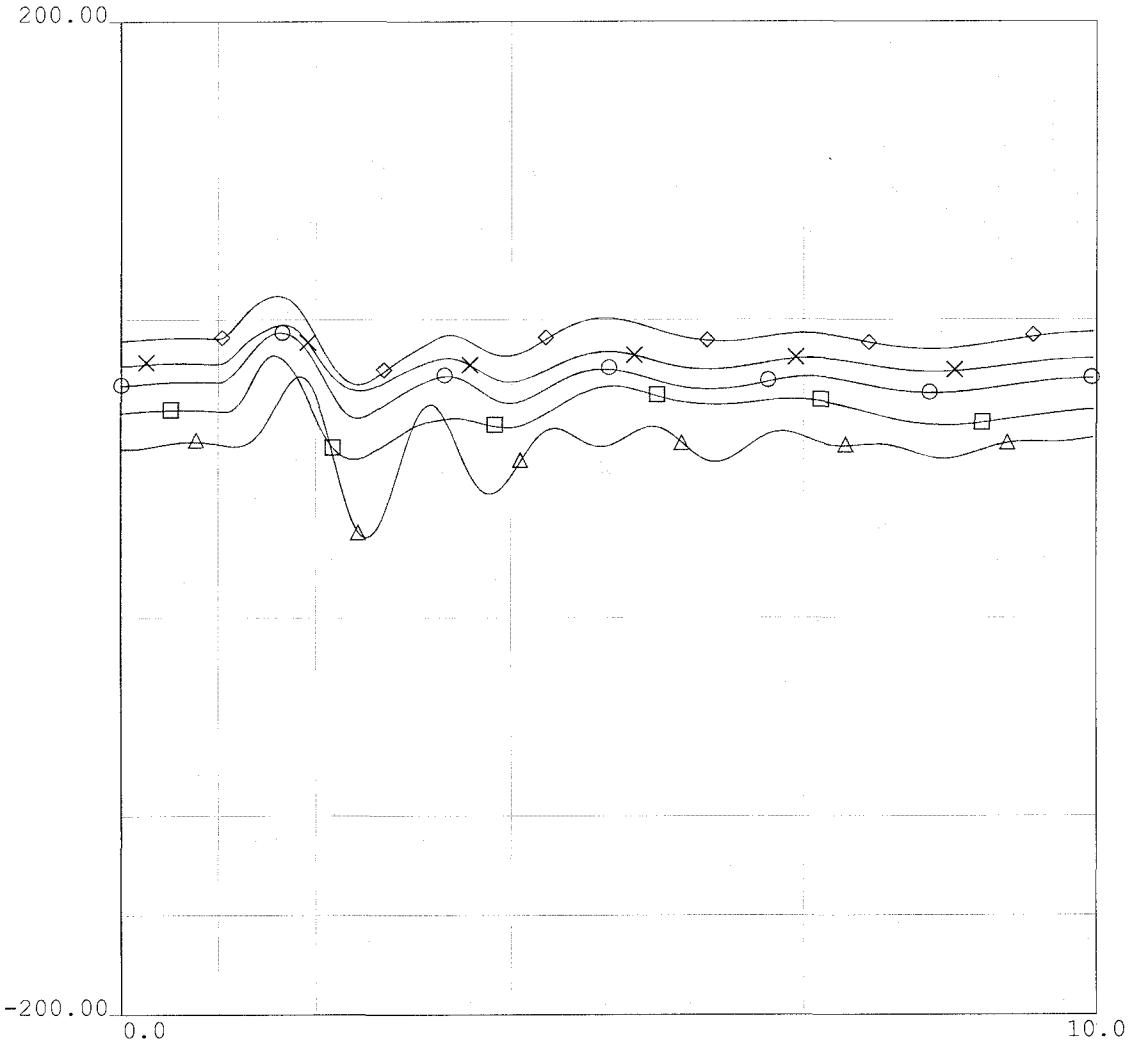
14HS-TS5:THREE PHASE FAULT CLEARING ON HASSAYAMPA-JOJOBA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

SVC_output



14HS-TS5:THREE PHASE FAULT CLEARING ON HASSAYAMPA-JOJOBA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

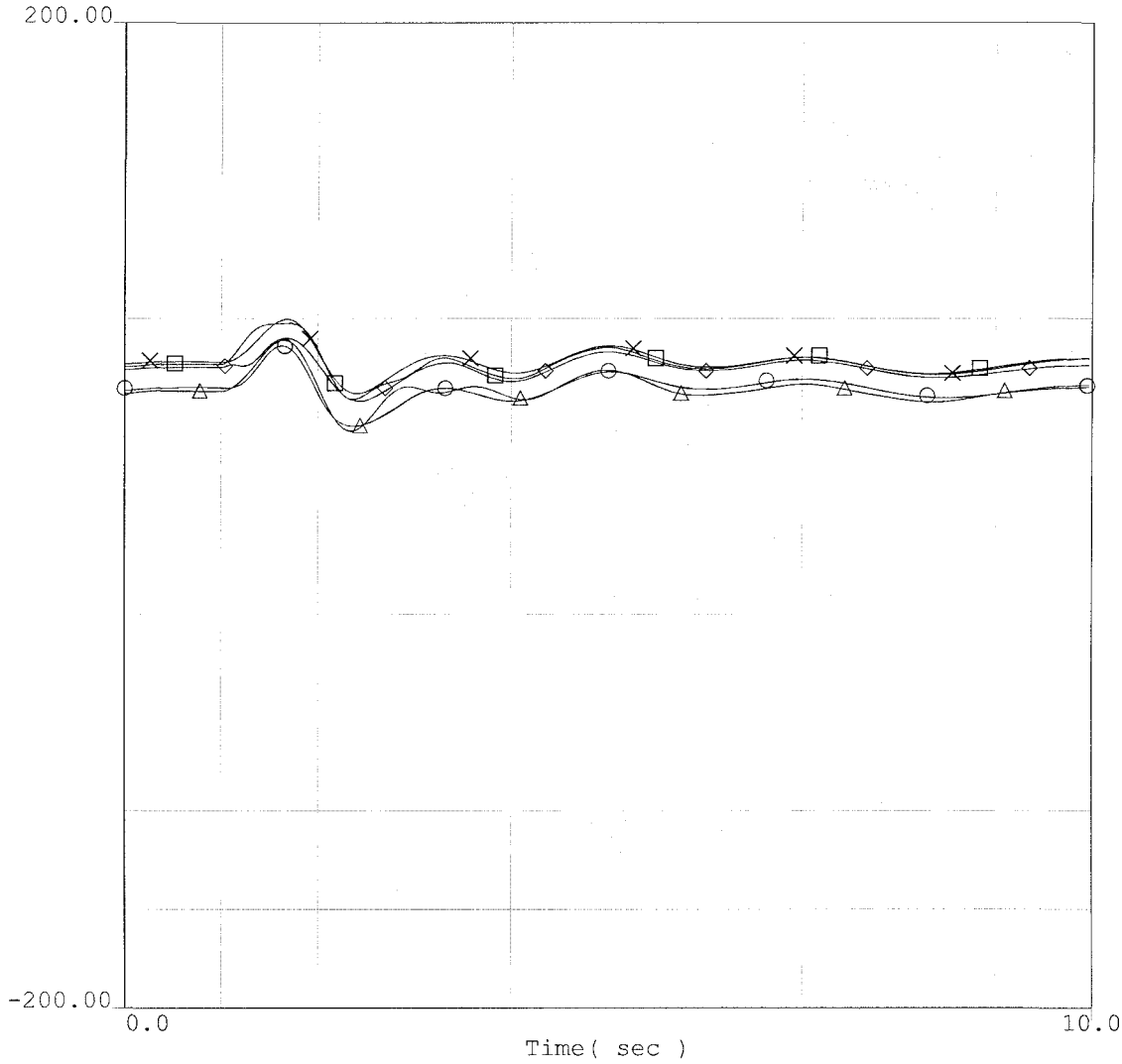
SYSTEM_Rotorangles



-200.0000 ang	16500	SPR GEN1	19.0	0	0.0	1	1	200.0000
-200.0000 ang	10321	SJUAN_G4	22.0	0	0.0	1	1	200.0000
-200.0000 ang	14942	SAGUARO2	15.5	0	0.0	1	1	200.0000
-200.0000 ang	17024	APACHCT1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	16518	SPR GEN3	21.0	0	0.0	1	1	200.0000

14HS-TS5:THREE PHASE FAULT CLEARING ON HASSAYAMPA-JOJOBA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

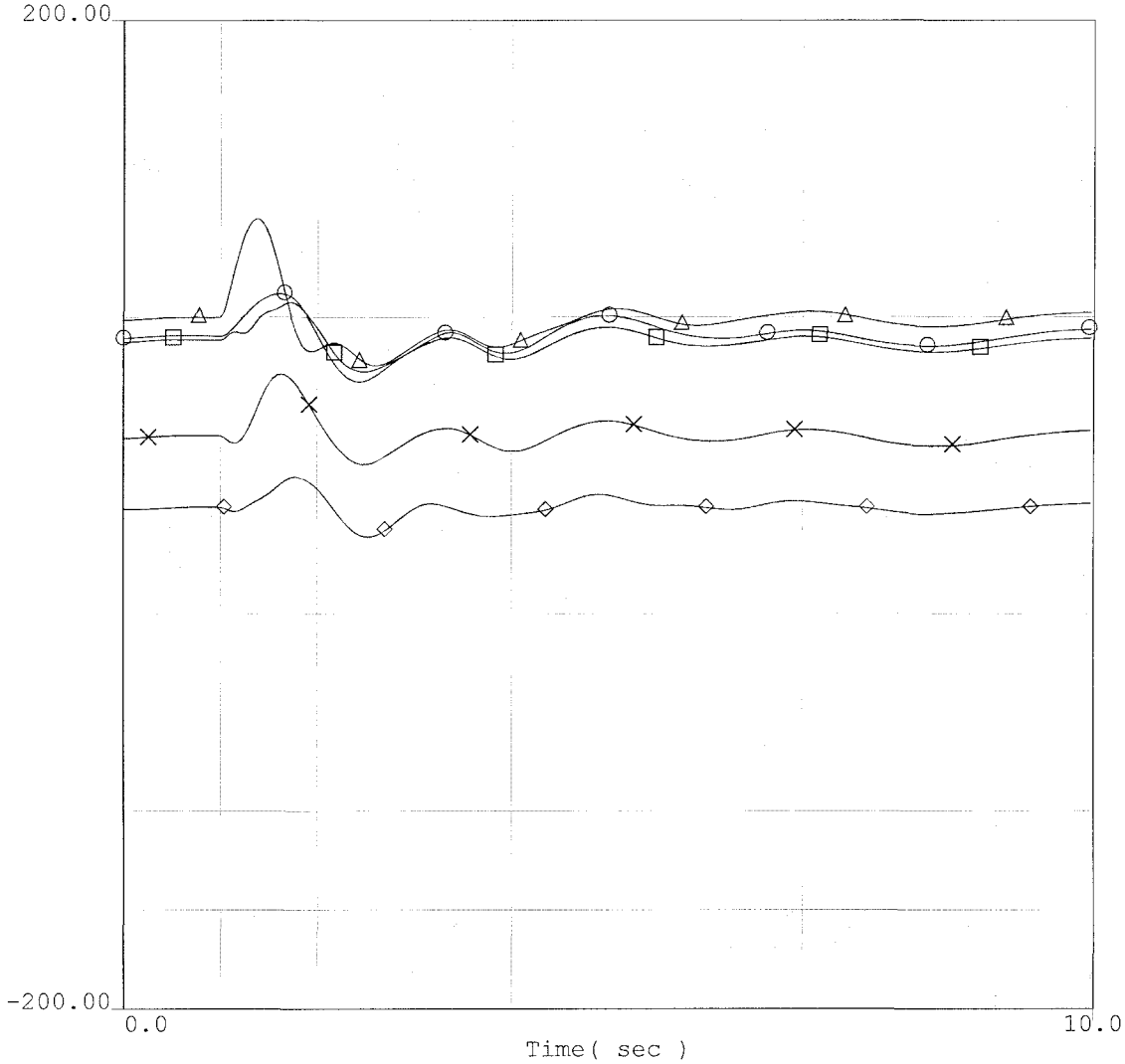
SYSTEM_Rotorangles



-200.0000 ang	15140	DBG-CT1	18.0	0	0.0	1	1	200.0000
-200.0000 ang	14945	SAG. CT3	13.8	0	0.0	1	1	200.0000
-200.0000 ang	14902	CHOLLA3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	15921	SANTAN 1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	14903	CHOLLA4	22.0	0	0.0	1	1	200.0000

14HS-TS5:THREE PHASE FAULT CLEARING ON HASSAYAMPA-JOJOBA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

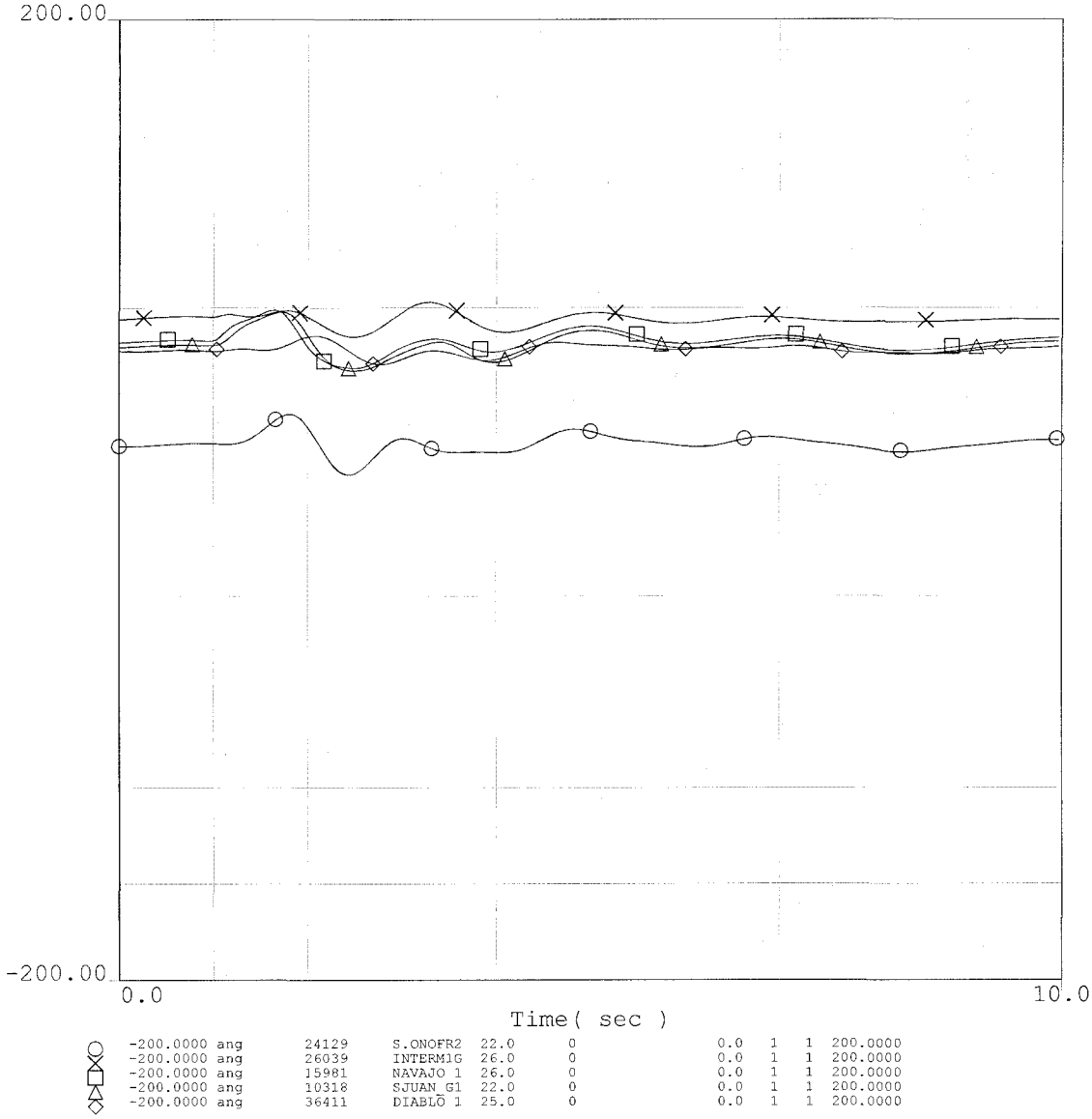
SYSTEM_Rotorangles



-200.0000 ang	16518	SPR GEN3	21.0	0	0.0	1	1	200.0000
-200.0000 ang	16503	SUNDTGE4	18.0	0	0.0	1	1	200.0000
-200.0000 ang	14914	FCNGN4CC	22.0	0	0.0	H	1	200.0000
-200.0000 ang	14931	PALOVRD1	24.0	0	0.0	1	1	200.0000
-200.0000 ang	24004	ALAMT4 G	18.0	0	0.0	H	1	200.0000

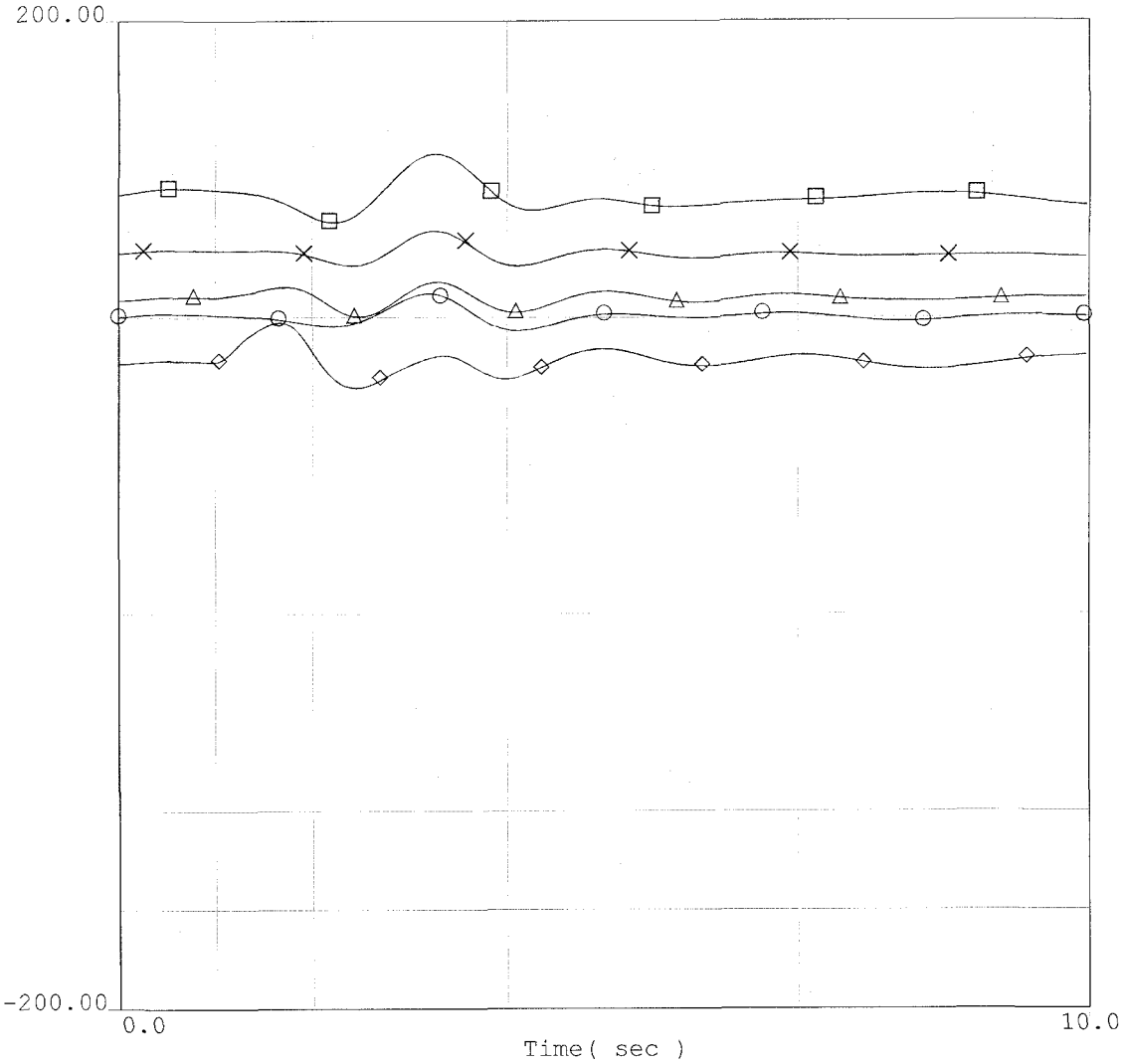
14HS-TS5:THREE PHASE FAULT CLEARING ON HASSAYAMPA-JOJOBA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

SYSTEM_Rotorangles



14HS-TS5:THREE PHASE FAULT CLEARING ON HASSAYAMPA-JOJOBA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

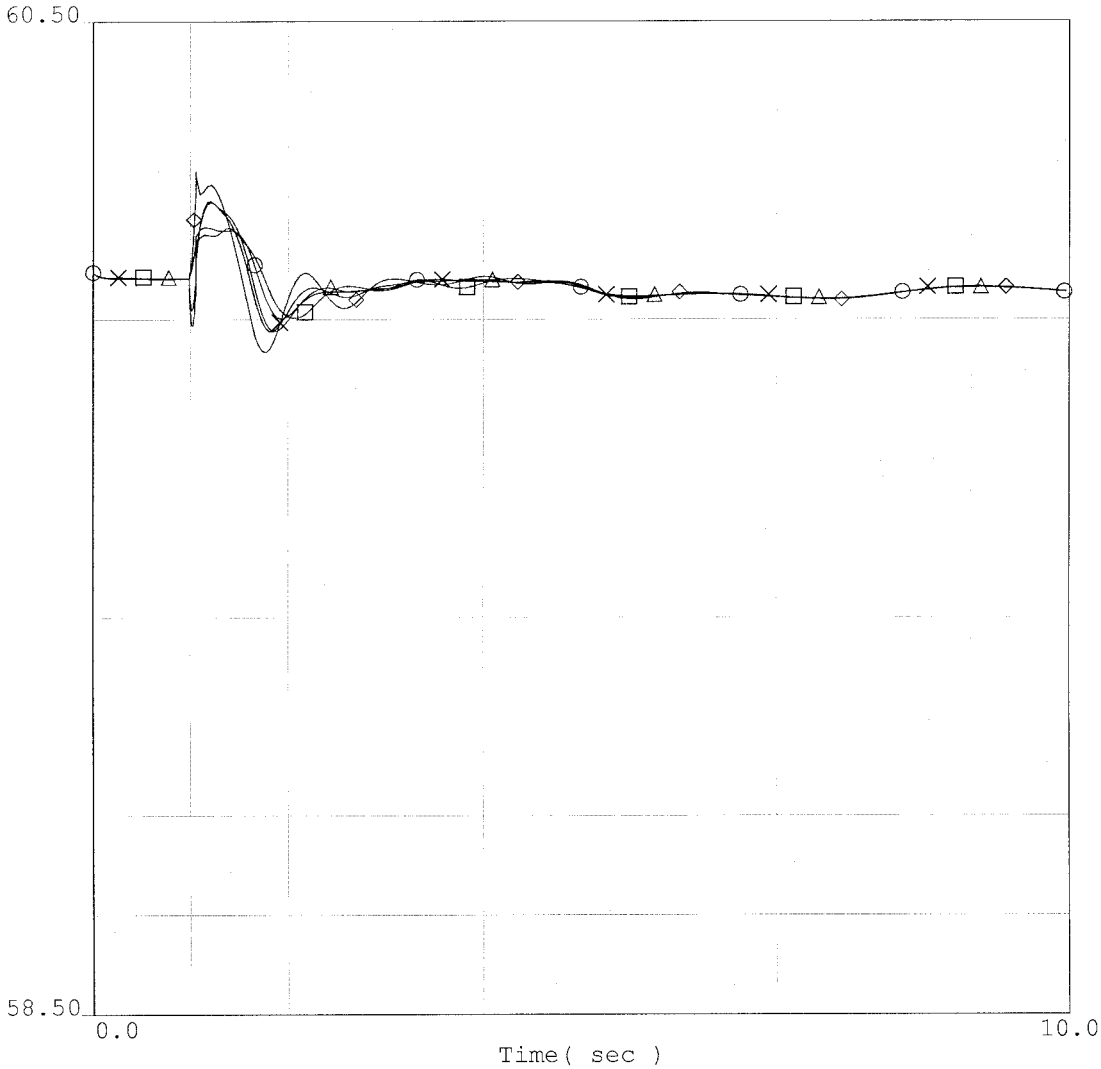
SYSTEM_Rotorangles



-200.0000 ang	73129	MBPP-1	24.0	0	0.0	1	1	200.0000
-200.0000 ang	60086	BRIDGER1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	62050	COLSTP 1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	65500	EHUNTR 3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	10321	SJUAN_G4	22.0	0	0.0	1	1	200.0000

14HS-TS5:THREE PHASE FAULT CLEARING ON HASSAYAMPA-JOJOBA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

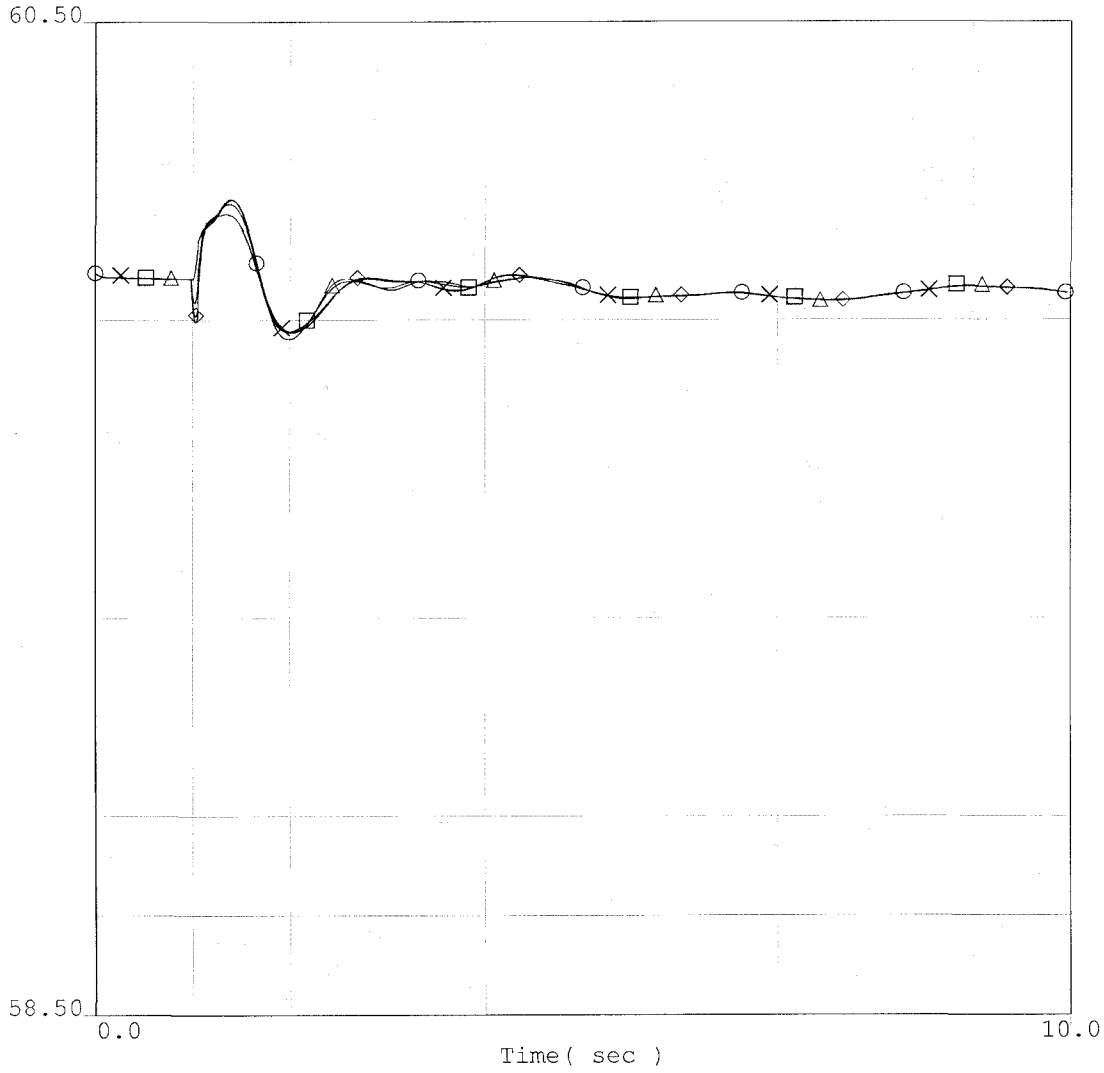
Frequencies:



○	58.5000	fbus	14003	NAVAJO	500.0	0	0.0	1	1	60.5000
⊠	58.5000	fbus	14005	WESTWING	500.0	0	0.0	1	1	60.5000
□	58.5000	fbus	14001	FOURCORN	500.0	0	0.0	1	1	60.5000
△	58.5000	fbus	14016	PNPKAPS	500.0	0	0.0	1	1	60.5000
◇	58.5000	fbus	15021	PALOVRDE	500.0	0	0.0	1	1	60.5000

14HS-TS5:THREE PHASE FAULT CLEARING ON HASSAYAMPA-JOJOBA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

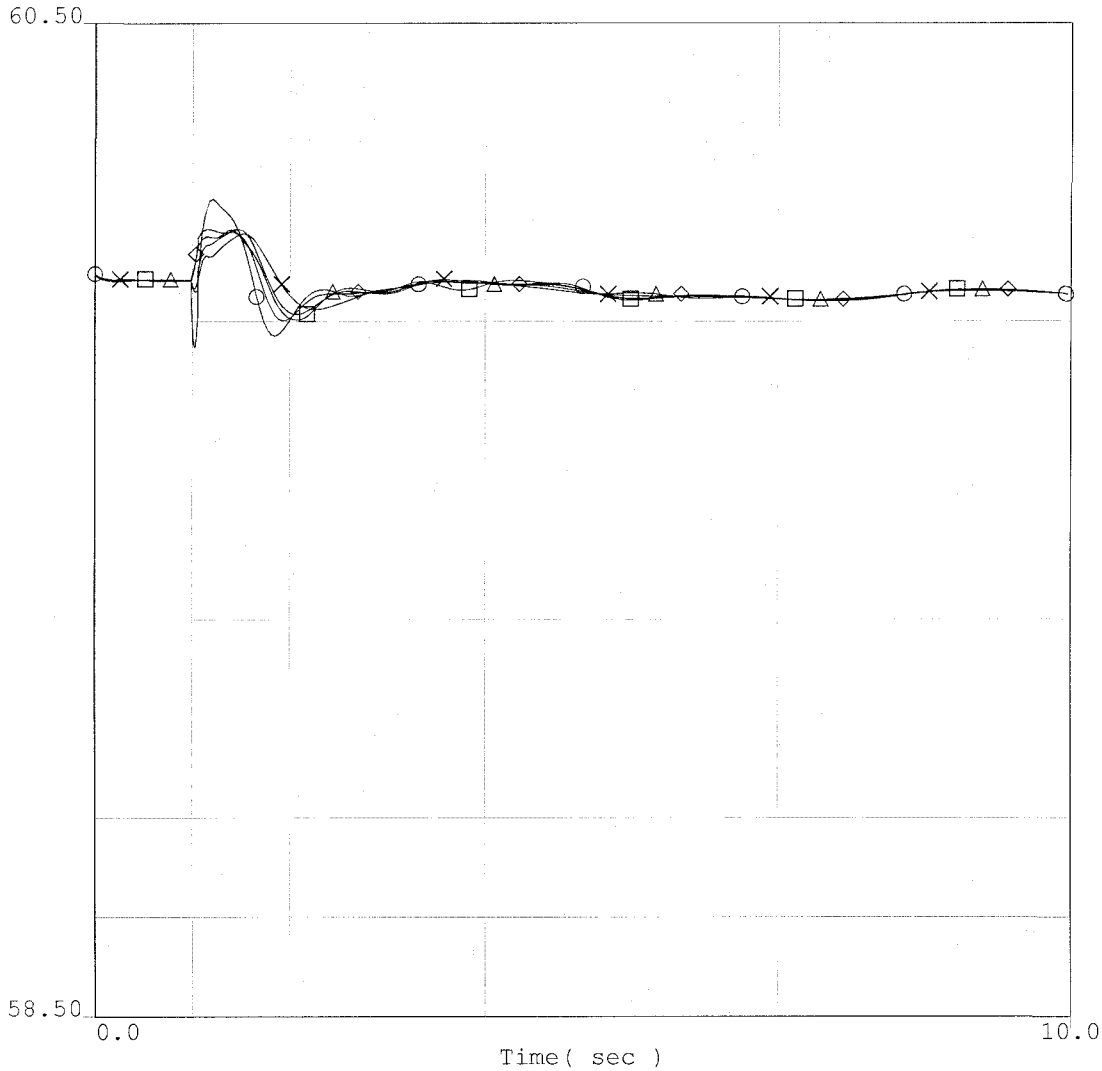
Frequencies:



58.5000 fbus	16000	TORTOLIT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	16105	VAIL 345.0	0	0.0	1	1	60.5000
58.5000 fbus	16103	SOUTH 345.0	0	0.0	1	1	60.5000
58.5000 fbul	15001	CORONADO 500.0	0	0.0	1	1	60.5000
58.5000 fbus	16109	WINCHSTR 345.0	0	0.0	1	1	60.5000

14HS-TS5:THREE PHASE FAULT CLEARING ON HASSAYAMPA-JOJOBA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

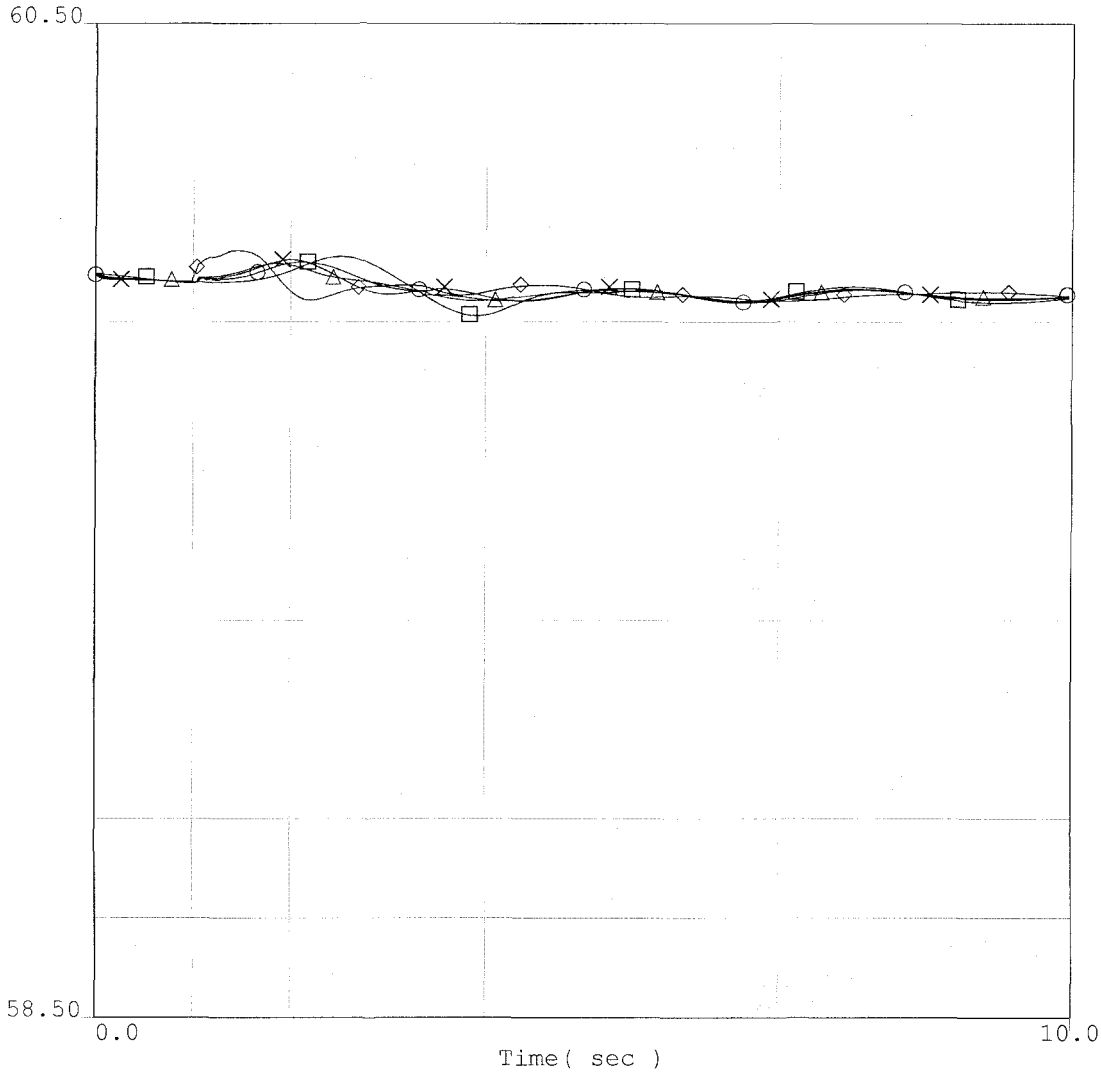
Frequencies:



○	58.5000	fbul	14231	WESTWNGW	230.0	0	0.0	1	1	60.5000
×	58.5000	fbus	26003	ADELANTO	500.0	0	0.0	1	1	60.5000
□	58.5000	fbus	14001	FOURCORN	500.0	0	0.0	1	1	60.5000
△	58.5000	fbus	26048	MCCULLGH	500.0	0	0.0	1	1	60.5000
◇	58.5000	fbus	14003	NAVAJO	500.0	0	0.0	1	1	60.5000

14HS-TS5:THREE PHASE FAULT CLEARING ON HASSAYAMPA-JOJOBA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

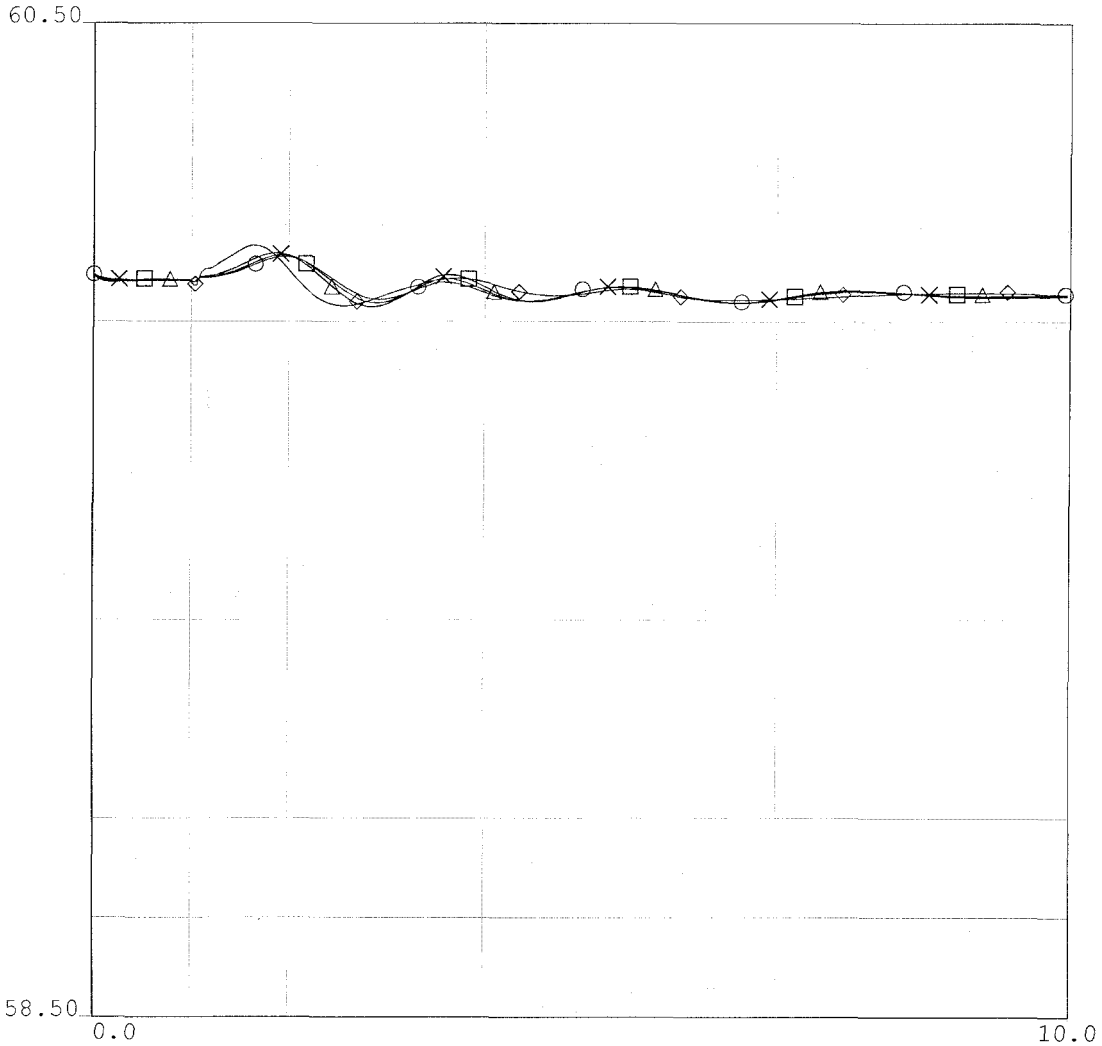
Frequencies:



58.5000 fbus	40489	GRIZZLY 500.0	0	0.0	1	1	60.5000
58.5000 fbus	40687	MALIN 500.0	0	0.0	1	1	60.5000
58.5000 fbus	40459	GARRISON 500.0	0	0.0	1	1	60.5000
58.5000 fbus	60235	MIDPOINT 345.0	0	0.0	1	1	60.5000
58.5000 fbus	66230	PINTO 138.0	0	0.0	1	1	60.5000

14HS-TS5:THREE PHASE FAULT CLEARING ON HASSAYAMPA-JOJOBA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

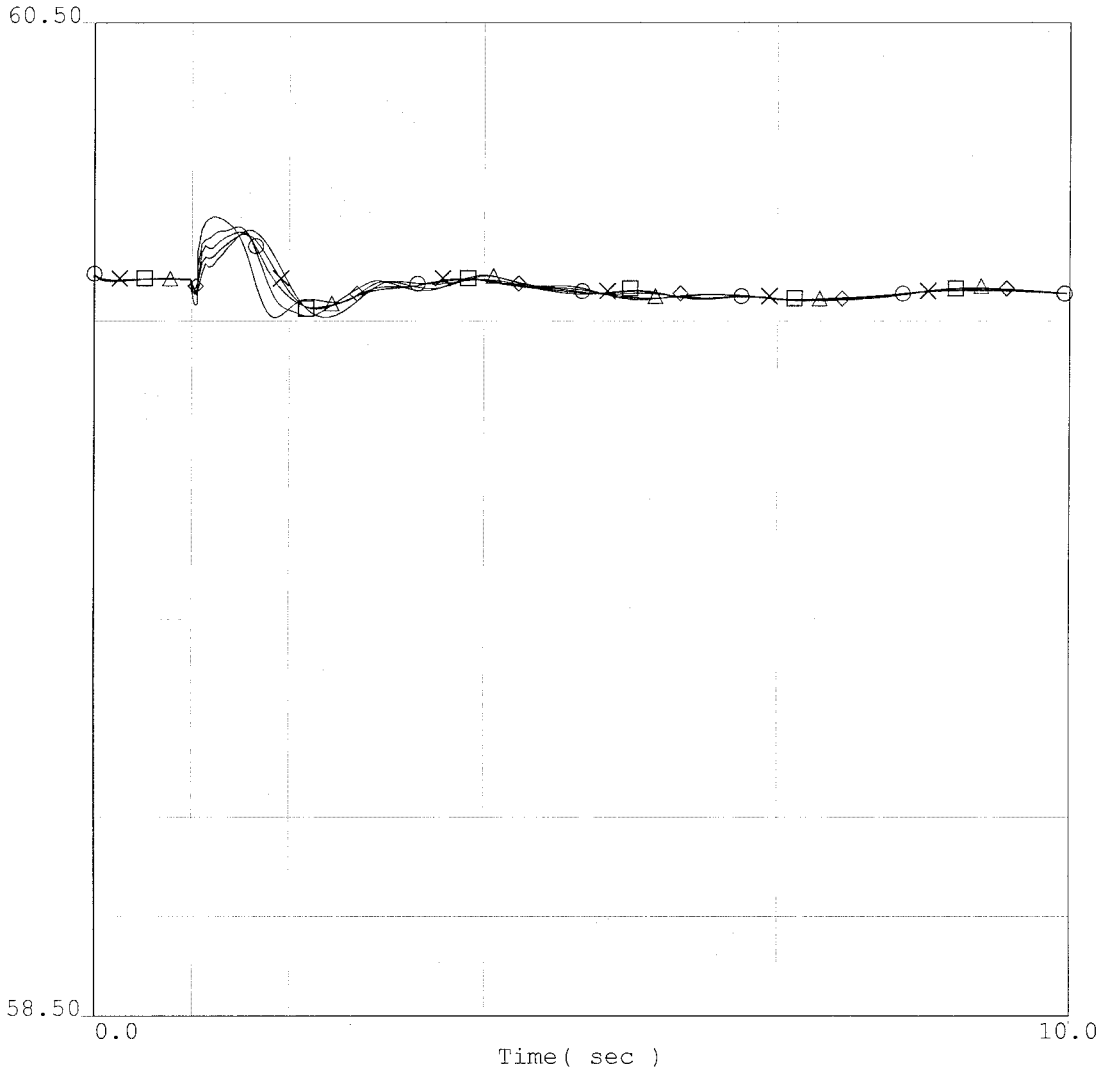
Frequencies:



58.5000	fbus	30005	ROUND MT 500.0	0	0.0	1	1	60.5000
58.5000	fbus	30015	TABLE MT 500.0	0	0.0	1	1	60.5000
58.5000	fbus	30035	TRACY 500.0	0	0.0	1	1	60.5000
58.5000	fbus	30040	TESLA 500.0	0	0.0	1	1	60.5000
58.5000	fbus	30060	MIDWAY 500.0	0	0.0	1	1	60.5000

14HS-TS5:THREE PHASE FAULT CLEARING ON HASSAYAMPA-JOJOBA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

Frequencies:



58.5000 fbus	24801	DEVERS 500.0	0	0.0	1	1	60.5000
58.5000 fbus	24086	LUGO 500.0	0	0.0	1	1	60.5000
58.5000 fbus	26094	SYLMARLA 230.0	0	0.0	1	1	60.5000
58.5000 fbus	22468	MIGUEL 500.0	0	0.0	1	1	60.5000
58.5000 fbus	22536	N.GILA 500.0	0	0.0	1	1	60.5000

14HS-TS5:THREE PHASE FAULT CLEARING ON HASSAYAMPA-JOJOBA 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

HIGHEST VOLTAGE DIP

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct	@time
14	RUDD	69	vbul	1	0.949	5	1.525
14	Q1SOLAR	230	vbus	1.02	0.936	8.2	1.525
24	DEVRSVC1	500	vbug	1.06	1.019	3.8	1.525

LOWEST FREQUENCY

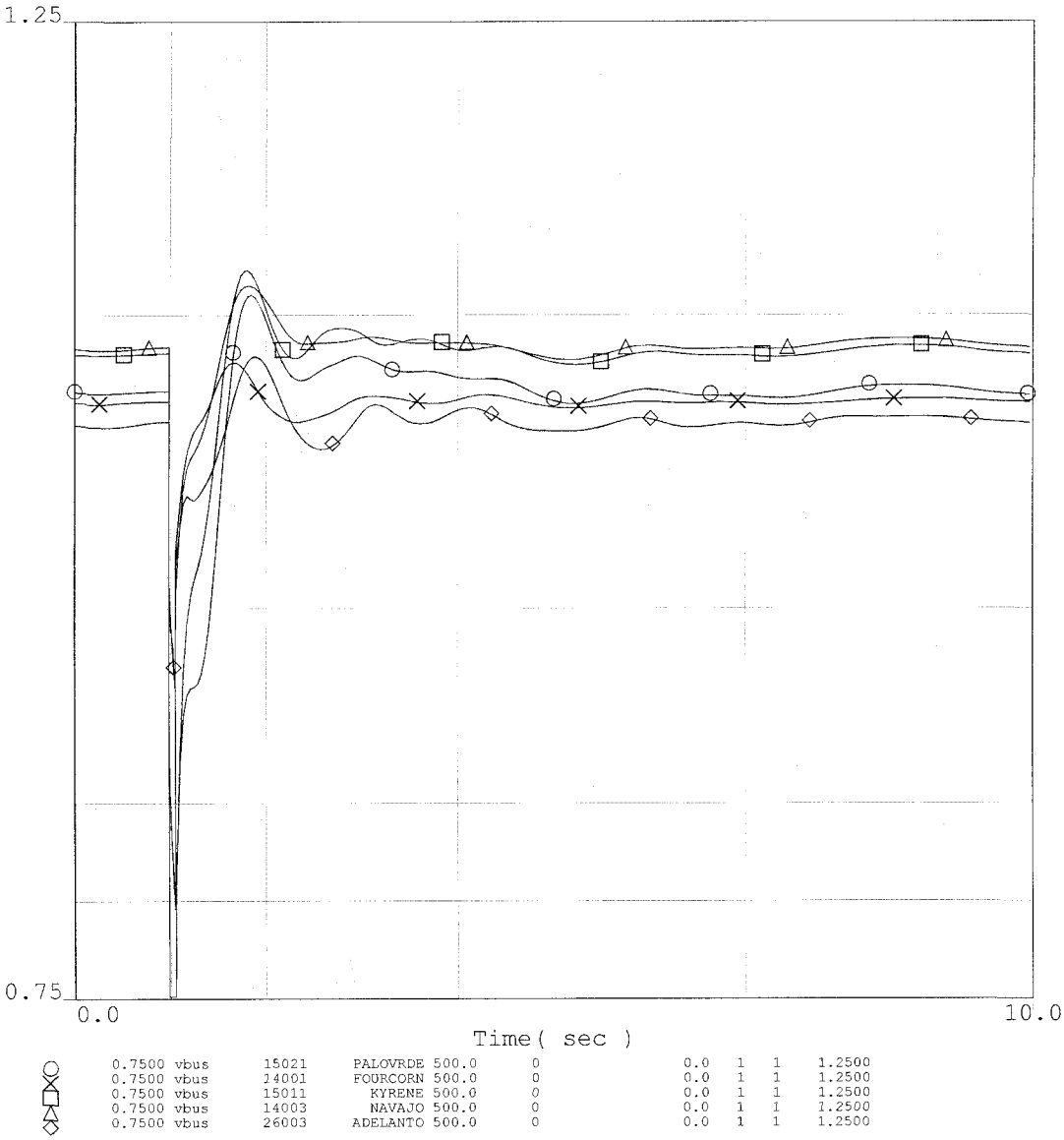
AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
14	WHITETNK	69	fbul	59.515	1.042
14	Q1COL1	34.5	fbus	55.318	1.054
14	HGC-ST1	13.8	fbug	59.741	1.75

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

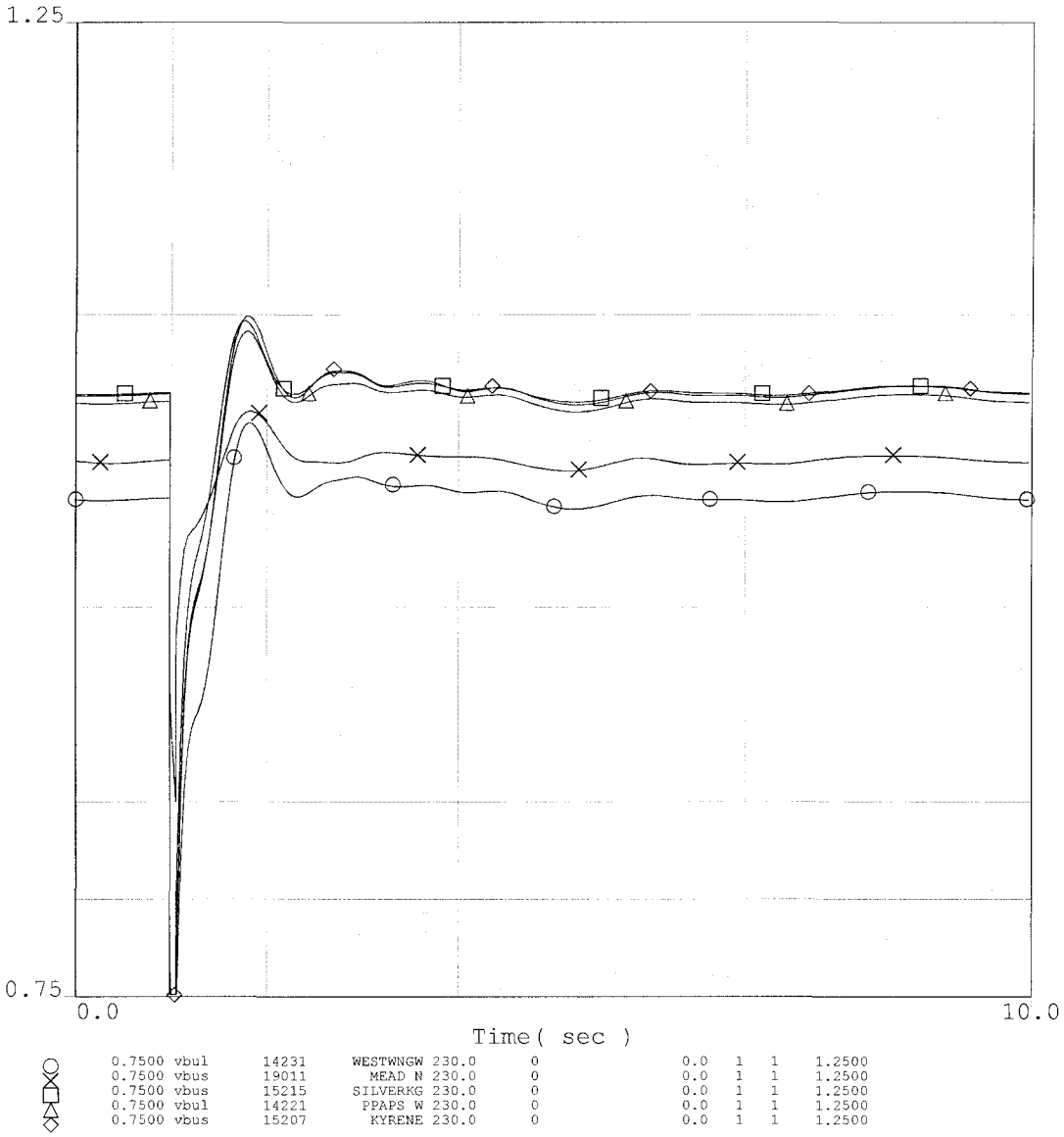
There were 0 violations of MORC criteria 1 (25% Voltage Dip) !
There were 0 violations of MORC criteria 2 (20% Voltage Dip for 20 Cycles)!
There were 0 violations of MORC criteria 3 (59.6 HZ for 6 Cycles)!

ARIZONA_voltages:



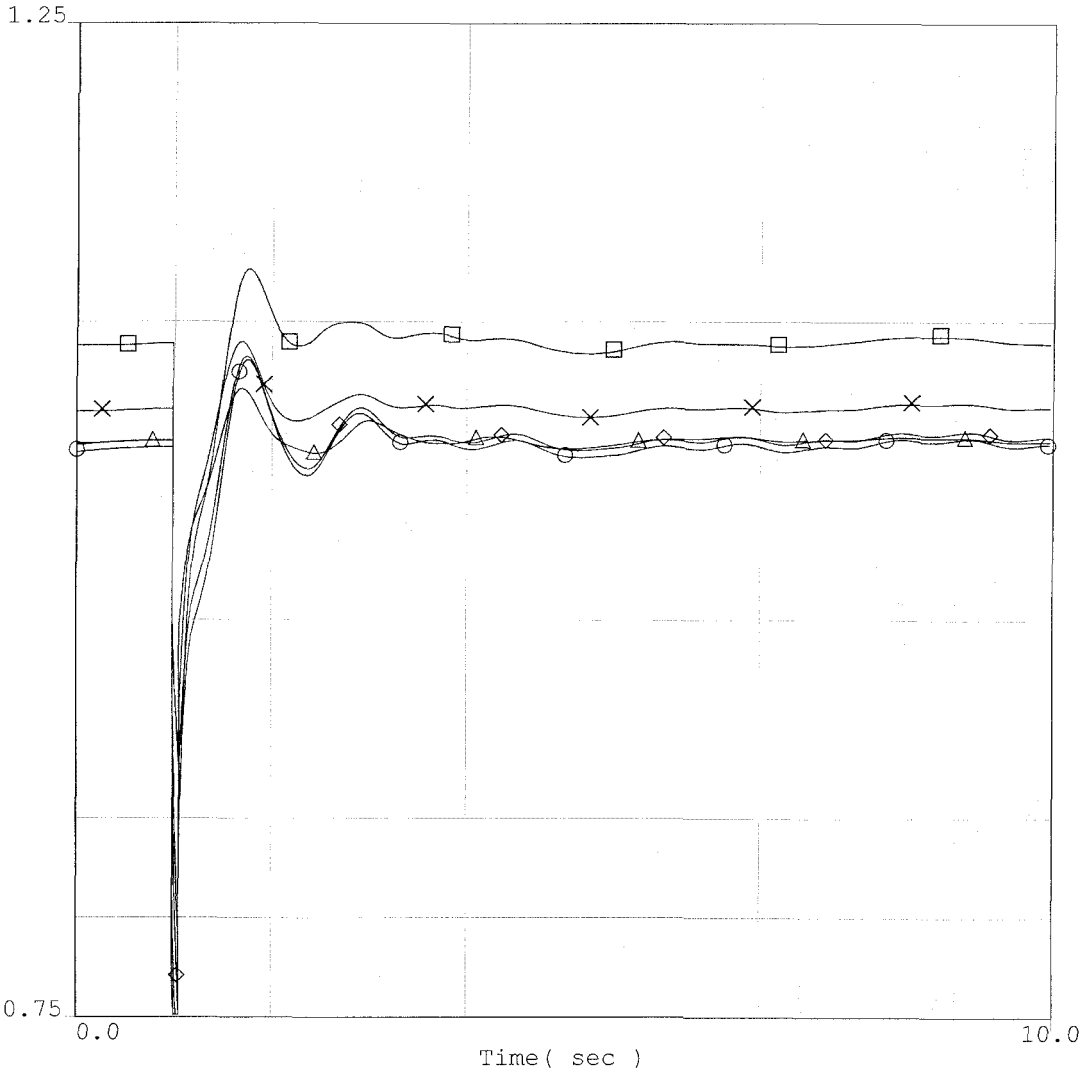
2014HS-TS6:THREE PHASE FAULTCLEARING ON HASSAYAMPA-PINAL W 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

ARIZONA_voltages:



2014HS-TS6:THREE PHASE FAULTCLEARING ON HASSAYAMPA-PINAL W 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

ARIZONA_voltages:



○	0.7500	vbus	16103	SOUTH 345.0	0	0.0	1	1	1.2500
×	0.7500	vbus	14000	CHOLLA 500.0	0	0.0	1	1	1.2500
□	0.7500	vbus	15041	SILVERKG 500.0	0	0.0	1	1	1.2500
△	0.7500	vbus	16104	SPRINGR 345.0	0	0.0	1	1	1.2500
◇	0.7500	vbus	16109	WINCHSTR 345.0	0	0.0	1	1	1.2500

2014HS-TS6:THREE PHASE FAULTCLEARING ON HASSAYAMPA-PINAL W 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

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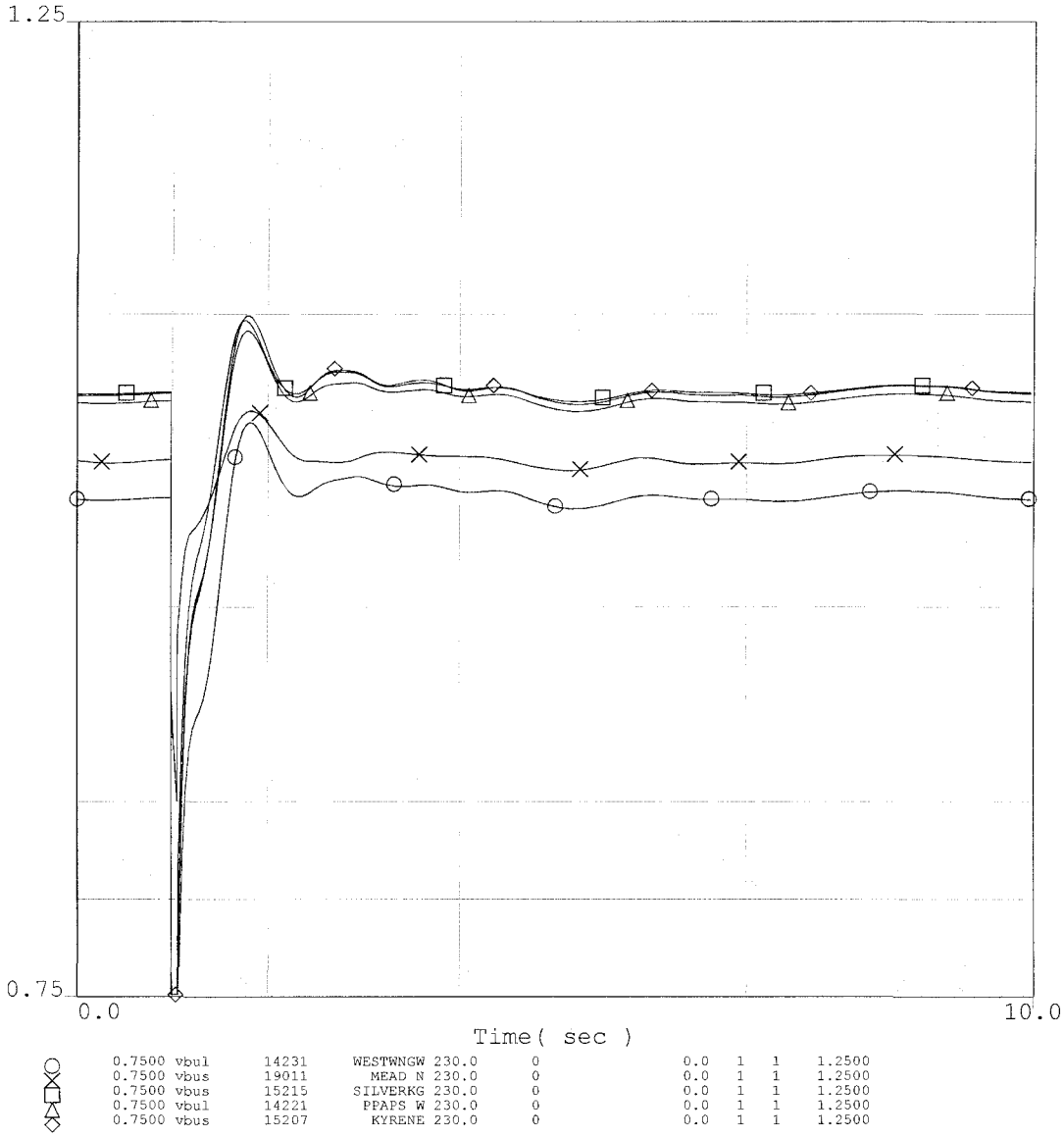
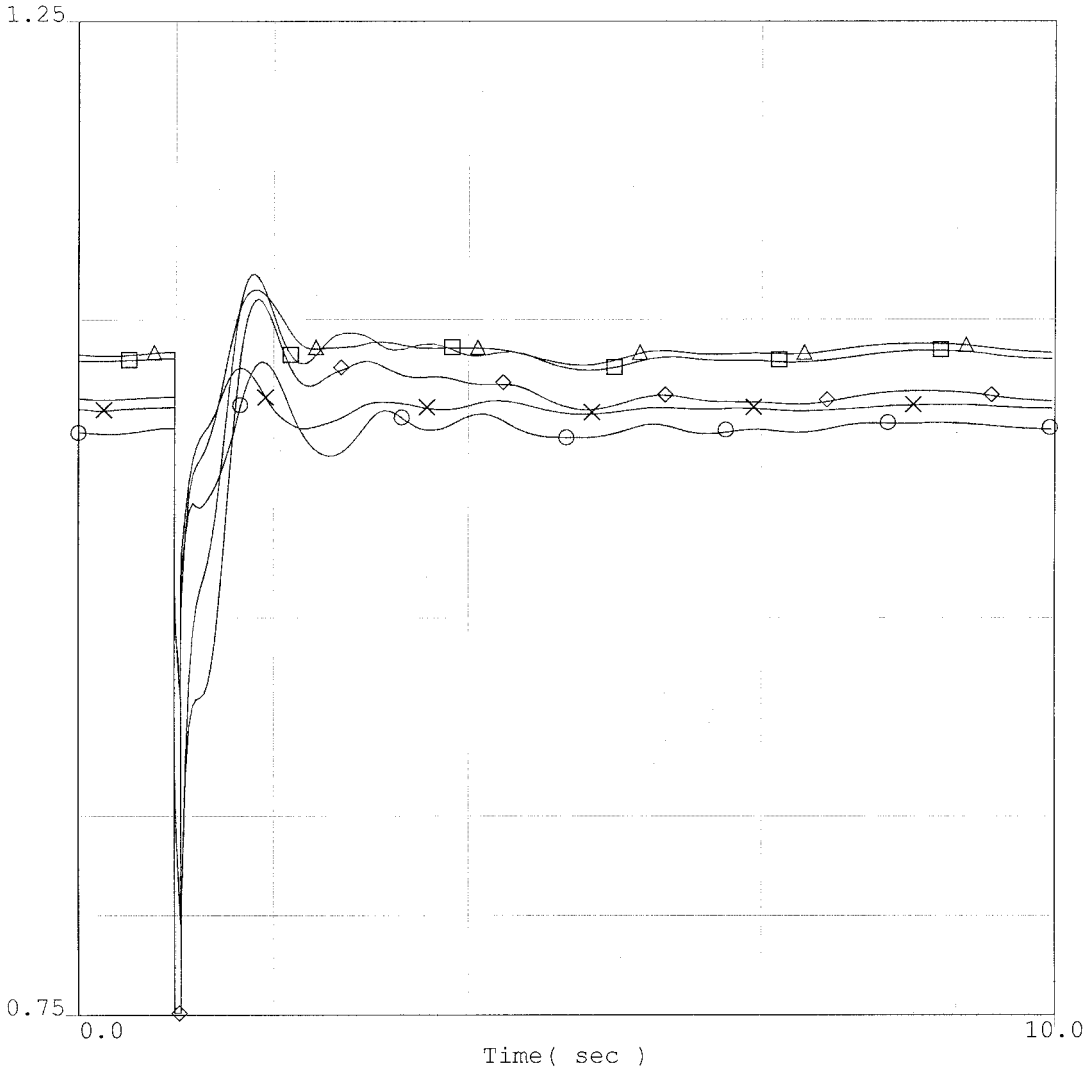
Thu Mar 31 06:38:36 2011

ARIZONA_voltages:



2014HS-TS6:THREE PHASE FAULTCLEARING ON HASSAYAMPA-PINAL W 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

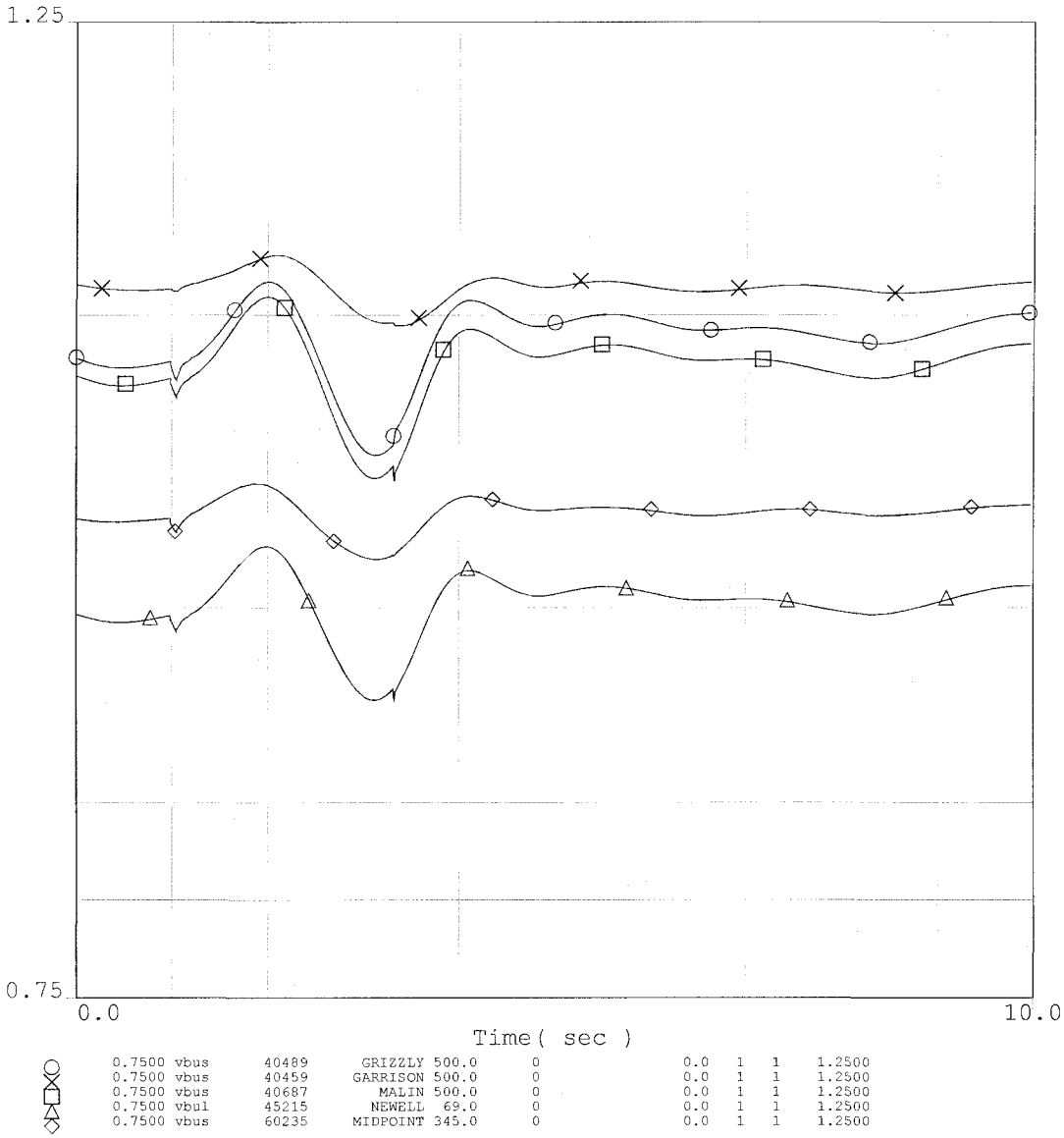
ARIZONA_voltages:



0.7500 vbus	26003	ADELANTO 500.0	0	0.0	1	1	1.2500
0.7500 vbus	14001	FOURCORN 500.0	0	0.0	1	1	1.2500
0.7500 vbus	15011	KYRENE 500.0	0	0.0	1	1	1.2500
0.7500 vbus	14003	NAVAJO 500.0	0	0.0	1	1	1.2500
0.7500 vbus	15021	PALOVRDE 500.0	0	0.0	1	1	1.2500

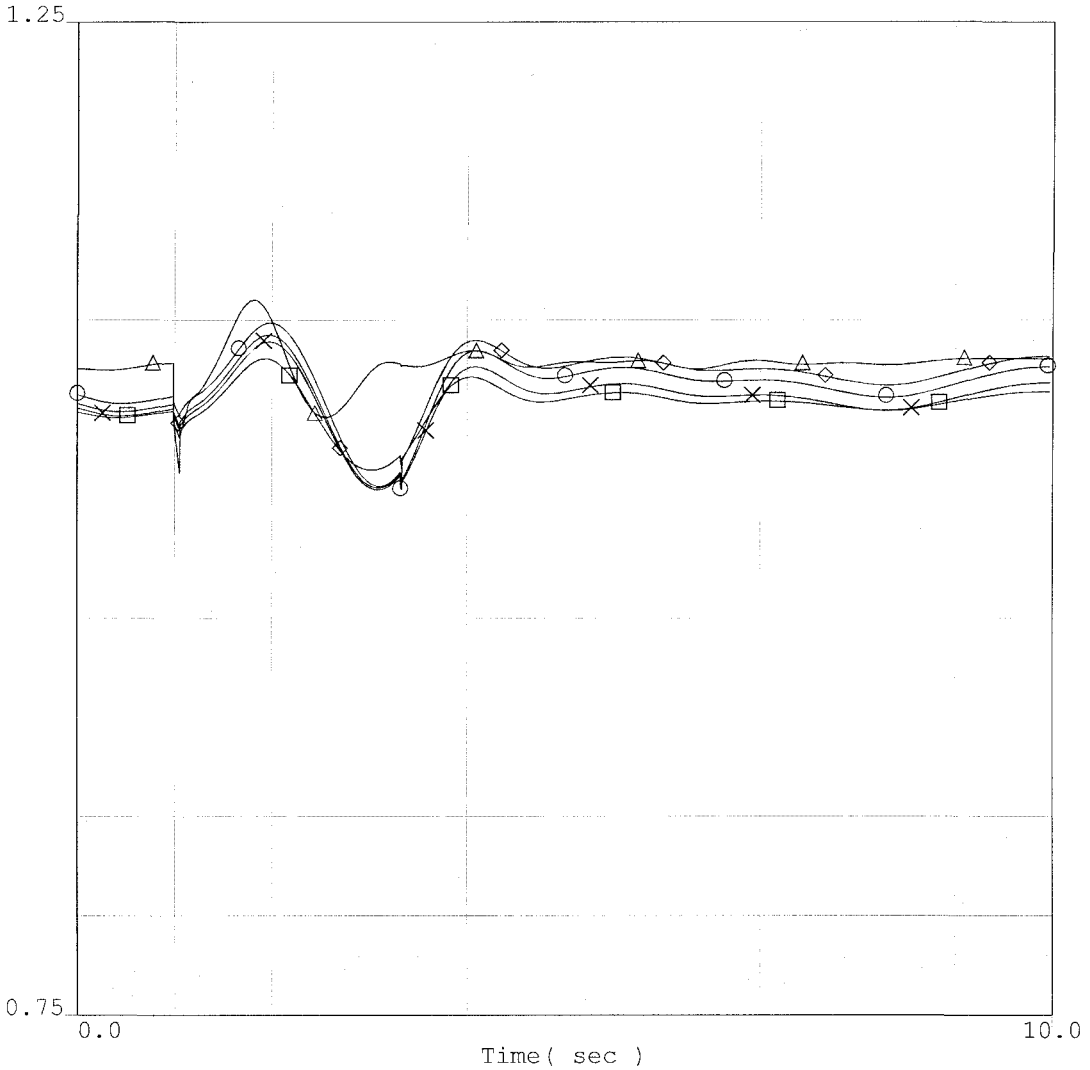
2014HS-TS6:THREE PHASE FAULTCLEARING ON HASSAYAMPA-PINAL W 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

NORTHWEST_voltages:



2014HS-TS6:THREE PHASE FAULTCLEARING ON HASSAYAMPA-PINAL W 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

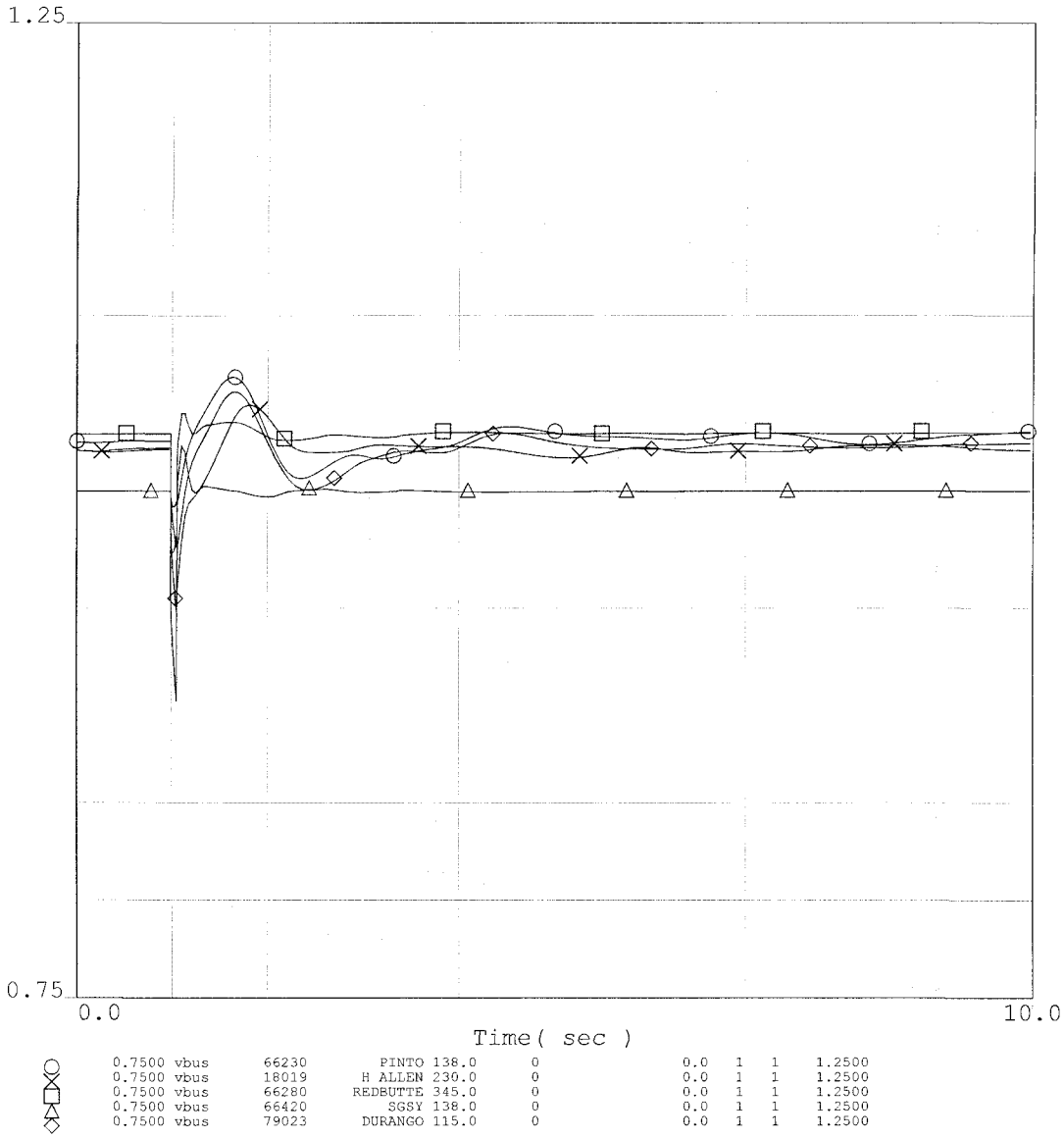
CALIFORNIA_voltages:



0.7500 vbus	30005	ROUND MT 500.0	0	0.0	1	1	1.2500
0.7500 vbus	30015	TABLE MT 500.0	0	0.0	1	1	1.2500
0.7500 vbus	30040	TESLA 500.0	0	0.0	1	1	1.2500
0.7500 vbus	30060	MIDWAY 500.0	0	0.0	1	1	1.2500
0.7500 vbus	30020	OLINDA 500.0	0	0.0	1	1	1.2500

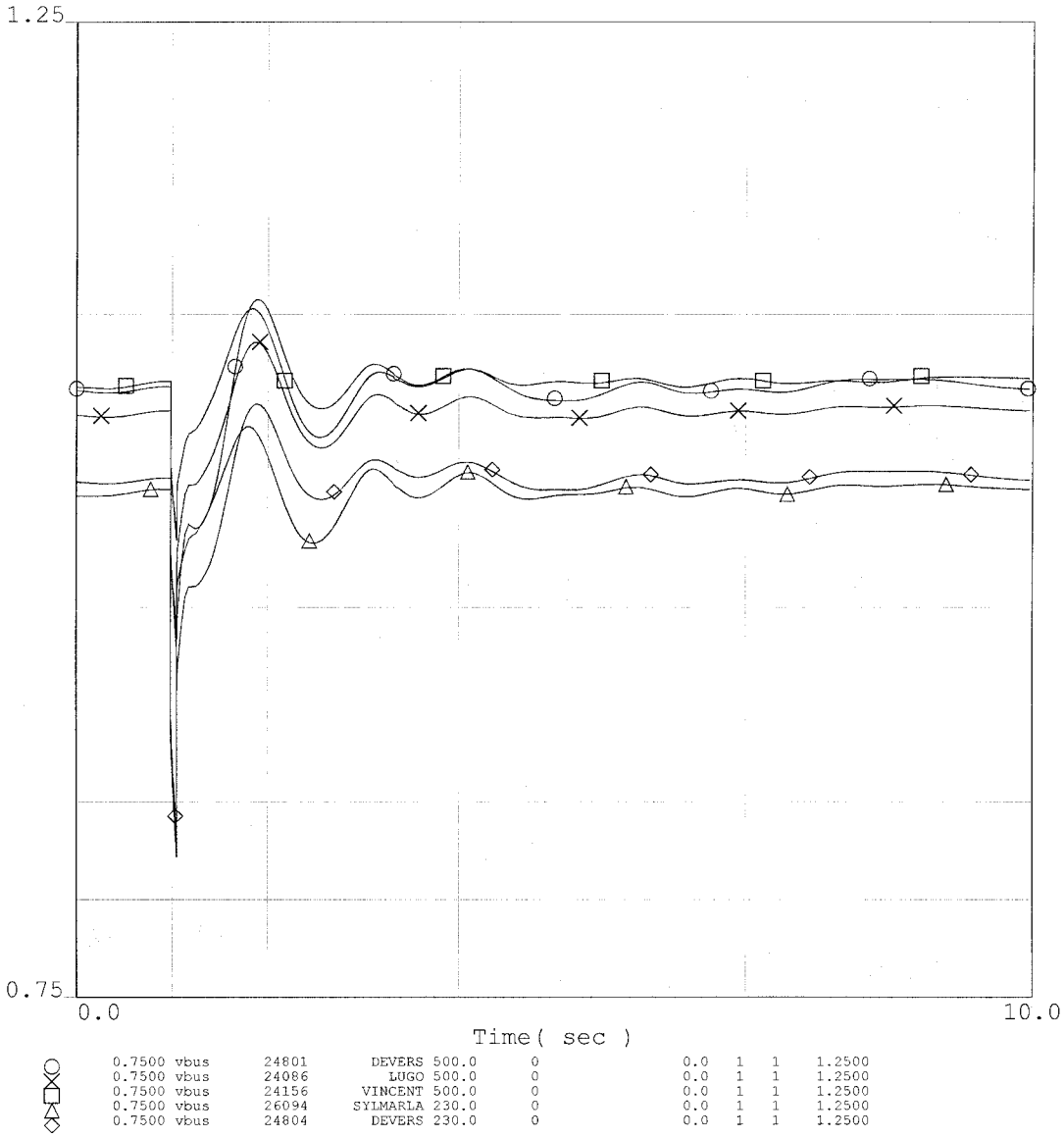
2014HS-TS6:THREE PHASE FAULTCLEARING ON HASSAYAMPA-PINAL W 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

UTAH_voltages:



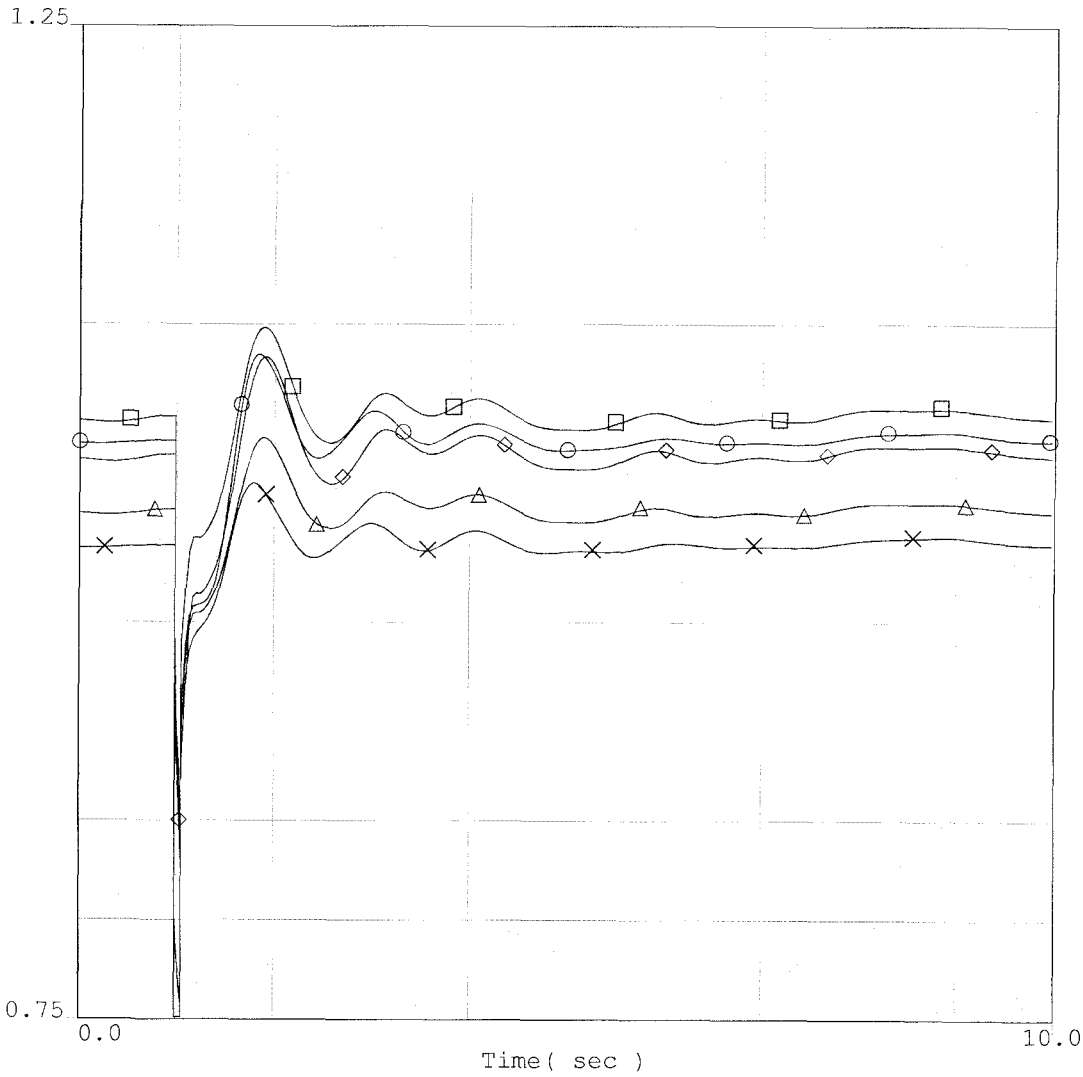
2014HS-TS6:THREE PHASE FAULTCLEARING ON HASSAYAMPA-PINAL W 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

CALIFORNIA_voltages:



2014HS-TS6:THREE PHASE FAULTCLEARING ON HASSAYAMPA-PINAL W 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

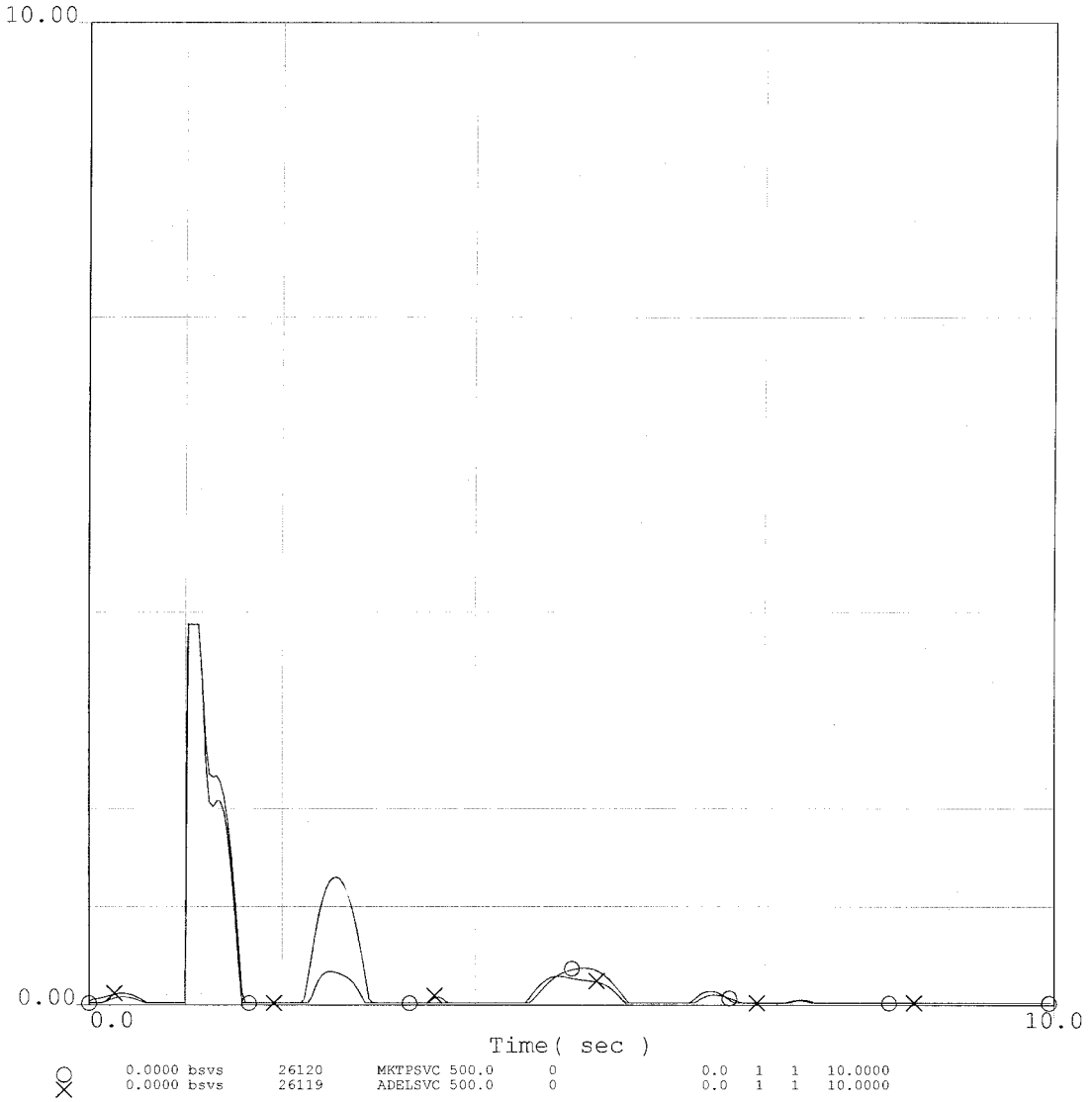
CALIFORNIA_voltages:



0.7500 vbus	22360	IMPRLVLY 500.0	0	0.0	1	1	1.2500
0.7500 vbug	22356	IMPRLVLY 230.0	0	0.0	1	1	1.2500
0.7500 vbus	24151	VALLEYSC 500.0	0	0.0	1	1	1.2500
0.7500 vbus	24805	DEVERS 115.0	0	0.0	1	1	1.2500
0.7500 vbul	24229	VALLEY-S 115.0	0	0.0	1	1	1.2500

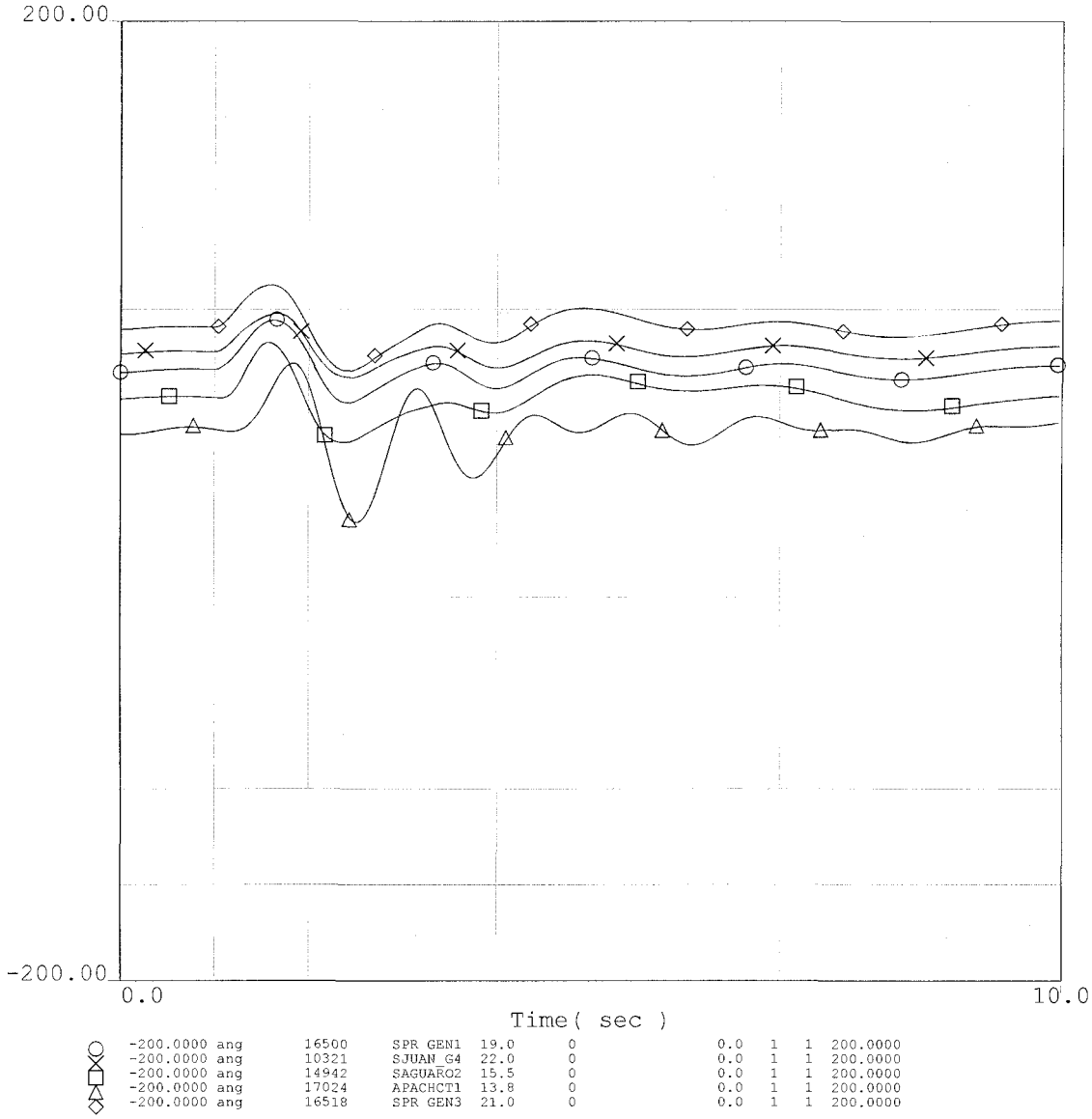
2014HS-TS6:THREE PHASE FAULTCLEARING ON HASSAYAMPA-PINAL W 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

SVC_output



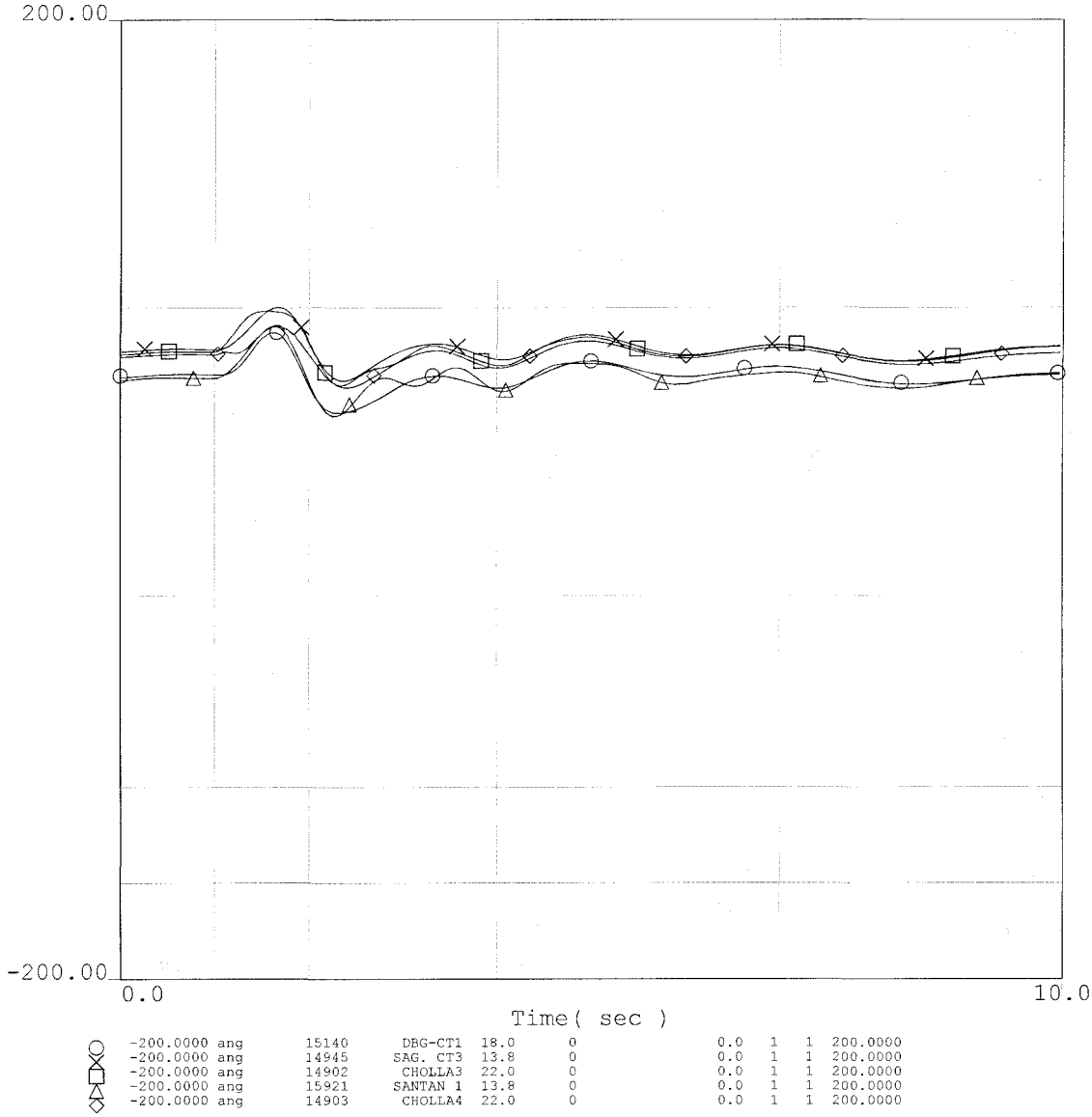
2014HS-TS6:THREE PHASE FAULTCLEARING ON HASSAYAMPA-PINAL W 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

SYSTEM_Rotorangles



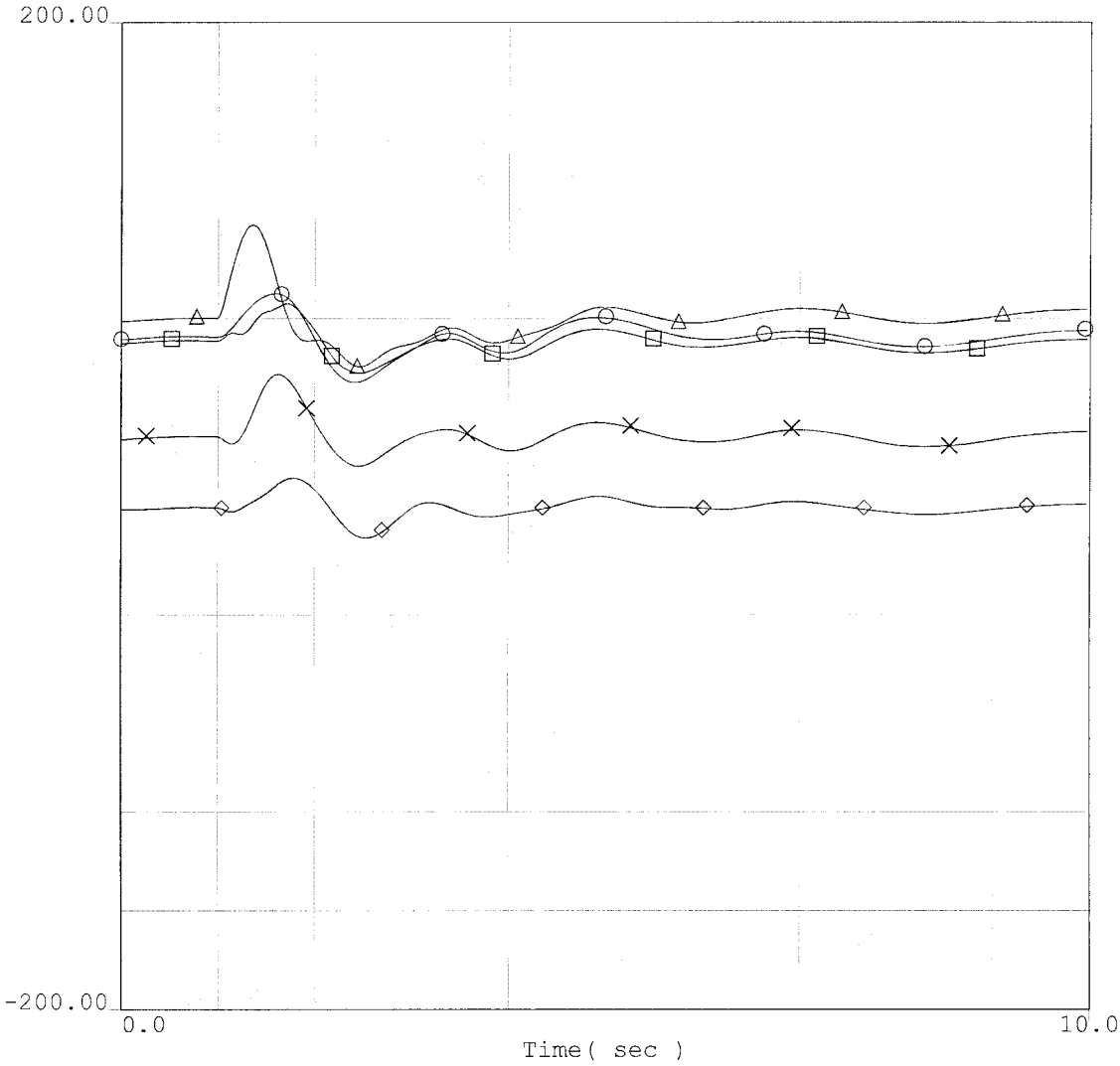
2014HS-TS6:THREE PHASE FAULTCLEARING ON HASSAYAMPA-PINAL W 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

SYSTEM_Rotorangles



2014HS-TS6:THREE PHASE FAULTCLEARING ON HASSAYAMPA-PINAL W 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

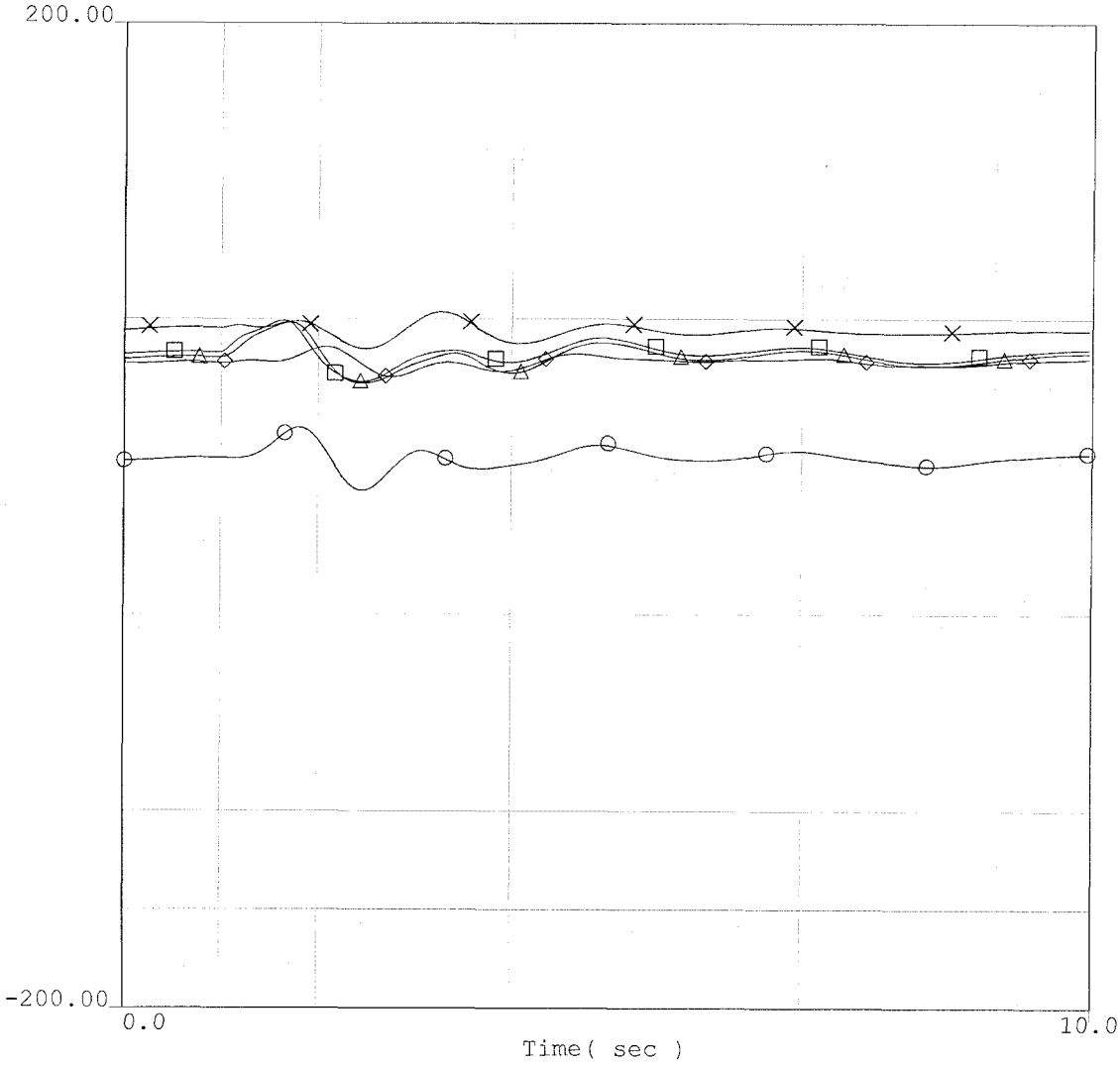
SYSTEM_Rotorangles



-200.0000 ang	16518	SPR GEN3	21.0	0	0.0	1	1	200.0000
-200.0000 ang	16503	SUNDTGE4	18.0	0	0.0	1	1	200.0000
-200.0000 ang	14914	FCNGN4CC	22.0	0	0.0	H	1	200.0000
-200.0000 ang	14931	PALOVRD1	24.0	0	0.0	1	1	200.0000
-200.0000 ang	24004	ALAMT4 G	18.0	0	0.0	H	1	200.0000

2014HS-TS6:THREE PHASE FAULTCLEARING ON HASSAYAMPA-PINAL W 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

SYSTEM_Rotorangles



○	-200.0000 ang	24129	S.ONOFR2	22.0	0	0.0	1	1	200.0000
⊗	-200.0000 ang	26039	INTERM1G	26.0	0	0.0	1	1	200.0000
□	-200.0000 ang	15981	NAVAJO 1	26.0	0	0.0	1	1	200.0000
△	-200.0000 ang	10318	SJUAN G1	22.0	0	0.0	1	1	200.0000
◇	-200.0000 ang	36411	DIABLO 1	25.0	0	0.0	1	1	200.0000

2014HS-TS6:THREE PHASE FAULTCLEARING ON HASSAYAMPA-PINAL W 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

14hs_q3_ha-pw.chf

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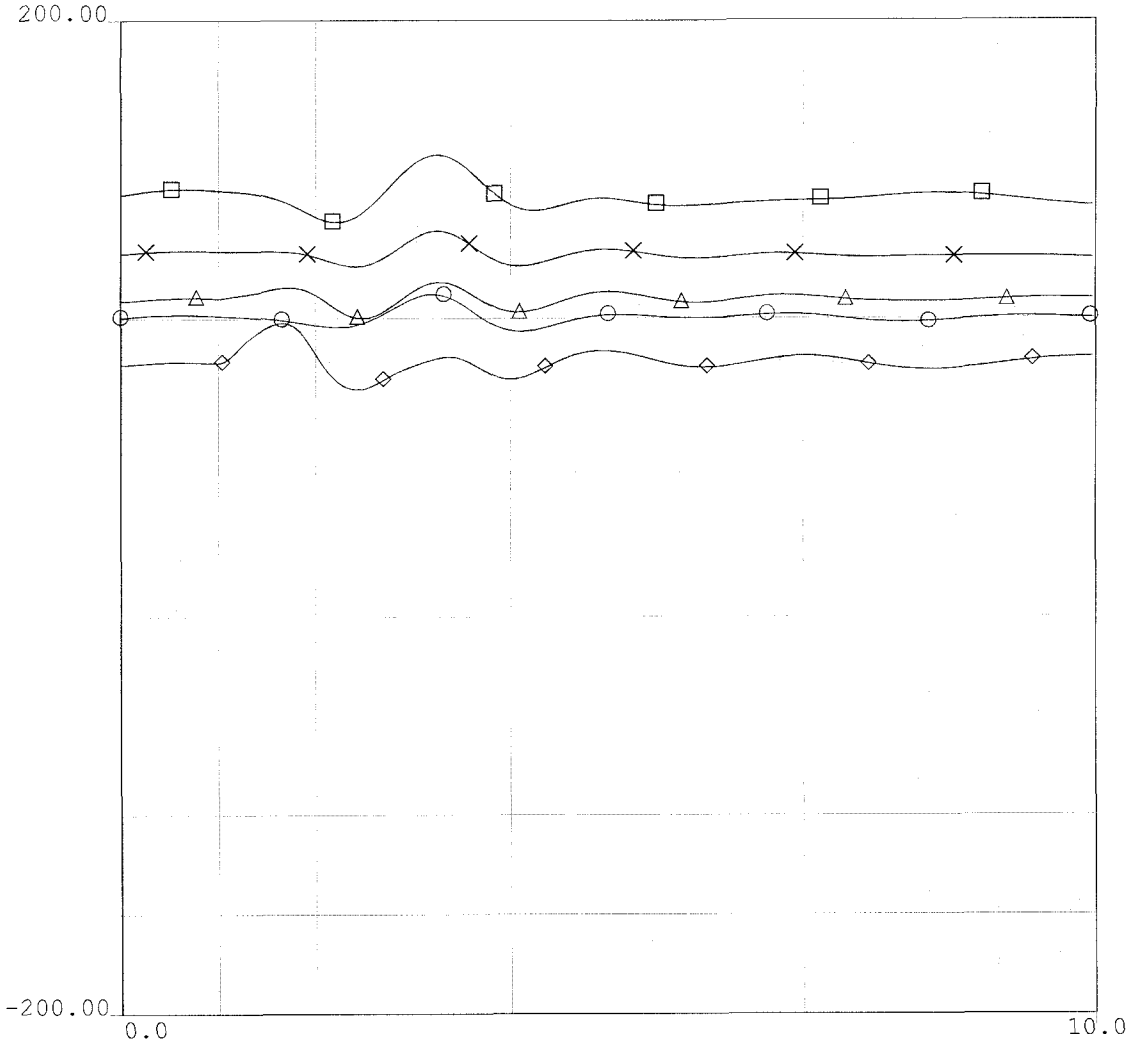
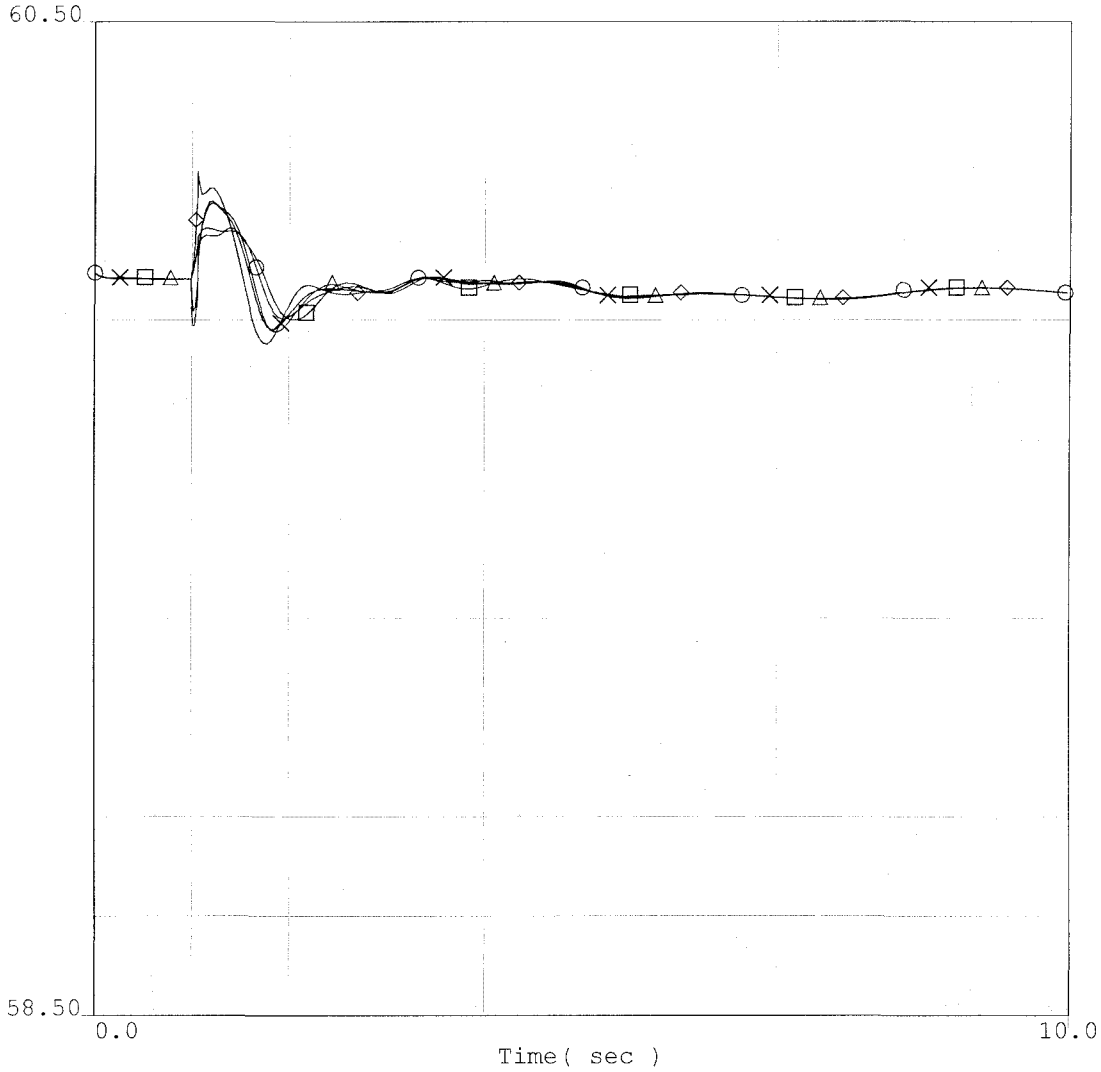
SYSTEM_Rotorangles



-200.0000 ang	73129	MBPP-1	24.0	0	0.0	1	1	200.0000
-200.0000 ang	60086	BRIDGER1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	62050	COLSTP 1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	65500	EHUNTR 3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	10321	SJUAN_G4	22.0	0	0.0	1	1	200.0000

2014HS-TS6:THREE PHASE FAULTCLEARING ON HASSAYAMPA-PINAL W 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

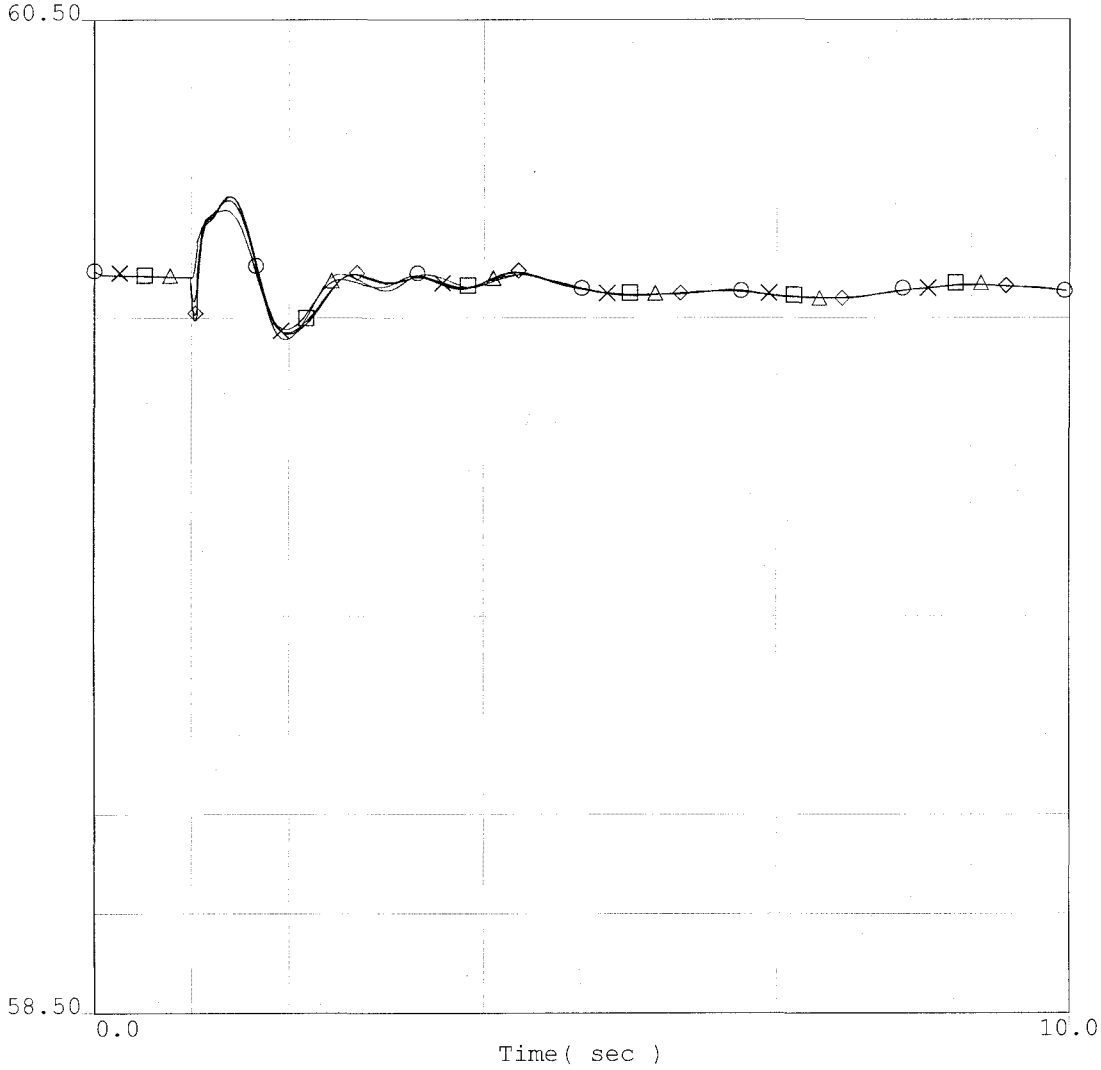
Frequencies:



○	58.5000 fbus	14003	NAVAJO 500.0	0	0.0	1	1	60.5000
×	58.5000 fbus	14005	WESTWING 500.0	0	0.0	1	1	60.5000
□	58.5000 fbus	14001	FOURCORN 500.0	0	0.0	1	1	60.5000
△	58.5000 fbus	14016	PNPKAPS 500.0	0	0.0	1	1	60.5000
◇	58.5000 fbus	15021	PALOVRDE 500.0	0	0.0	1	1	60.5000

2014HS-TS6:THREE PHASE FAULTCLEARING ON HASSAYAMPA-PINAL W 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

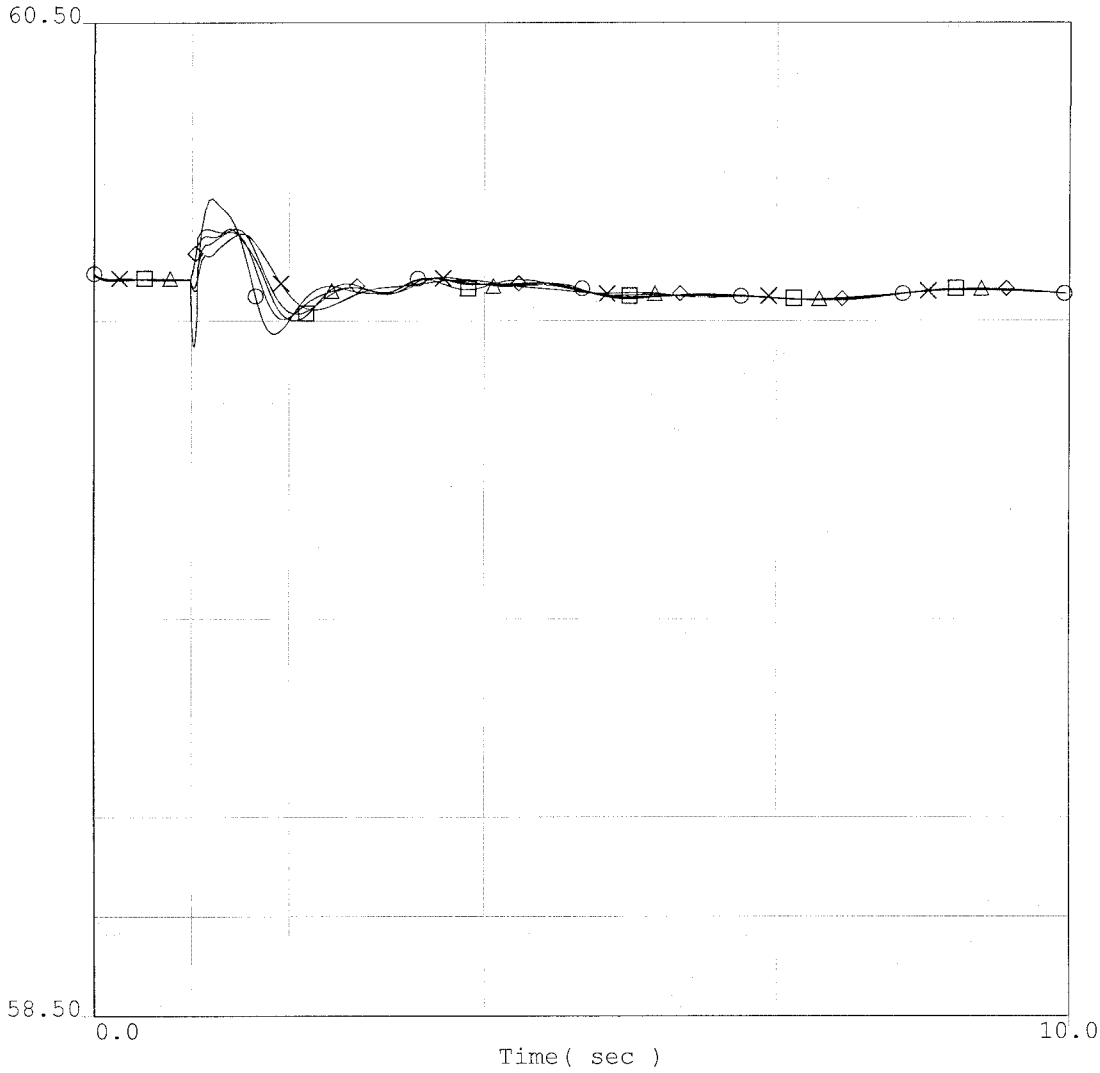
Frequencies:



○	58.5000 fbus	16000	TORTOLIT 500.0	0	0.0	1	1	60.5000
⊗	58.5000 fbus	16105	VAIL 345.0	0	0.0	1	1	60.5000
□	58.5000 fbus	16103	SOUTH 345.0	0	0.0	1	1	60.5000
△	58.5000 fbul	15001	CORONADO 500.0	0	0.0	1	1	60.5000
◇	58.5000 fbus	16109	WINCHSTR 345.0	0	0.0	1	1	60.5000

2014HS-TS6:THREE PHASE FAULTCLEARING ON HASSAYAMPA-PINAL W 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

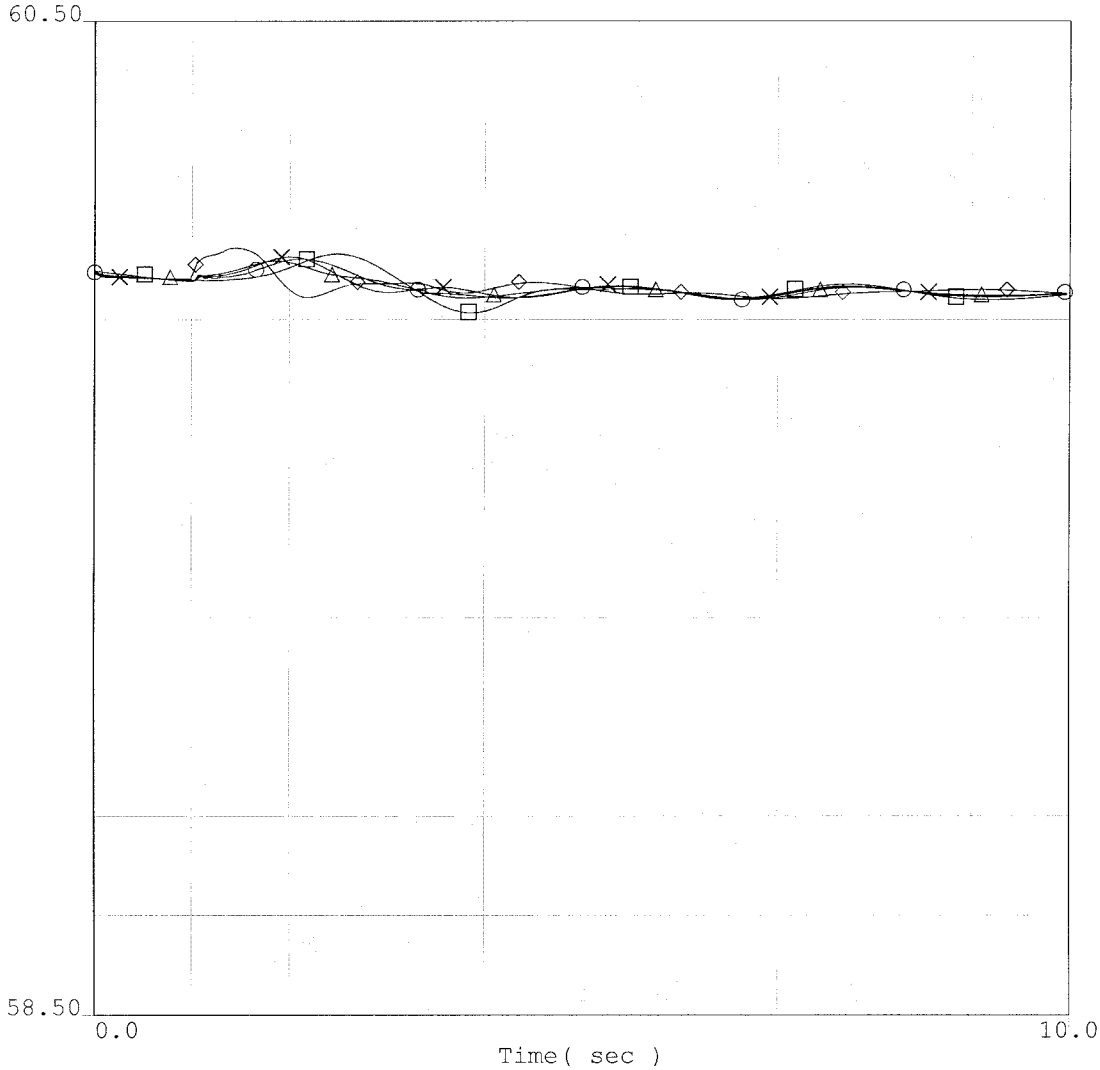
Frequencies:



○	58.5000	fbul	14231	WESTWNGW	230.0	0	0.0	1	1	60.5000
⊗	58.5000	fbus	26003	ADELANTO	500.0	0	0.0	1	1	60.5000
□	58.5000	fbus	14001	FOURCORN	500.0	0	0.0	1	1	60.5000
△	58.5000	fbus	26048	MCCULLGH	500.0	0	0.0	1	1	60.5000
◇	58.5000	fbus	14003	NAVAJO	500.0	0	0.0	1	1	60.5000

2014HS-TS6:THREE PHASE FAULTCLEARING ON HASSAYAMPA-PINAL W 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

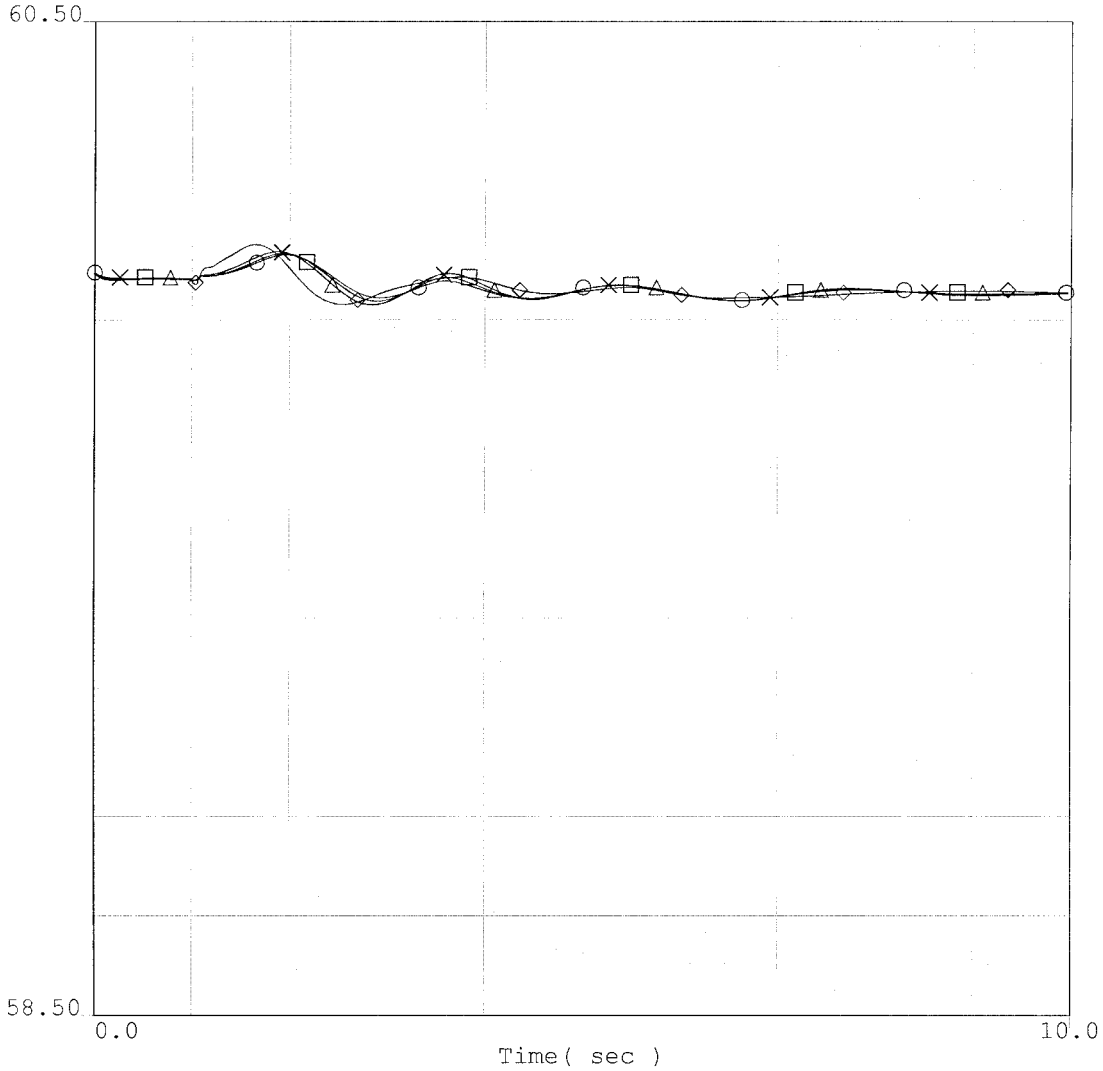
Frequencies:



58.5000	fbus	40489	GRIZZLY 500.0	0	0.0	1	1	60.5000
58.5000	fbus	40687	MALIN 500.0	0	0.0	1	1	60.5000
58.5000	fbus	40459	GARRISON 500.0	0	0.0	1	1	60.5000
58.5000	fbus	60235	MIDPOINT 345.0	0	0.0	1	1	60.5000
58.5000	fbus	66230	PINTO 138.0	0	0.0	1	1	60.5000

2014HS-TS6:THREE PHASE FAULTCLEARING ON HASSAYAMPA-PINAL W 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

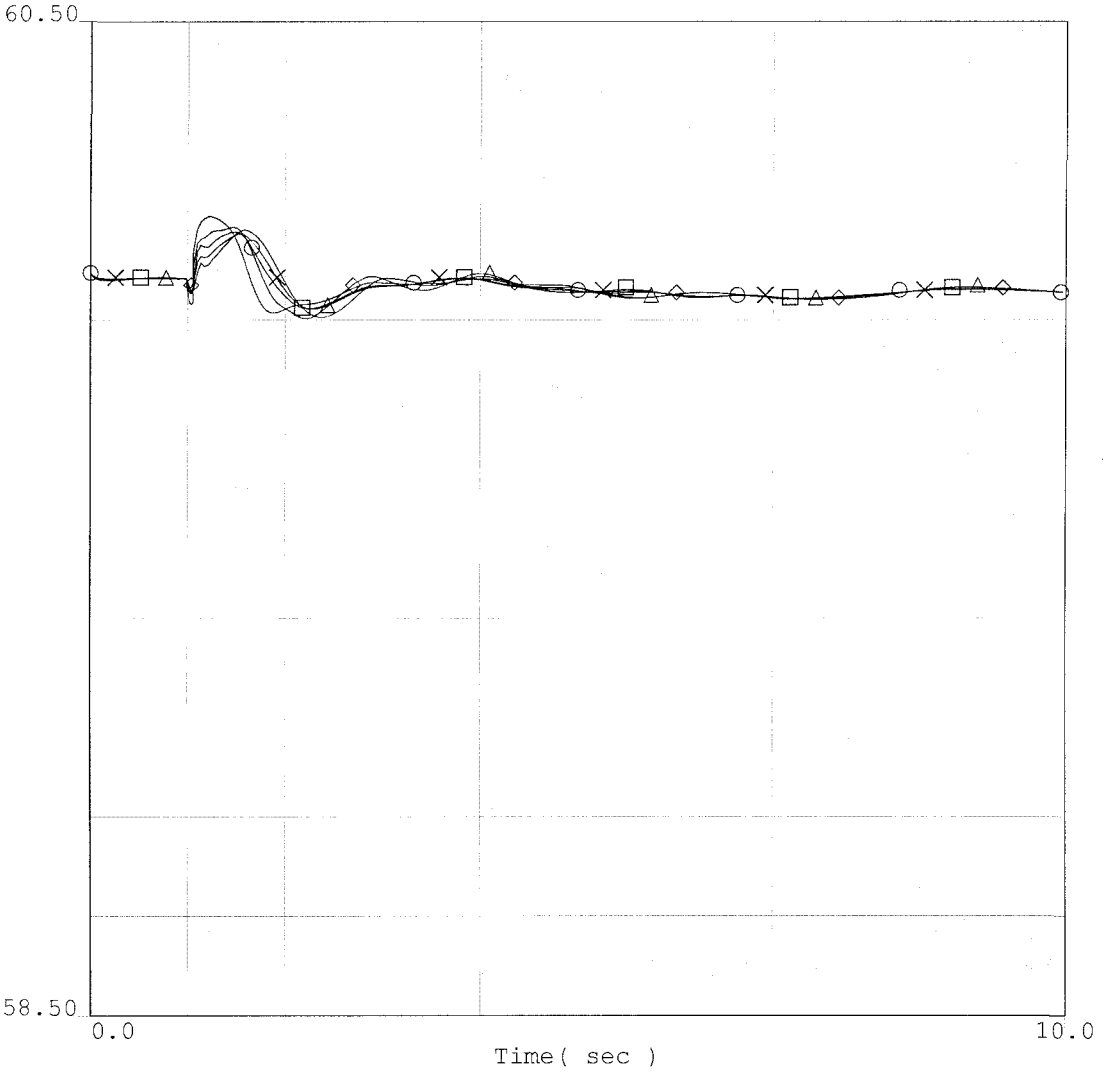
Frequencies:



58.5000 fbus	30005	ROUND MT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30015	TABLE MT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30035	TRACY 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30040	TESLA 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30060	MIDWAY 500.0	0	0.0	1	1	60.5000

2014HS-TS6:THREE PHASE FAULTCLEARING ON HASSAYAMPA-PINAL W 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

Frequencies:



58.5000 fbus	24801	DEVERS 500.0	0	0.0	1	1	60.5000
58.5000 fbus	24086	LUGO 500.0	0	0.0	1	1	60.5000
58.5000 fbus	26094	SYLMARLA 230.0	0	0.0	1	1	60.5000
58.5000 fbus	22466	MIGUEL 500.0	0	0.0	1	1	60.5000
58.5000 fbus	22536	N.GILA 500.0	0	0.0	1	1	60.5000

2014HS-TS6:THREE PHASE FAULTCLEARING ON HASSAYAMPA-PINAL W 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

HIGHEST VOLTAGE DIP

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct	@time
14	AF-NORTH	69	vbul	1.03	0.984	4.5	1.525
24	COLRIVER	500	vbus	1.06	0.997	5.9	1.525
24	DEVRSVC1	500	vbug	1.06	1.027	3.1	1.525

LOWEST FREQUENCY

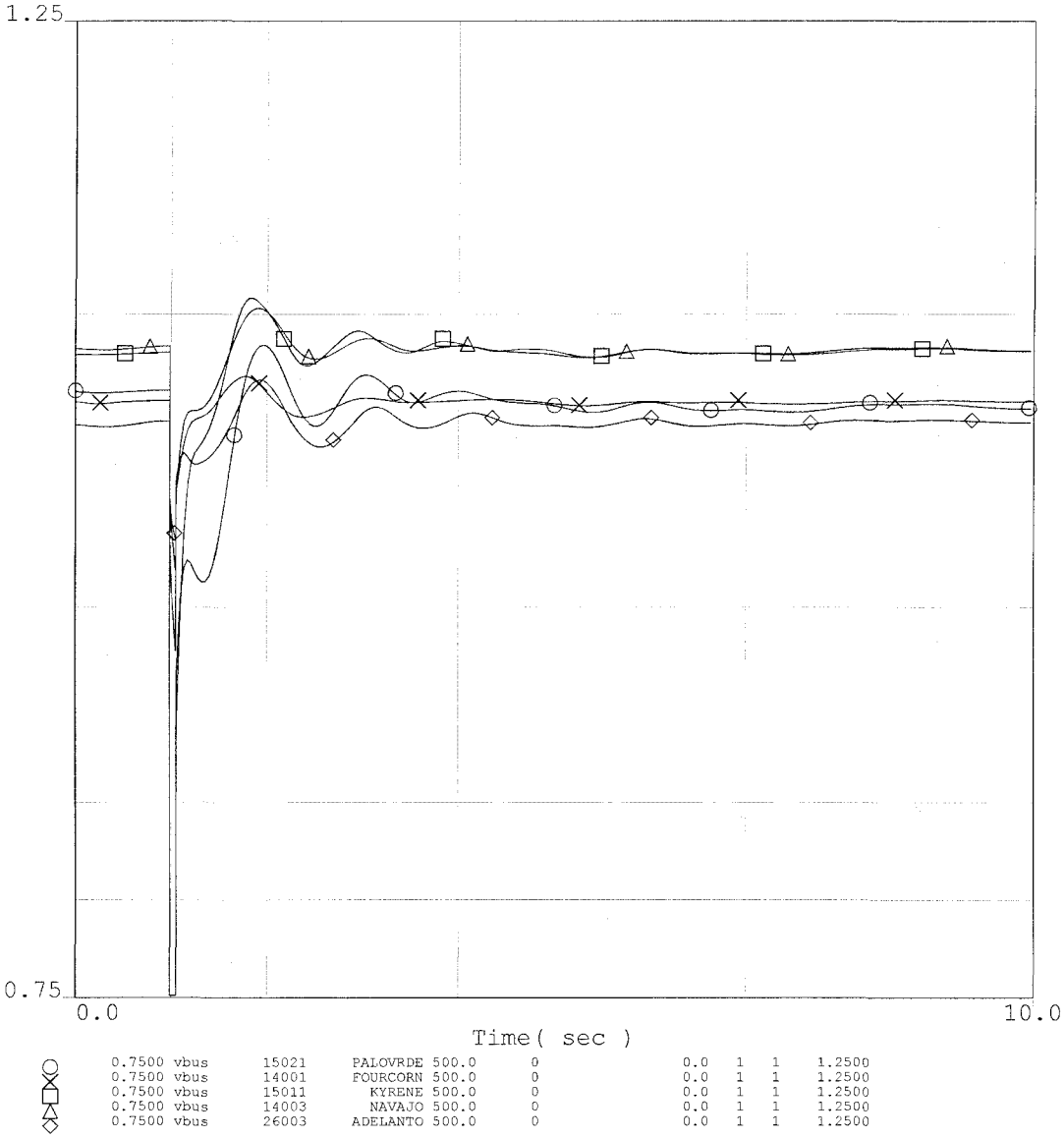
AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
14	WHITETNK	69	fbul	59.515	1.042
14	Q1COL1	34.5	fbus	55.318	1.054
11	NEWMN4C	13.8	fbug	59.736	2.2

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

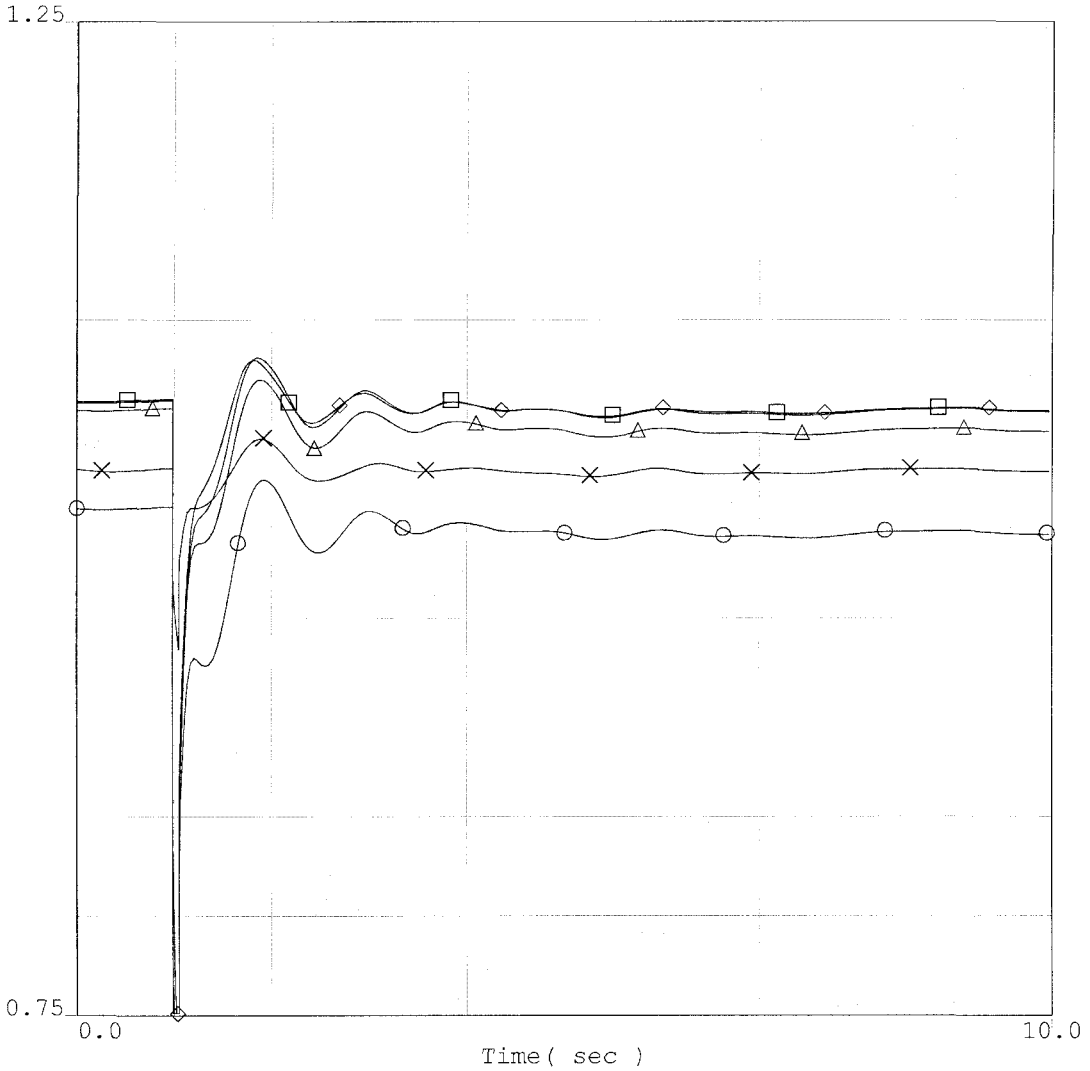
There were 0 violations of MORC criteria 1 (25% Voltage Dip) !
There were 0 violations of MORC criteria 2 (20% Voltage Dip for 20 Cycles)!
There were 0 violations of MORC criteria 3 (59.6 HZ for 6 Cycles)!

ARIZONA_voltages:



14HS-TS7:THREE PHASE FAULT CLEARING ON JOJOBA-KYRENE 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

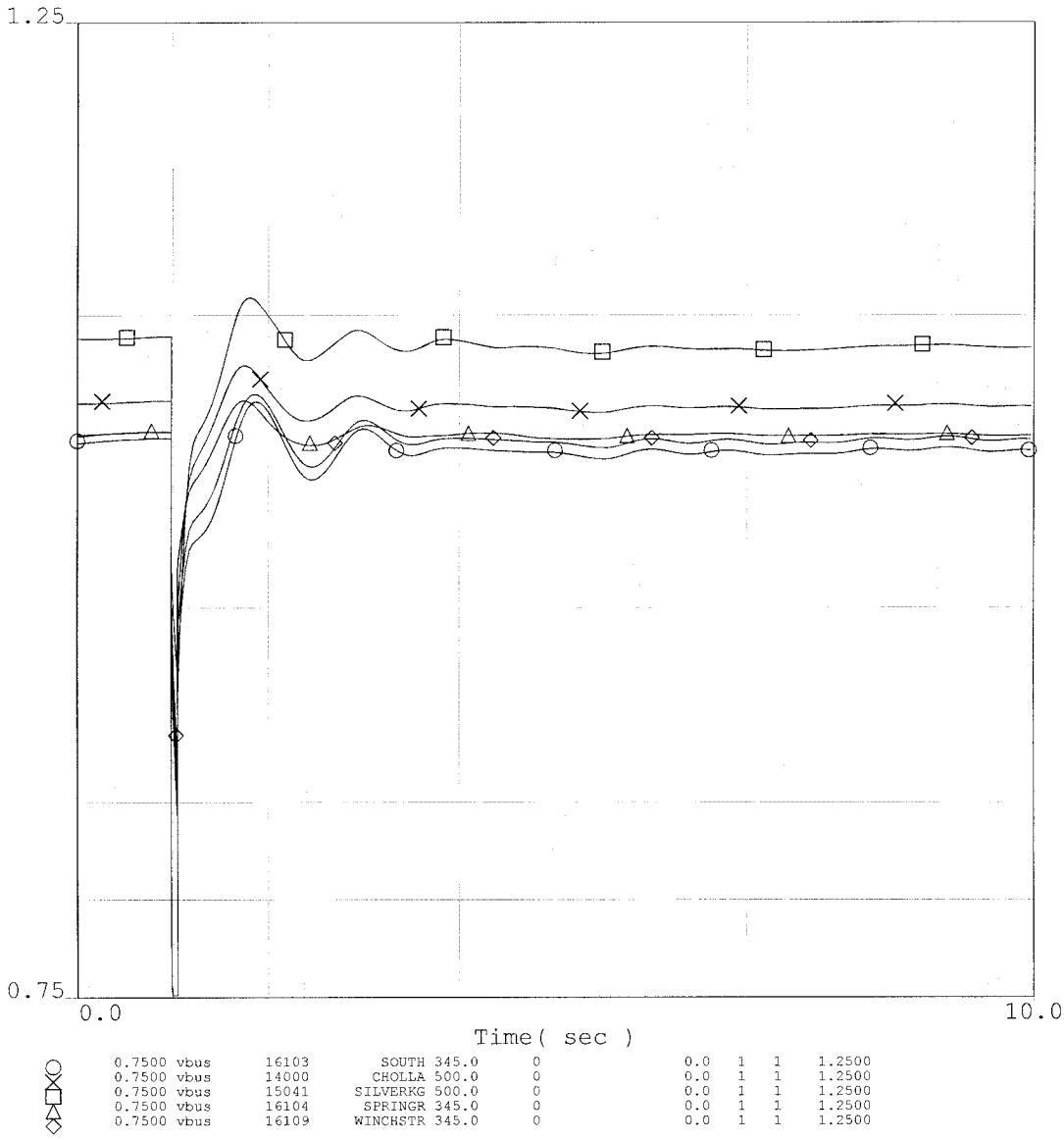
ARIZONA_voltages:



○	0.7500 vbul	14231	WESTWNGW 230.0	0	0.0	1	1	1.2500
⊠	0.7500 vbus	19011	MEAD N 230.0	0	0.0	1	1	1.2500
□	0.7500 vbus	15215	SILVERKG 230.0	0	0.0	1	1	1.2500
△	0.7500 vbul	14221	PPAPS W 230.0	0	0.0	1	1	1.2500
◇	0.7500 vbus	15207	KYRENE 230.0	0	0.0	1	1	1.2500

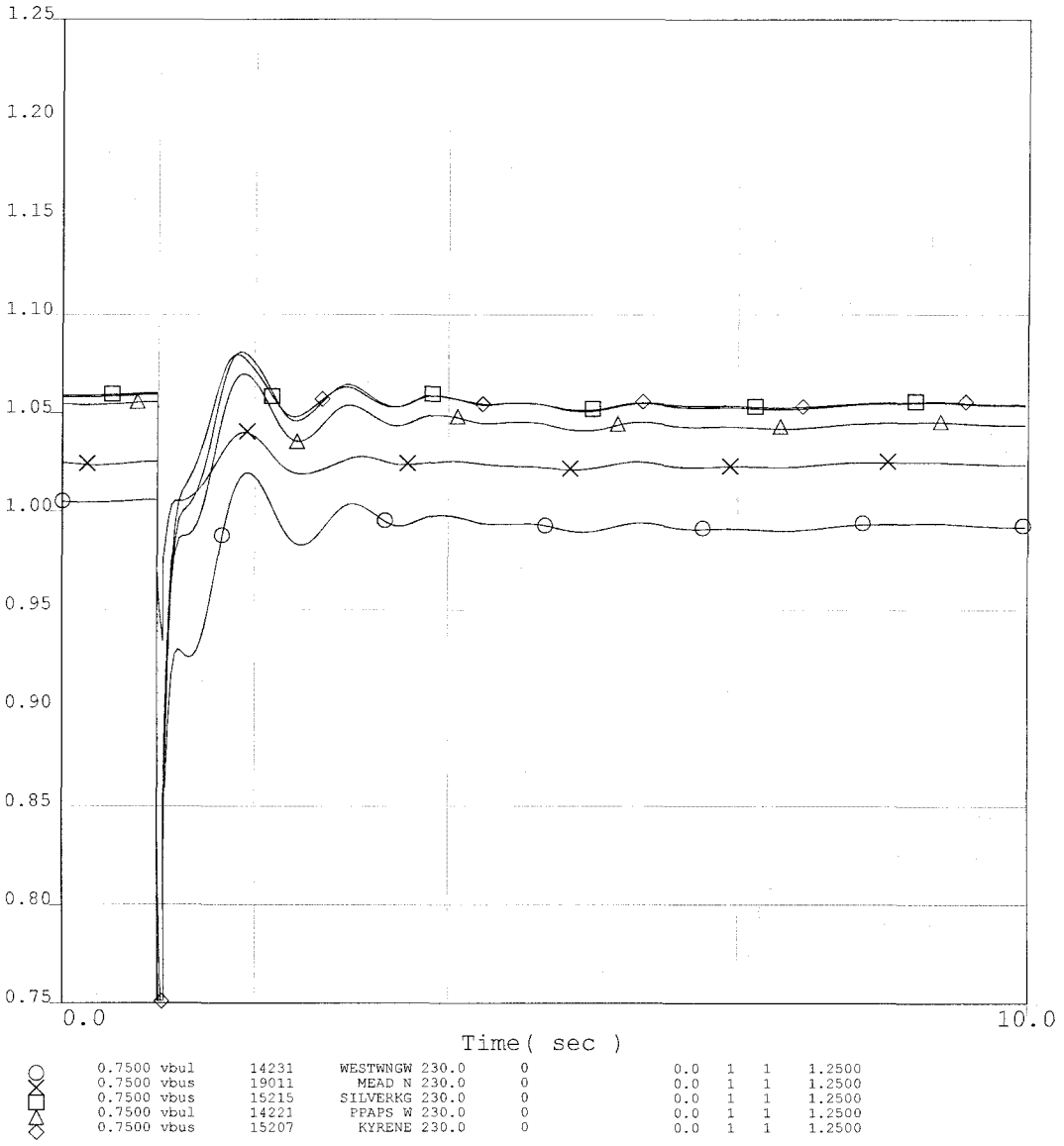
14HS-TS7:THREE PHASE FAULT CLEARING ON JOJOBA-KYRENE 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

ARIZONA_voltages:



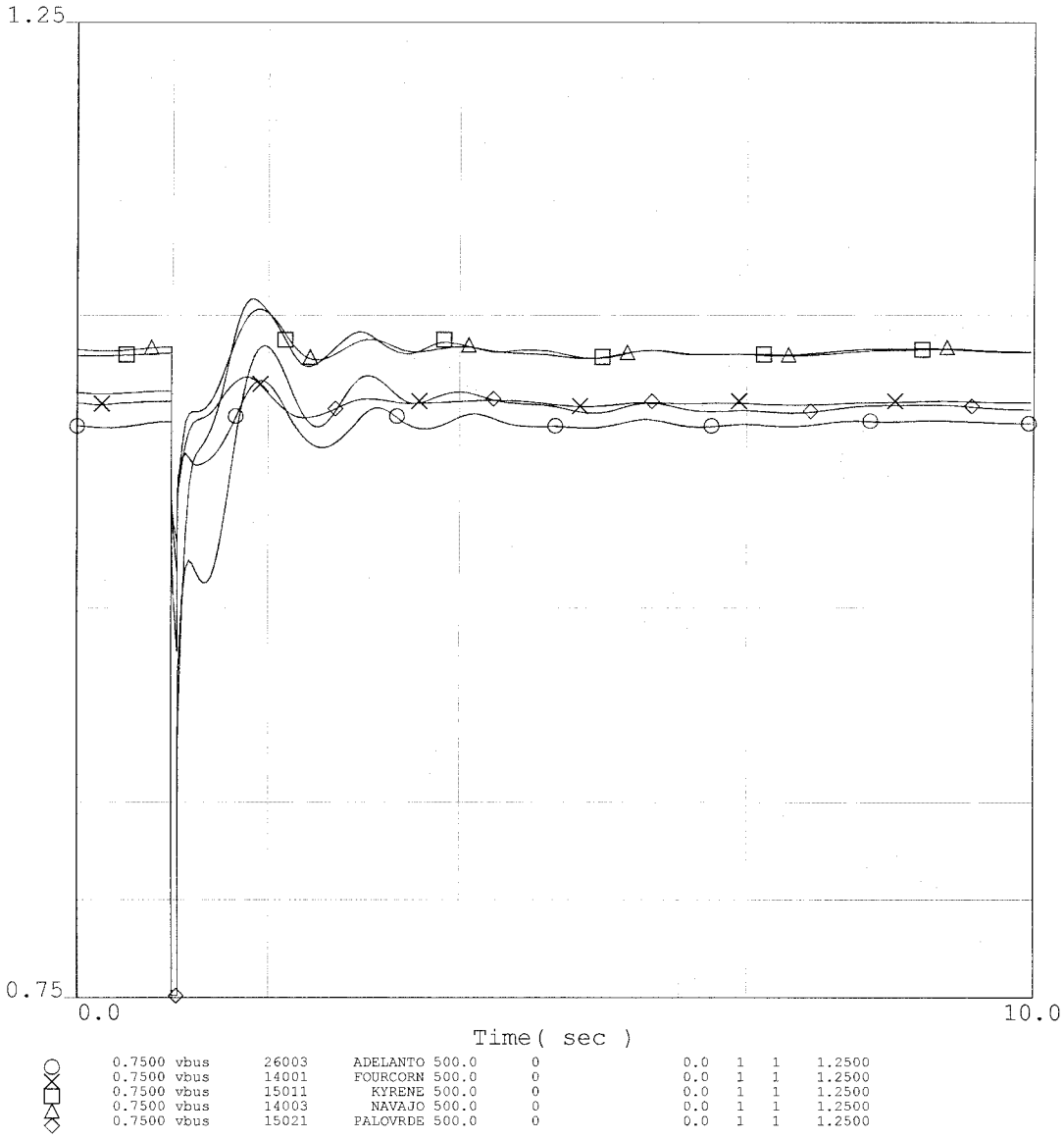
14HS-TS7:THREE PHASE FAULT CLEARING ON JOJOBA-KYRENE 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

ARIZONA_voltages:



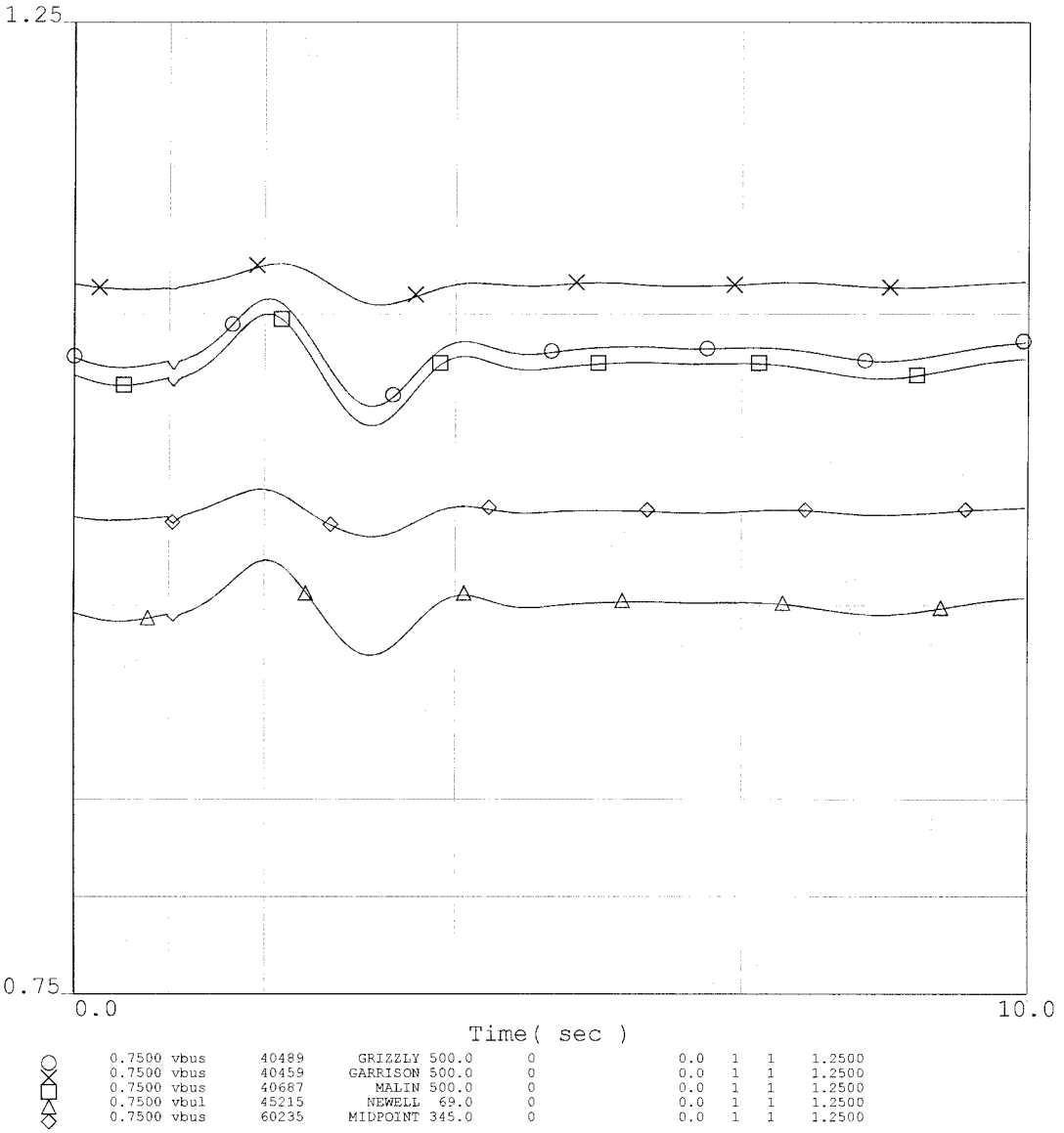
14HS-TS7:THREE PHASE FAULT CLEARING ON JOJOBA-KYRENE 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

ARIZONA_voltages:



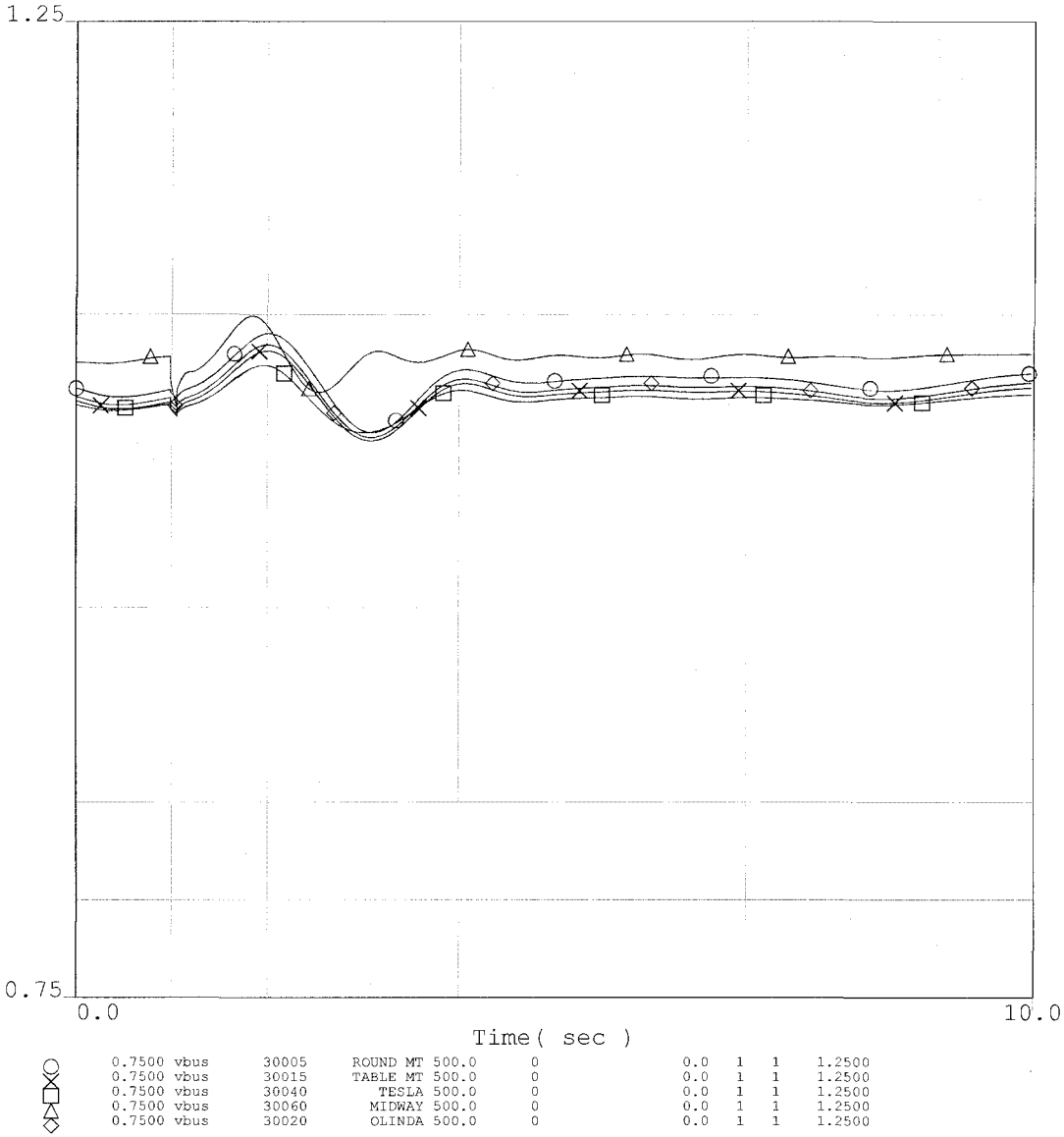
14HS-TS7:THREE PHASE FAULT CLEARING ON JOJOBA-KYRENE 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

NORTHWEST_voltages:



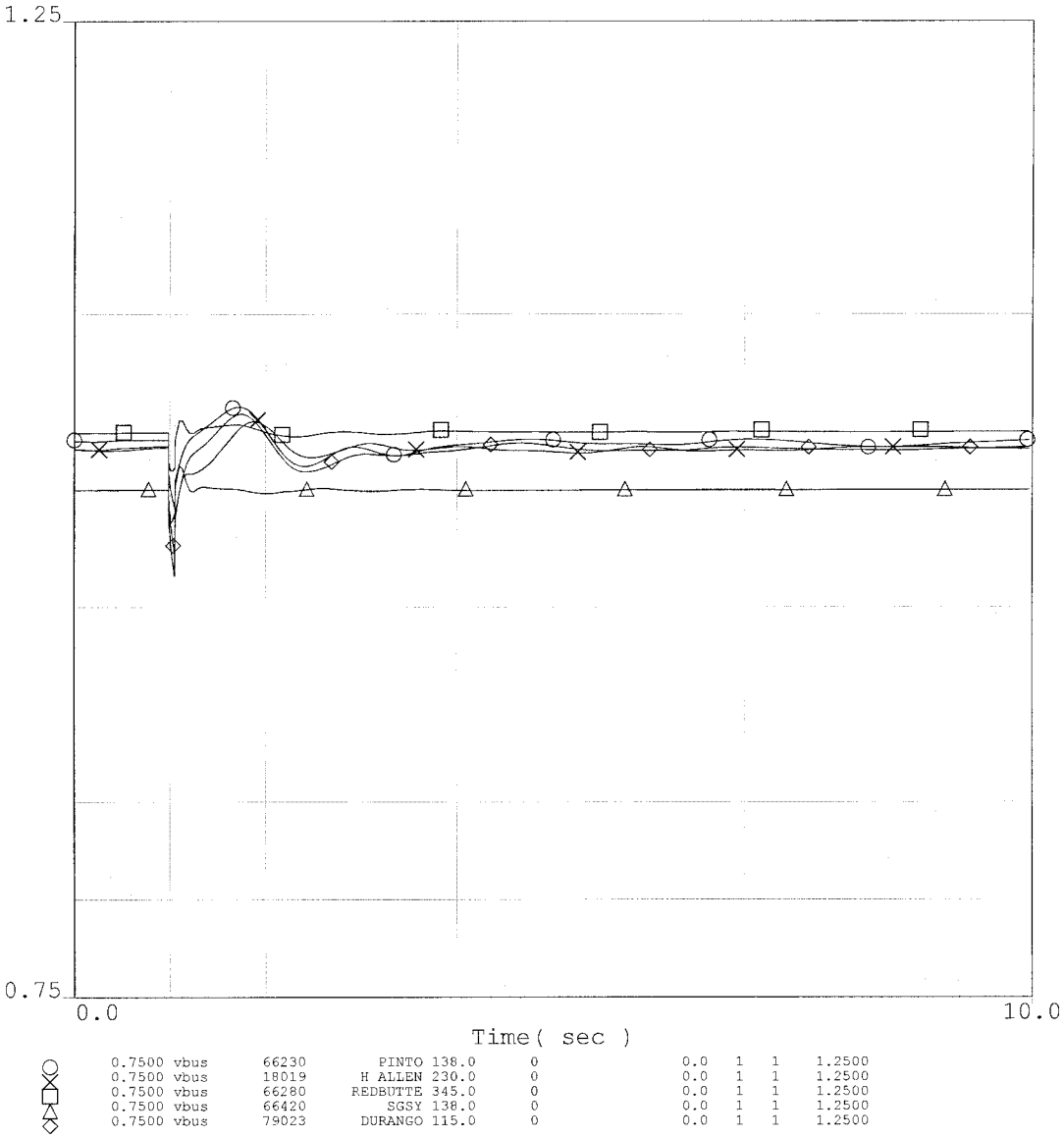
14HS-TS7:THREE PHASE FAULT CLEARING ON JOJOBA-KYRENE 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

CALIFORNIA_voltages:



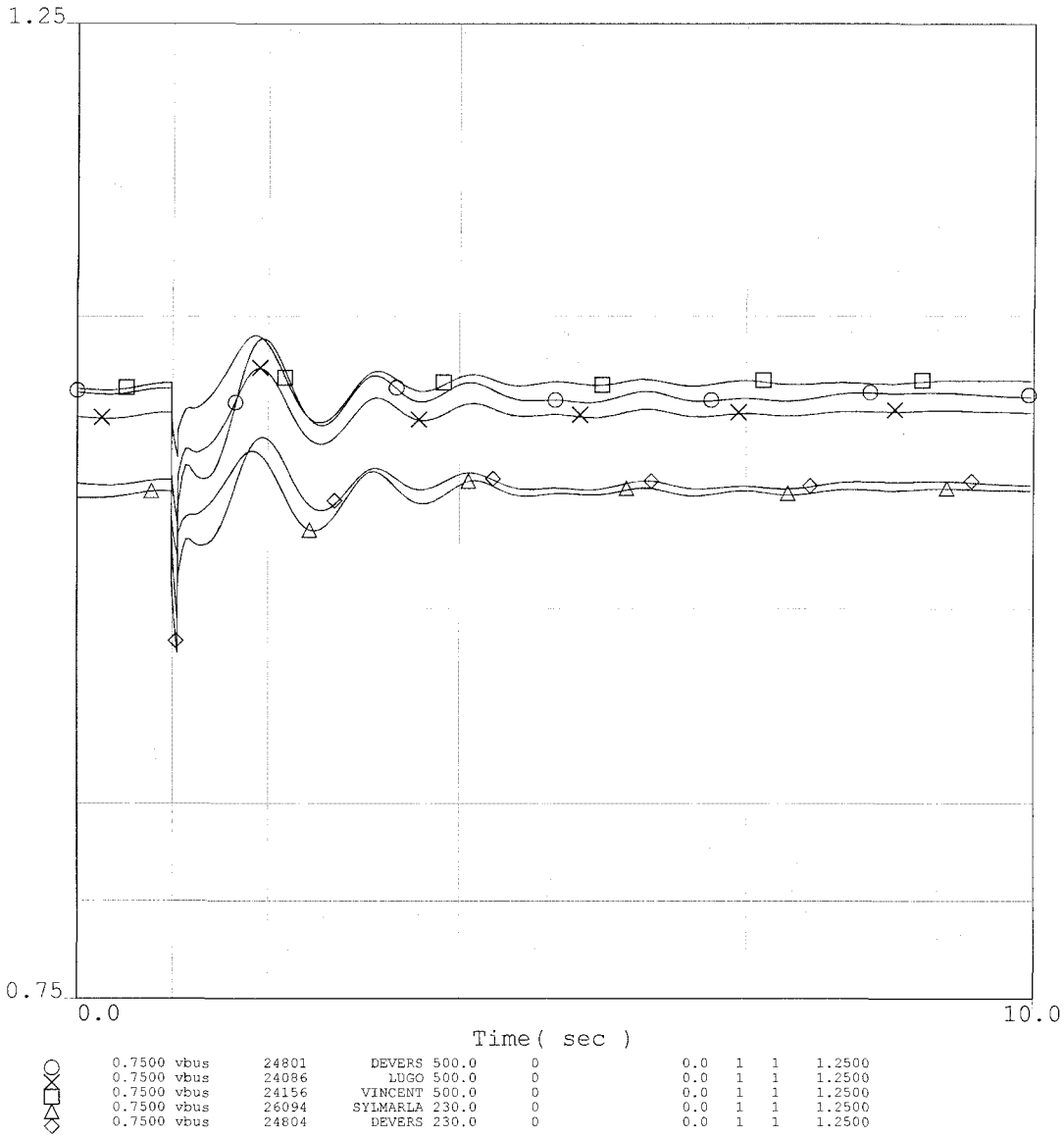
14HS-TS7:THREE PHASE FAULT CLEARING ON JOJOBA-KYRENE 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

UTAH_voltages:



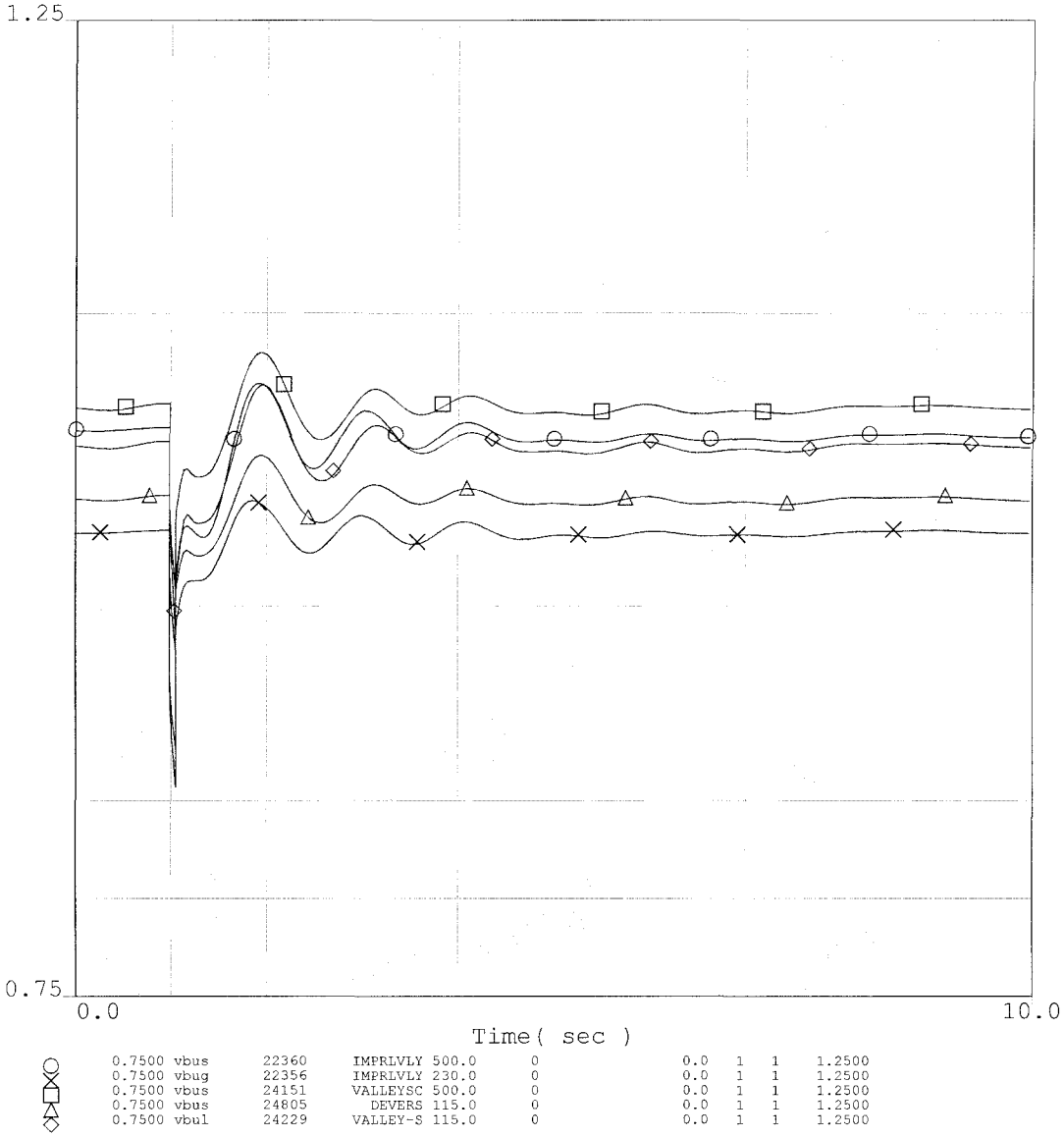
14HS-TS7:THREE PHASE FAULT CLEARING ON JOJOBA-KYRENE 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

CALIFORNIA_voltages:



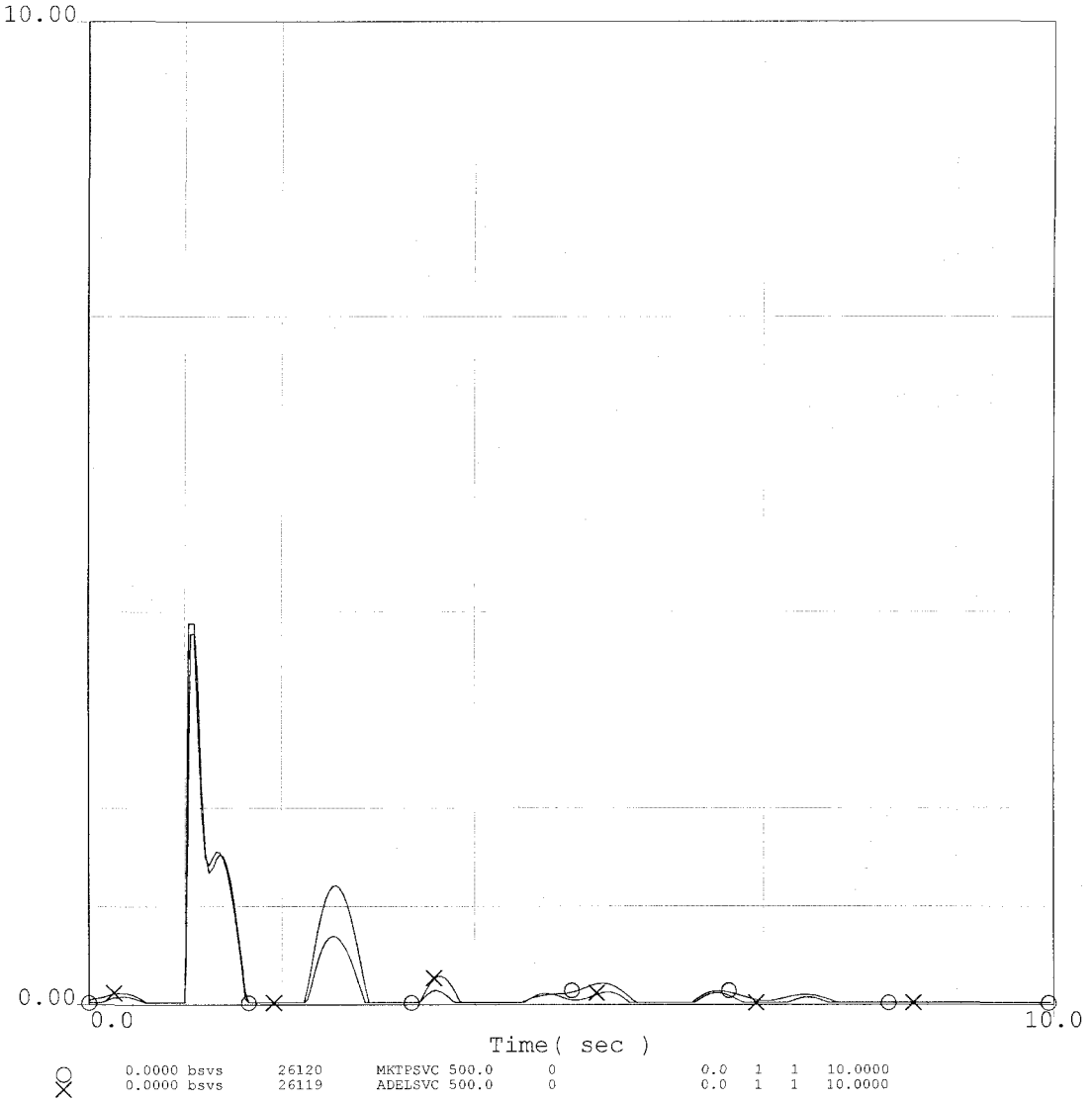
14HS-TS7:THREE PHASE FAULT CLEARING ON JOJOBA-KYRENE 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

CALIFORNIA_voltages:



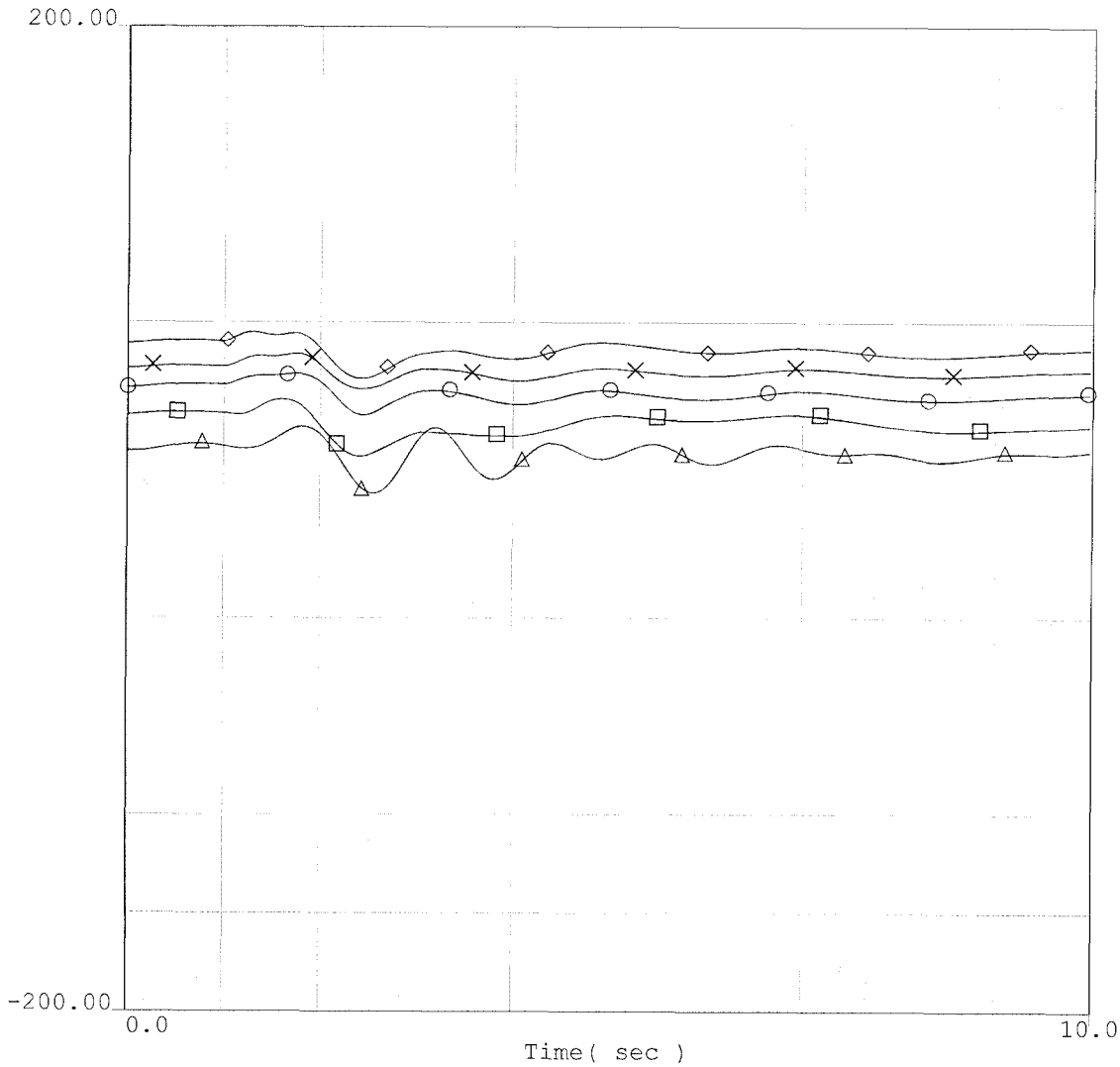
14HS-TS7:THREE PHASE FAULT CLEARING ON JOJOBA-KYRENE 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

SVC_output



14HS-TS7:THREE PHASE FAULT CLEARING ON JOJOBA-KYRENE 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

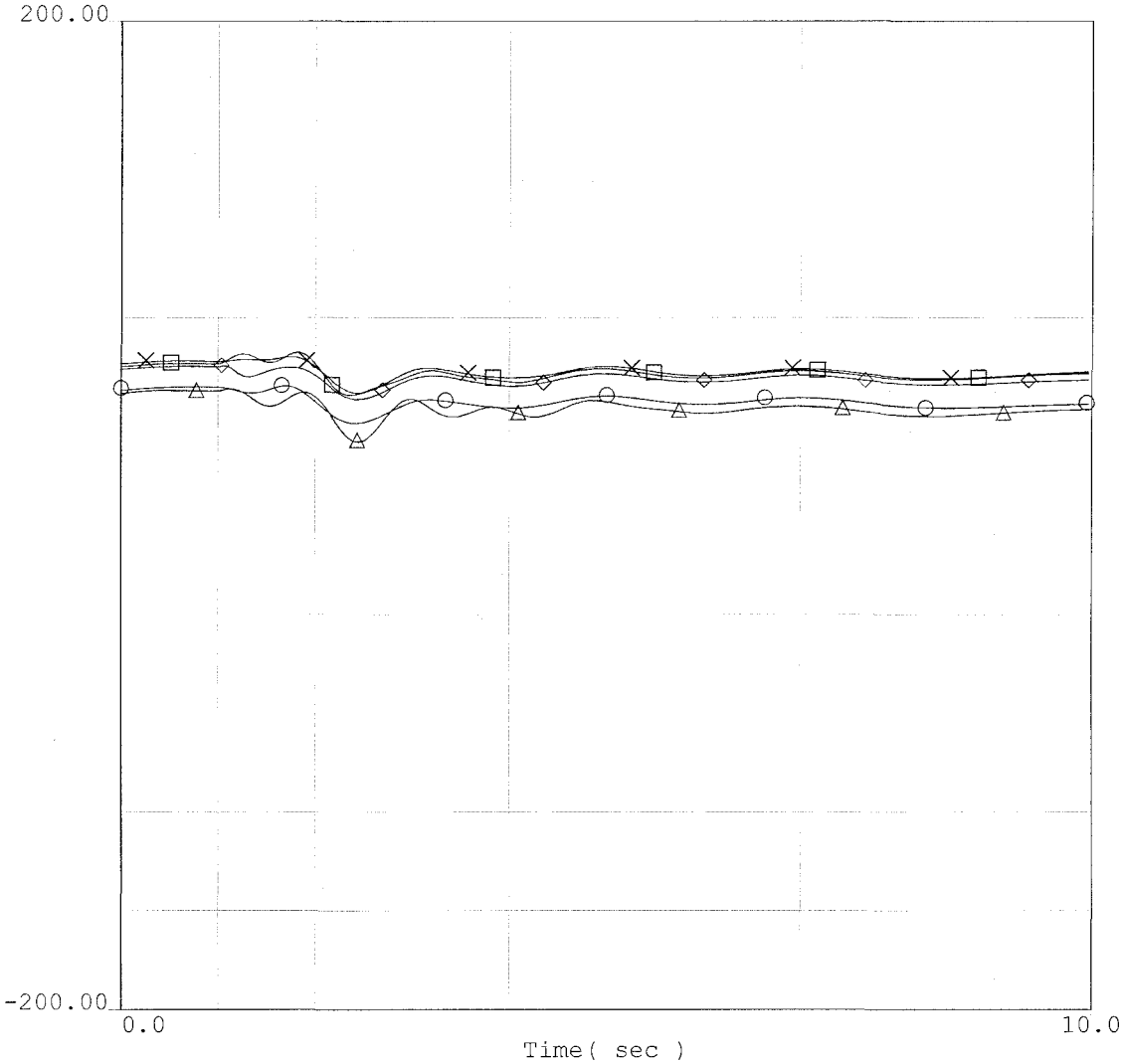
SYSTEM_Rotorangles



○	-200.0000 ang	16500	SPR GEN1	19.0	0	0.0	1	1	200.0000
⊗	-200.0000 ang	10321	SJUAN_G4	22.0	0	0.0	1	1	200.0000
□	-200.0000 ang	14942	SAGUARO2	15.5	0	0.0	1	1	200.0000
△	-200.0000 ang	17024	APACHCT1	13.8	0	0.0	1	1	200.0000
◇	-200.0000 ang	16518	SPR GEN3	21.0	0	0.0	1	1	200.0000

14HS-TS7:THREE PHASE FAULT CLEARING ON JOJOBA-KYRENE 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

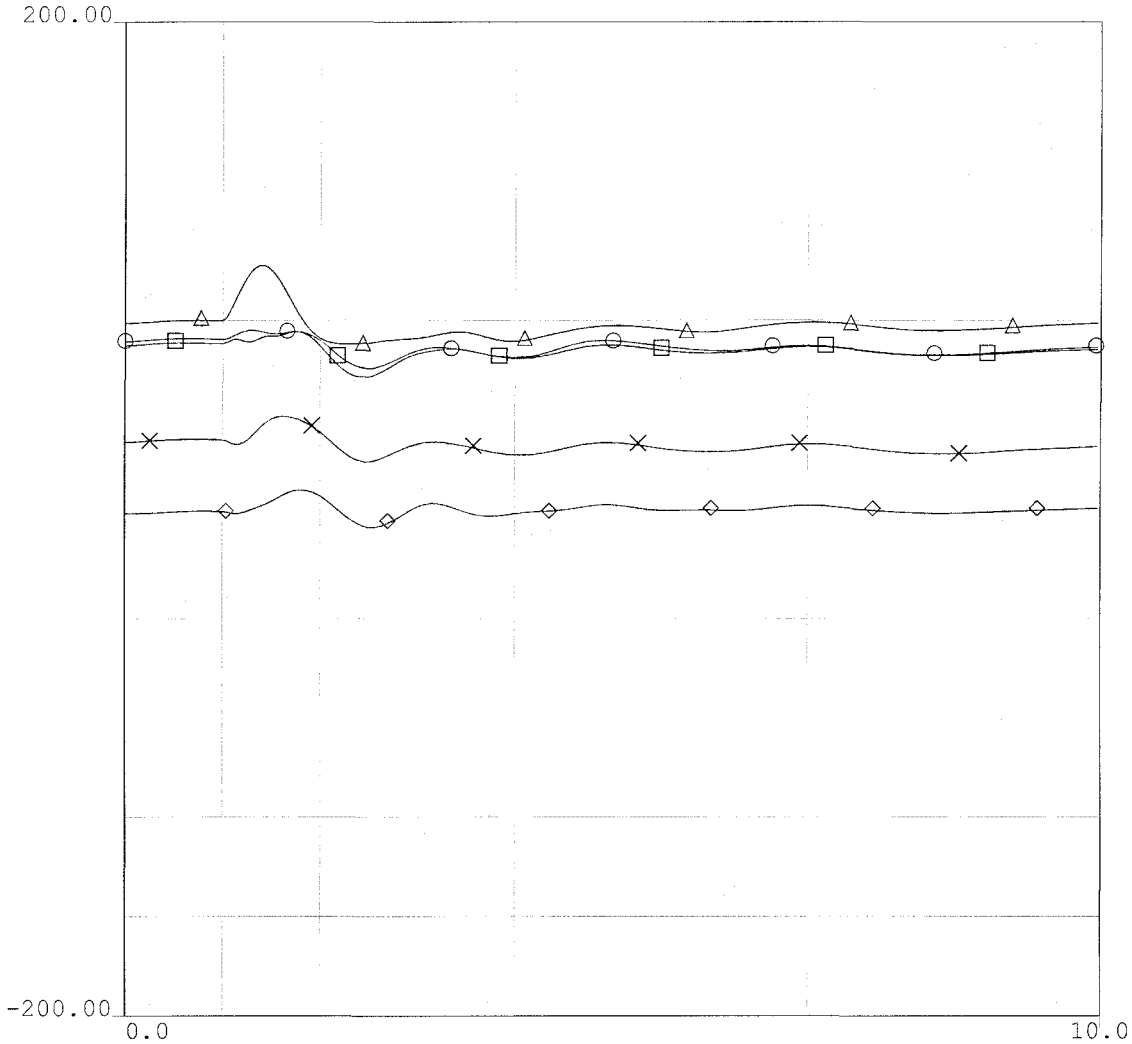
SYSTEM_Rotorangles



-200.0000 ang	15140	DBG-CT1	18.0	0	0.0	1	1	200.0000
-200.0000 ang	14945	SAG. CT3	13.8	0	0.0	1	1	200.0000
-200.0000 ang	14902	CHOLLA3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	15921	SANTAN 1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	14903	CHOLLA4	22.0	0	0.0	1	1	200.0000

14HS-TS7:THREE PHASE FAULT CLEARING ON JOJOBA-KYRENE 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

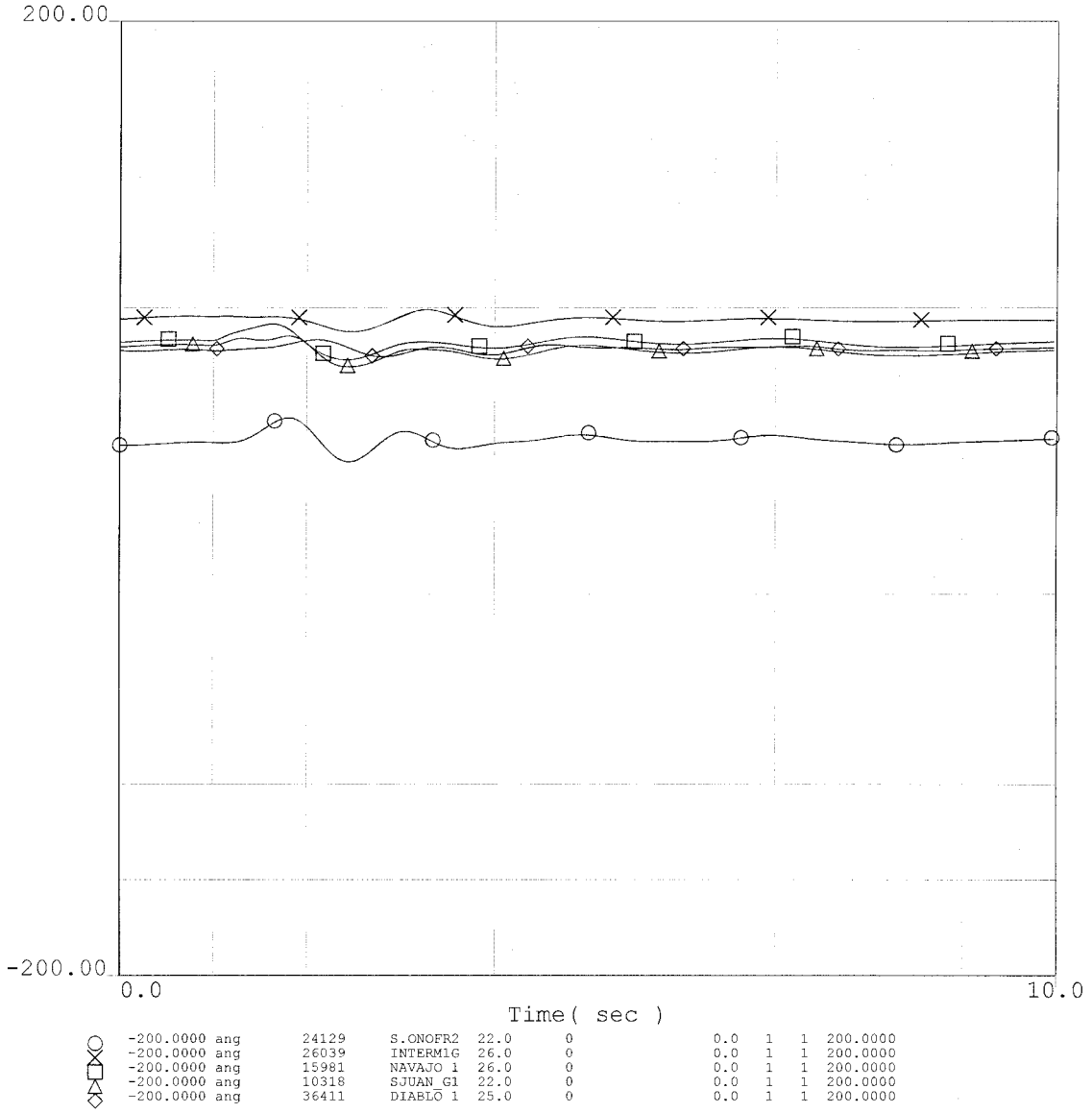
SYSTEM_Rotorangles



-200.0000 ang	16518	SPR GEN3	21.0	0	0.0	1	1	200.0000
-200.0000 ang	16503	SUNDTGE4	18.0	0	0.0	1	1	200.0000
-200.0000 ang	14914	FCNGN4CC	22.0	0	0.0	H	1	200.0000
-200.0000 ang	14931	PALOVRD1	24.0	0	0.0	1	1	200.0000
-200.0000 ang	24004	ALAMT4 G	18.0	0	0.0	H	1	200.0000

14HS-TS7:THREE PHASE FAULT CLEARING ON JOJOBA-KYRENE 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

SYSTEM_Rotorangles



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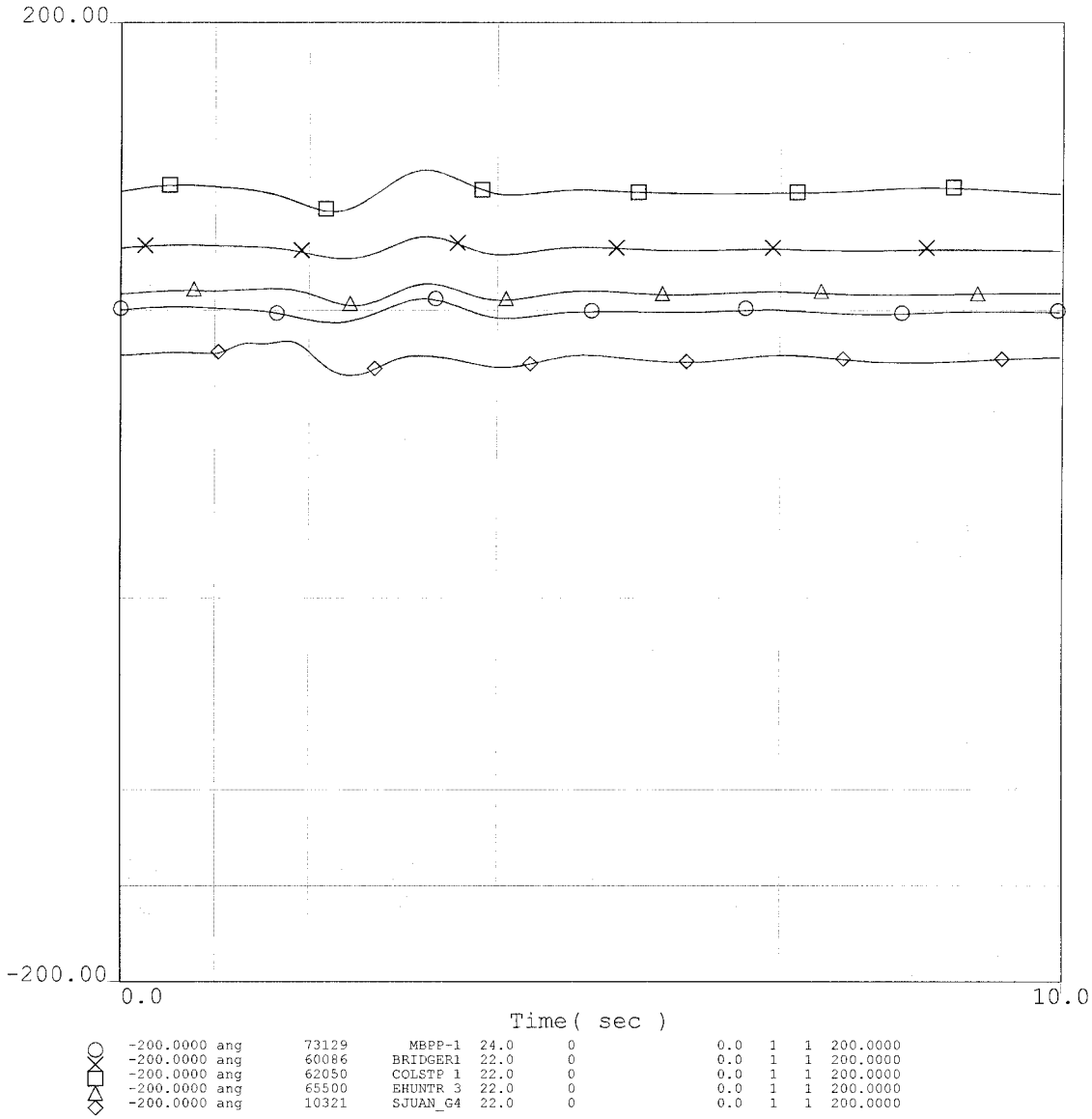
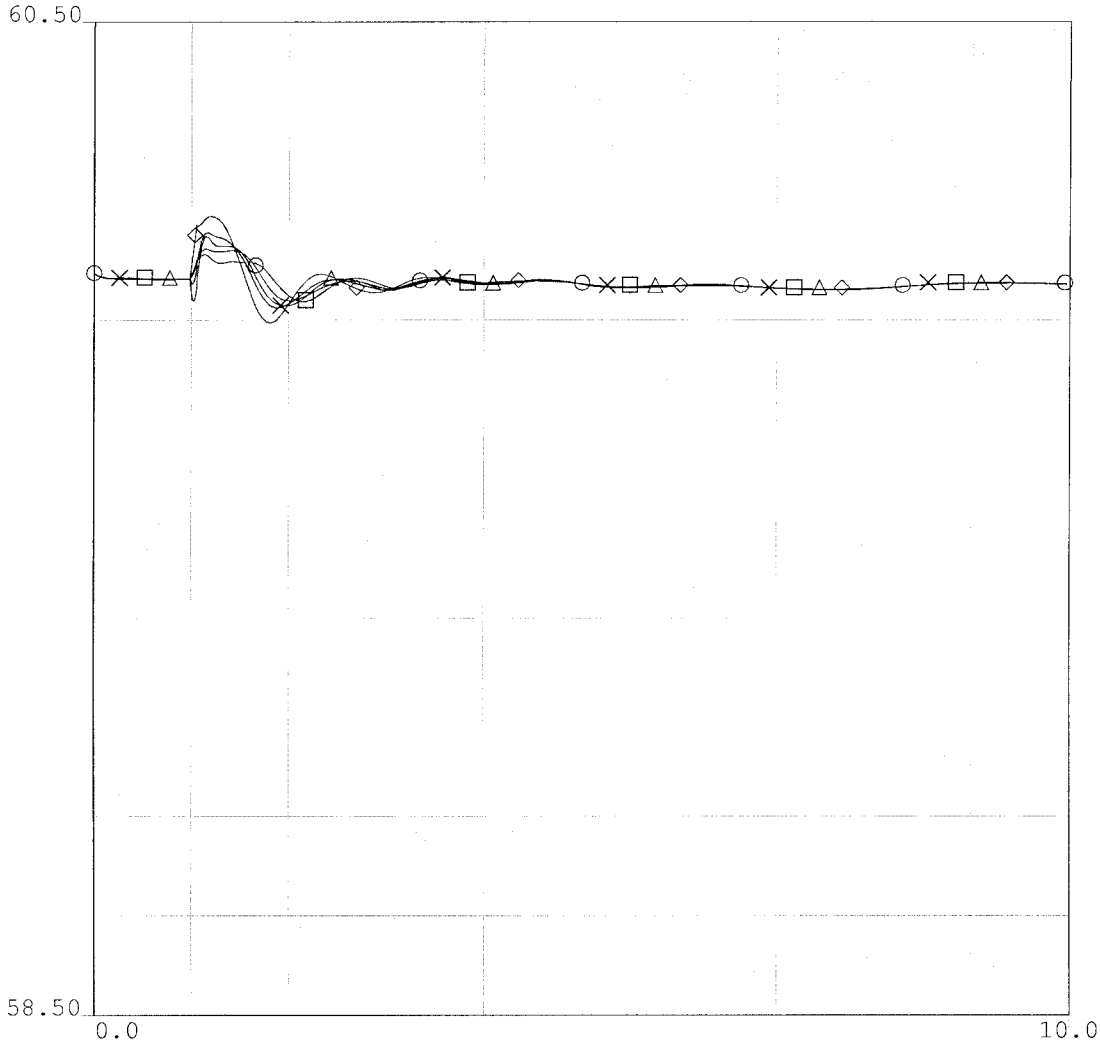
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

SYSTEM_Rotorangles



14HS-TS7:THREE PHASE FAULT CLEARING ON JOJOBA-KYRENE 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

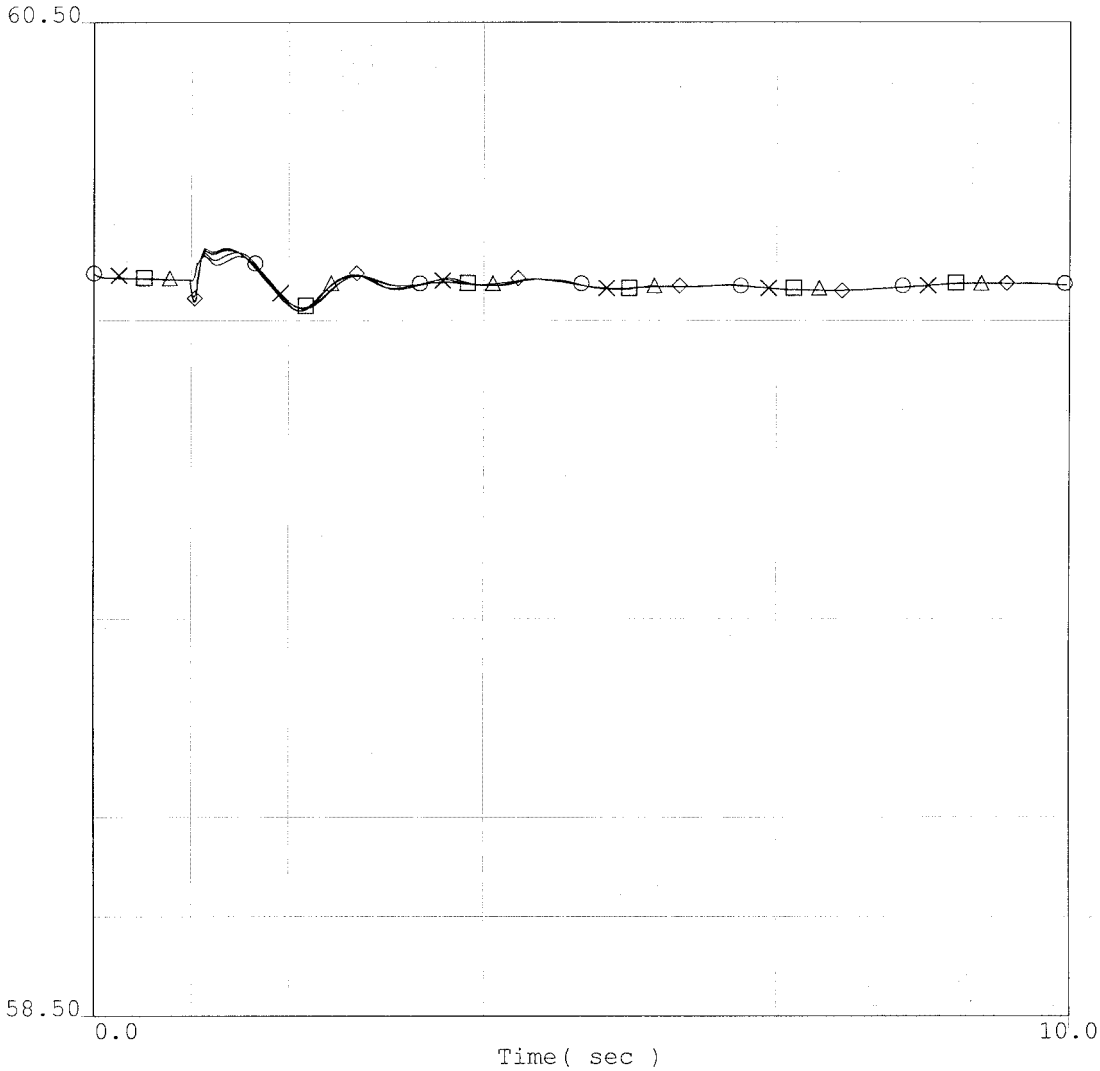
Frequencies:



○	58.5000 fbus	14003	NAVAJO 500.0	0	0.0	1	1	60.5000
×	58.5000 fbus	14005	WESTWING 500.0	0	0.0	1	1	60.5000
□	58.5000 fbus	14001	FOURCORN 500.0	0	0.0	1	1	60.5000
△	58.5000 fbus	14016	PNPKAPS 500.0	0	0.0	1	1	60.5000
◇	58.5000 fbus	15021	PALOVRDE 500.0	0	0.0	1	1	60.5000

14HS-TS7:THREE PHASE FAULT CLEARING ON JOJOBA-KYRENE 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

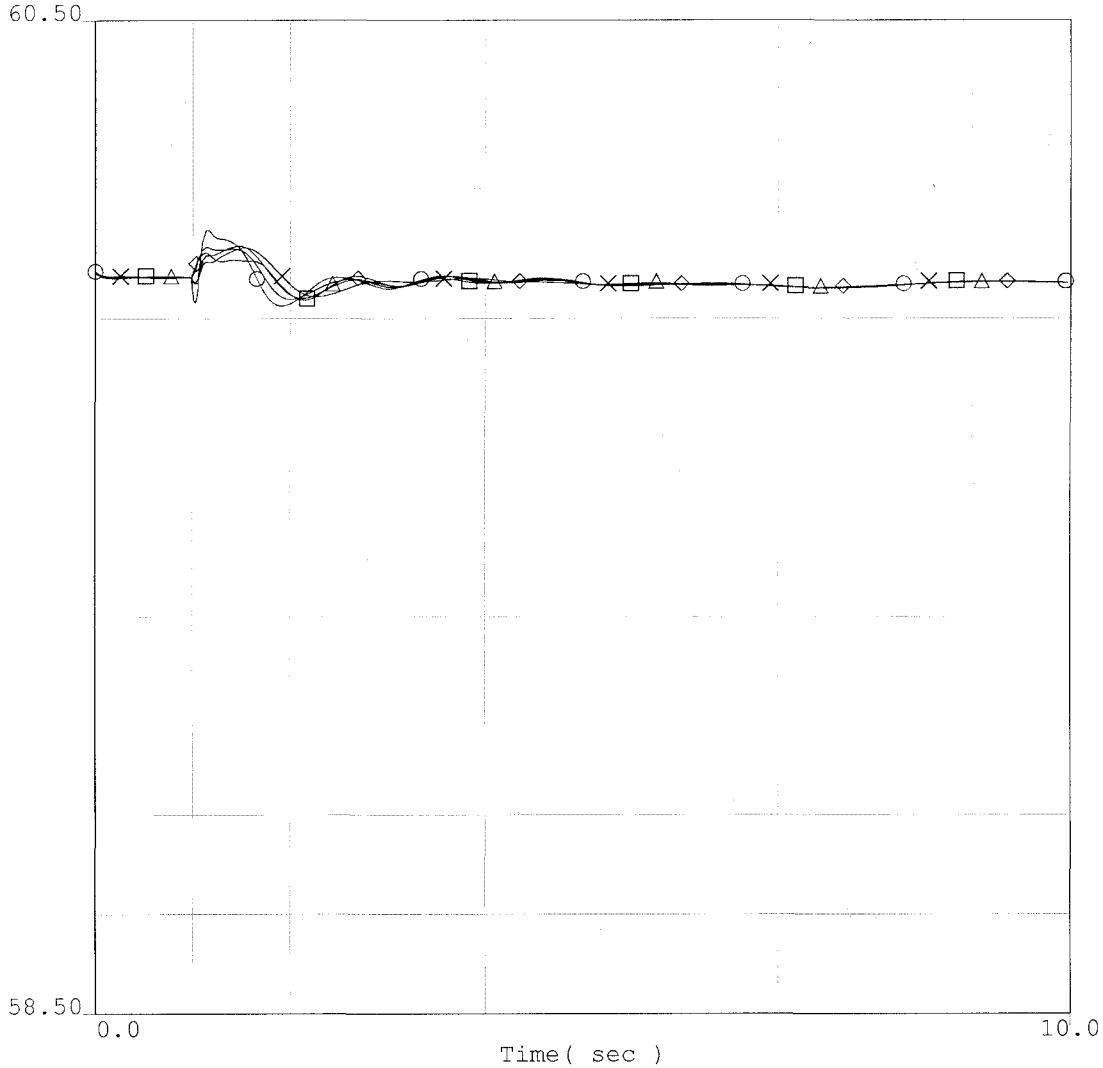
Frequencies:



○	58.5000	fbus	16000	TORTOLIT 500.0	0	0.0	1	1	60.5000
×	58.5000	fbus	16105	VAIL 345.0	0	0.0	1	1	60.5000
□	58.5000	fbus	16103	SOUTH 345.0	0	0.0	1	1	60.5000
△	58.5000	fbul	15001	CORONADO 500.0	0	0.0	1	1	60.5000
◇	58.5000	fbus	16109	WINCHSTR 345.0	0	0.0	1	1	60.5000

14HS-TS7:THREE PHASE FAULT CLEARING ON JOJOBA-KYRENE 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

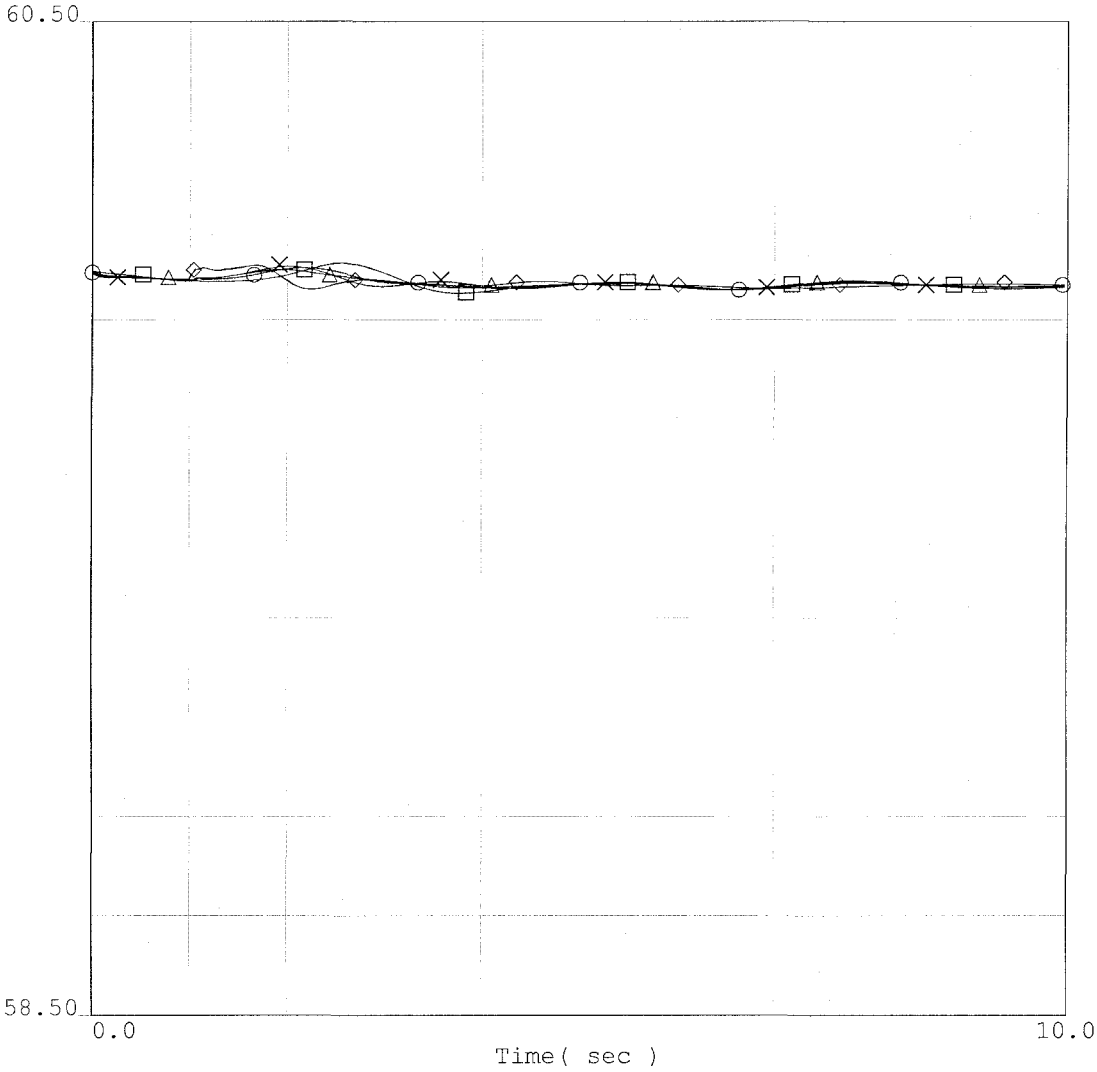
Frequencies:



58.5000	fbul	14231	WESTWNGW 230.0	0	0.0	1	1	60.5000
58.5000	fbus	26003	ADELANTO 500.0	0	0.0	1	1	60.5000
58.5000	fbus	14001	FOURCORN 500.0	0	0.0	1	1	60.5000
58.5000	fbus	26048	MCCULLGH 500.0	0	0.0	1	1	60.5000
58.5000	fbus	14003	NAVAJO 500.0	0	0.0	1	1	60.5000

14HS-TS7:THREE PHASE FAULT CLEARING ON JOJOBA-KYRENE 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

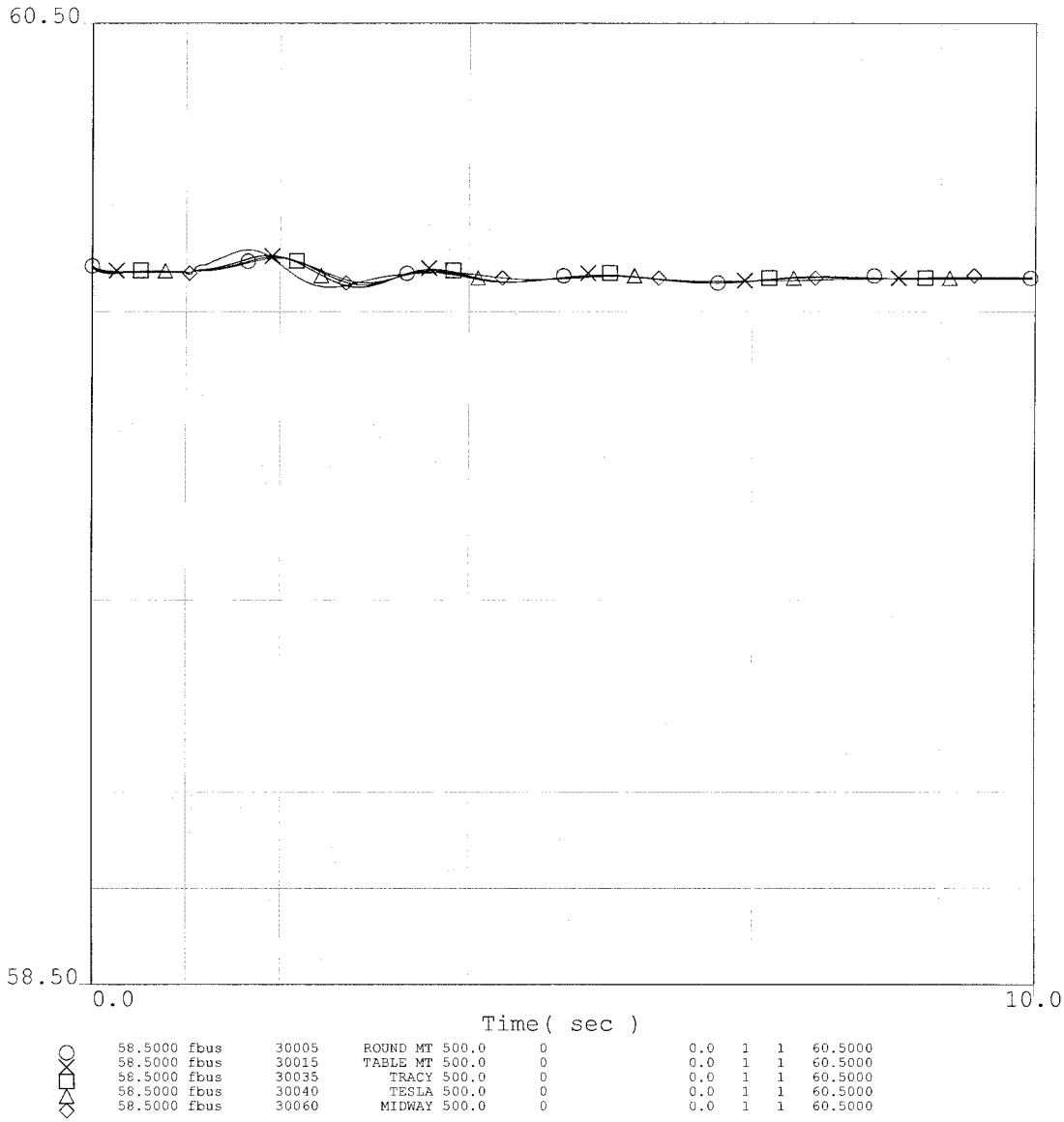
Frequencies:



○	58.5000	fbus	40489	GRIZZLY 500.0	0	0.0	1	1	60.5000
×	58.5000	fbus	40687	MALIN 500.0	0	0.0	1	1	60.5000
□	58.5000	fbus	40459	GARRISON 500.0	0	0.0	1	1	60.5000
△	58.5000	fbus	60235	MIDPOINT 345.0	0	0.0	1	1	60.5000
◇	58.5000	fbus	66230	PINTO 138.0	0	0.0	1	1	60.5000

14HS-TS7:THREE PHASE FAULT CLEARING ON JOJOBA-KYRENE 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

Frequencies:



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SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
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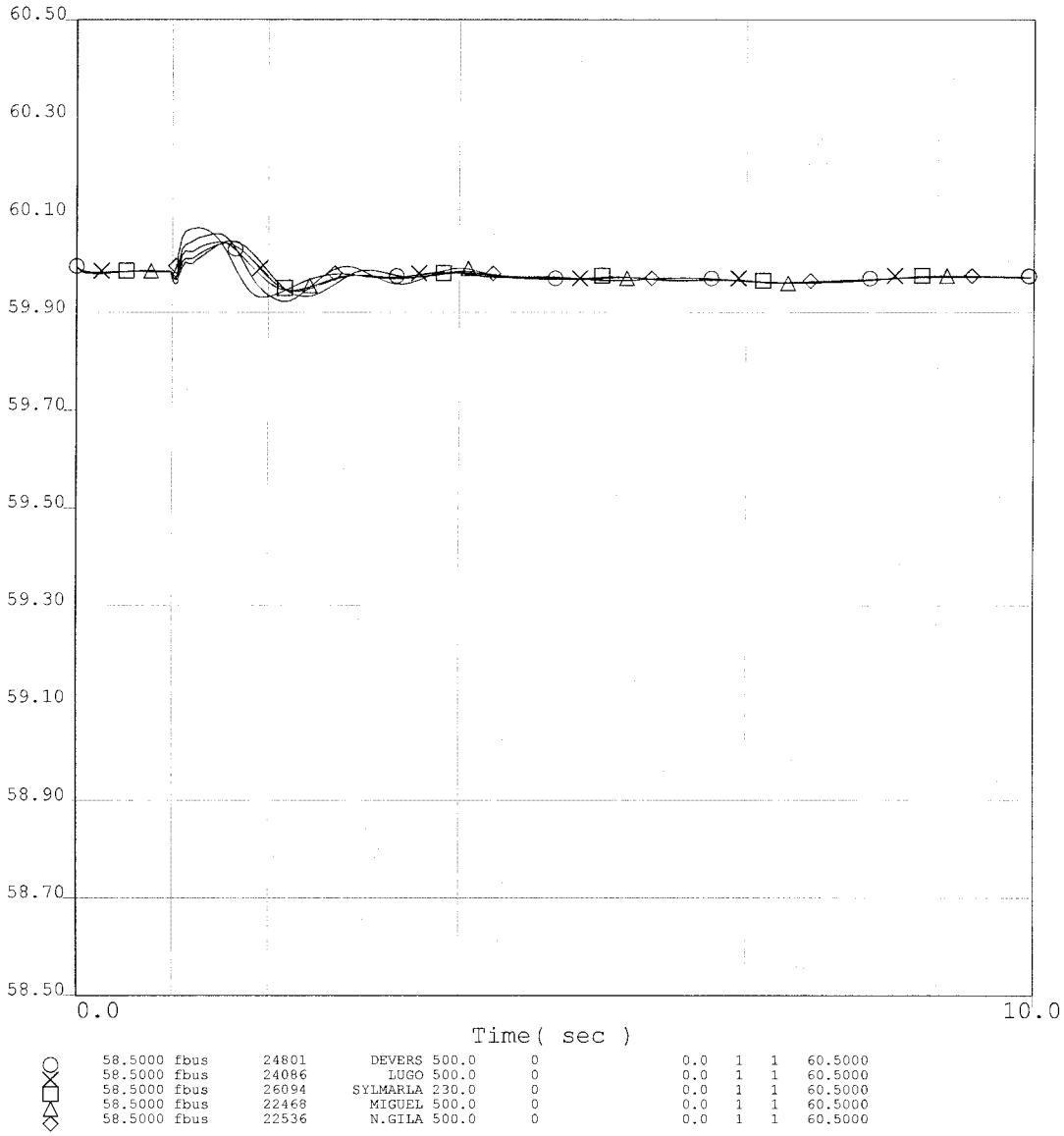
Frequencies:



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SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

HIGHEST VOLTAGE DIP

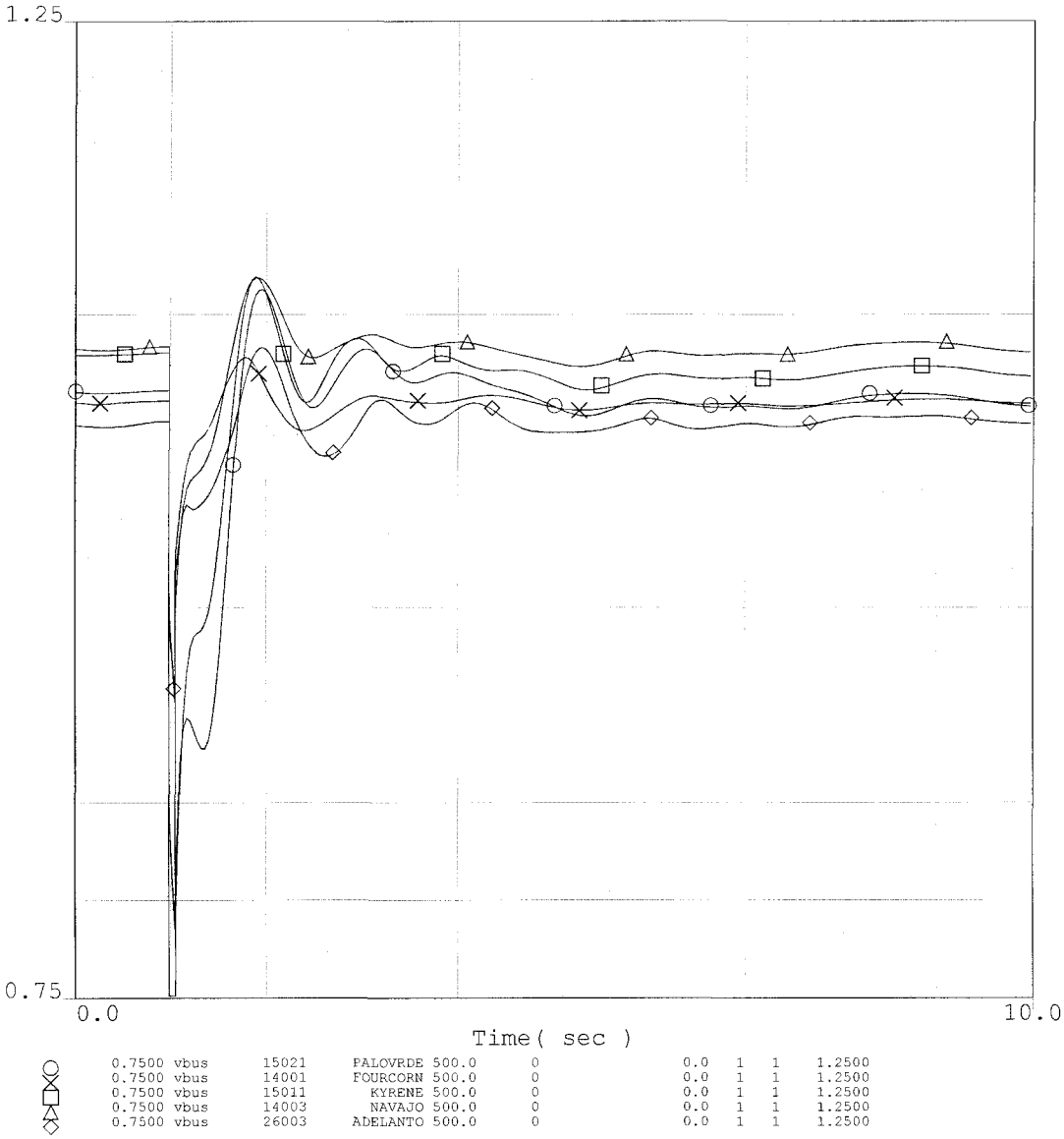
AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct	@time
14	GILABEND	230	vbul	1.016	0.941	7.3	1.525
14	GILARIVR	230	vbus	1.018	0.943	7.3	1.525
24	DEVRSVC1	500	vbug	1.06	1.029	2.9	1.525

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
14	KNOX	69	fbul	59.699	1.054
14	AGUAFR56	100	fbus	59.838	1.042
14	CPGS 1	13.8	fbug	59.806	1.263

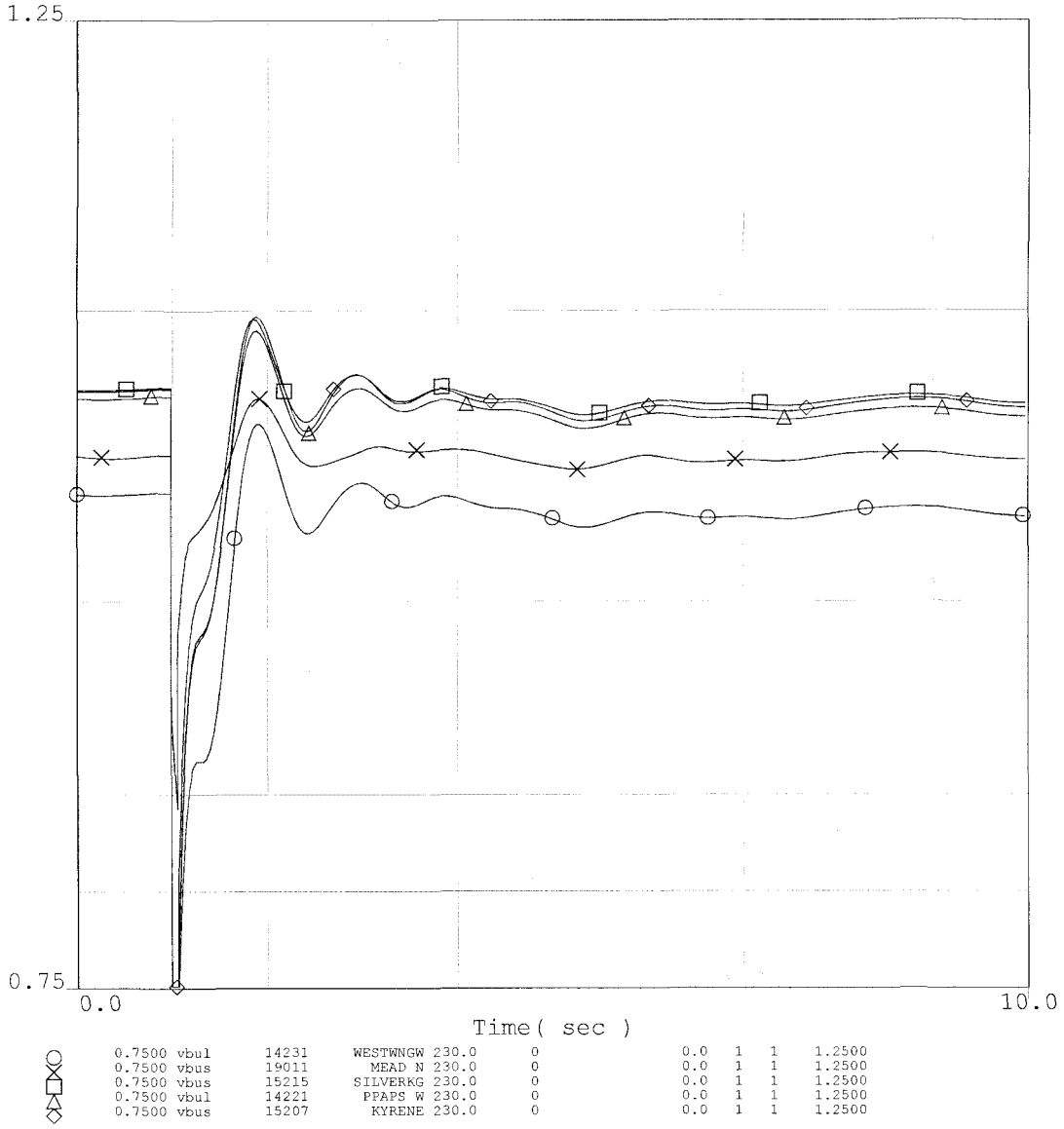
There were 0 violations of MORC criteria 1 (25% Voltage Dip) !
There were 0 violations of MORC criteria 2 (20% Voltage Dip for 20 Cycles)!
There were 0 violations of MORC criteria 3 (59.6 HZ for 6 Cycles)!

ARIZONA_voltages:



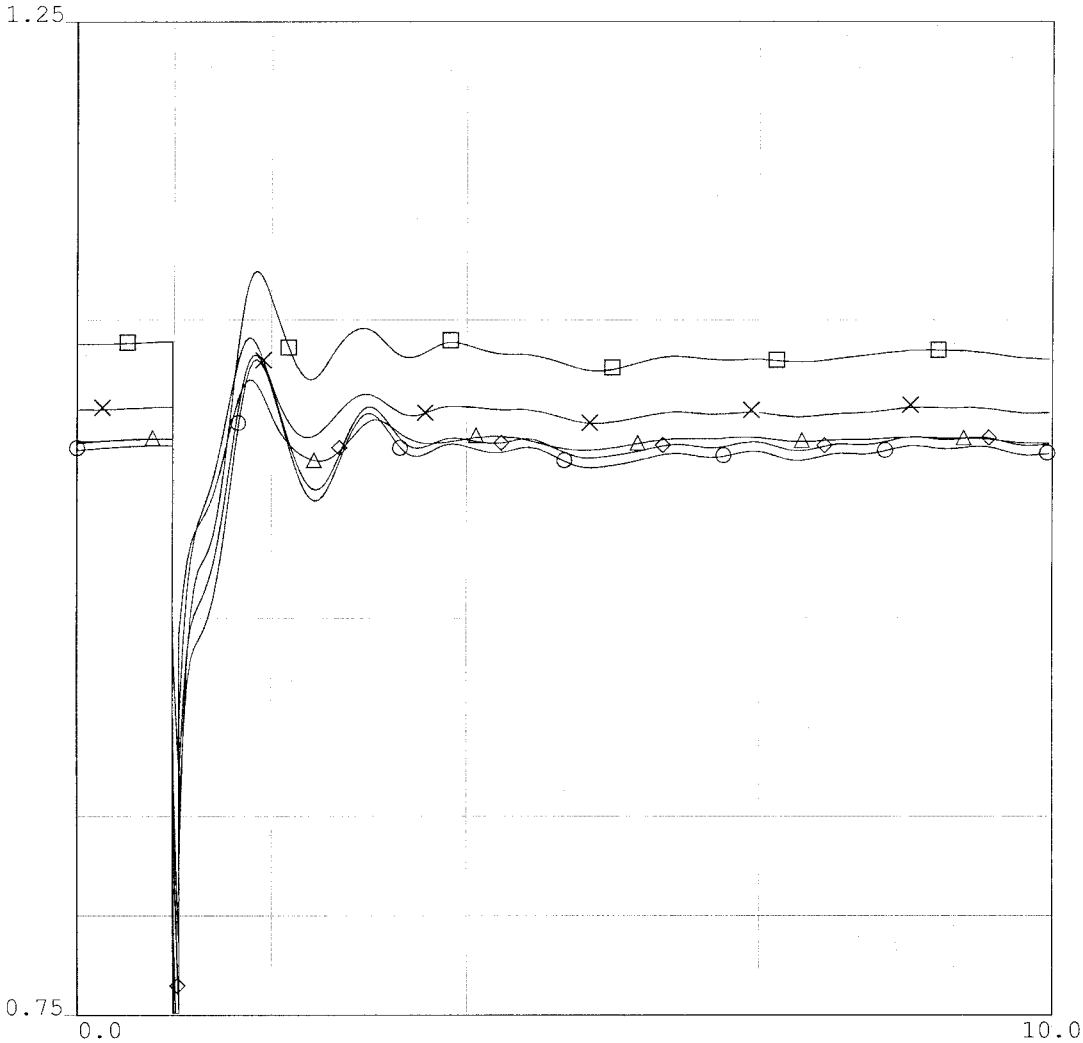
14HS-TS8:THREE PHASE FAULT CLEARING ON PALO VERDE-RUDD 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

ARIZONA_voltages:



14HS-TS8:THREE PHASE FAULT CLEARING ON PALO VERDE-RUDD 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

ARIZONA_voltages:



0.7500 vbus	16103	SOUTH 345.0	0	0.0	1	1	1.2500
0.7500 vbus	14000	CHOLLA 500.0	0	0.0	1	1	1.2500
0.7500 vbus	15041	SILVERKG 500.0	0	0.0	1	1	1.2500
0.7500 vbus	16104	SPRINGR 345.0	0	0.0	1	1	1.2500
0.7500 vbus	16109	WINCHSTR 345.0	0	0.0	1	1	1.2500

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SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
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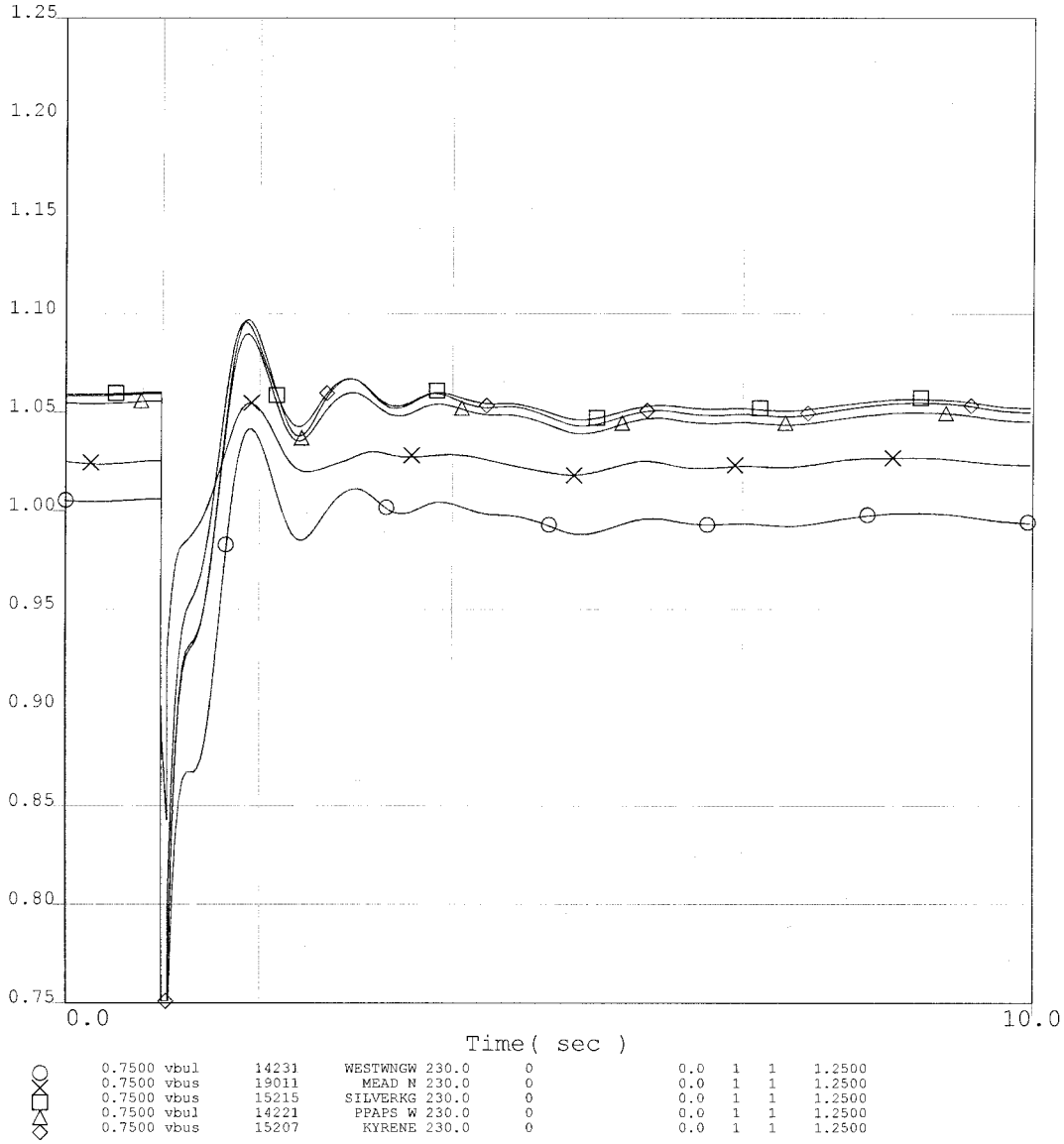
ARIZONA_voltages:



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SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
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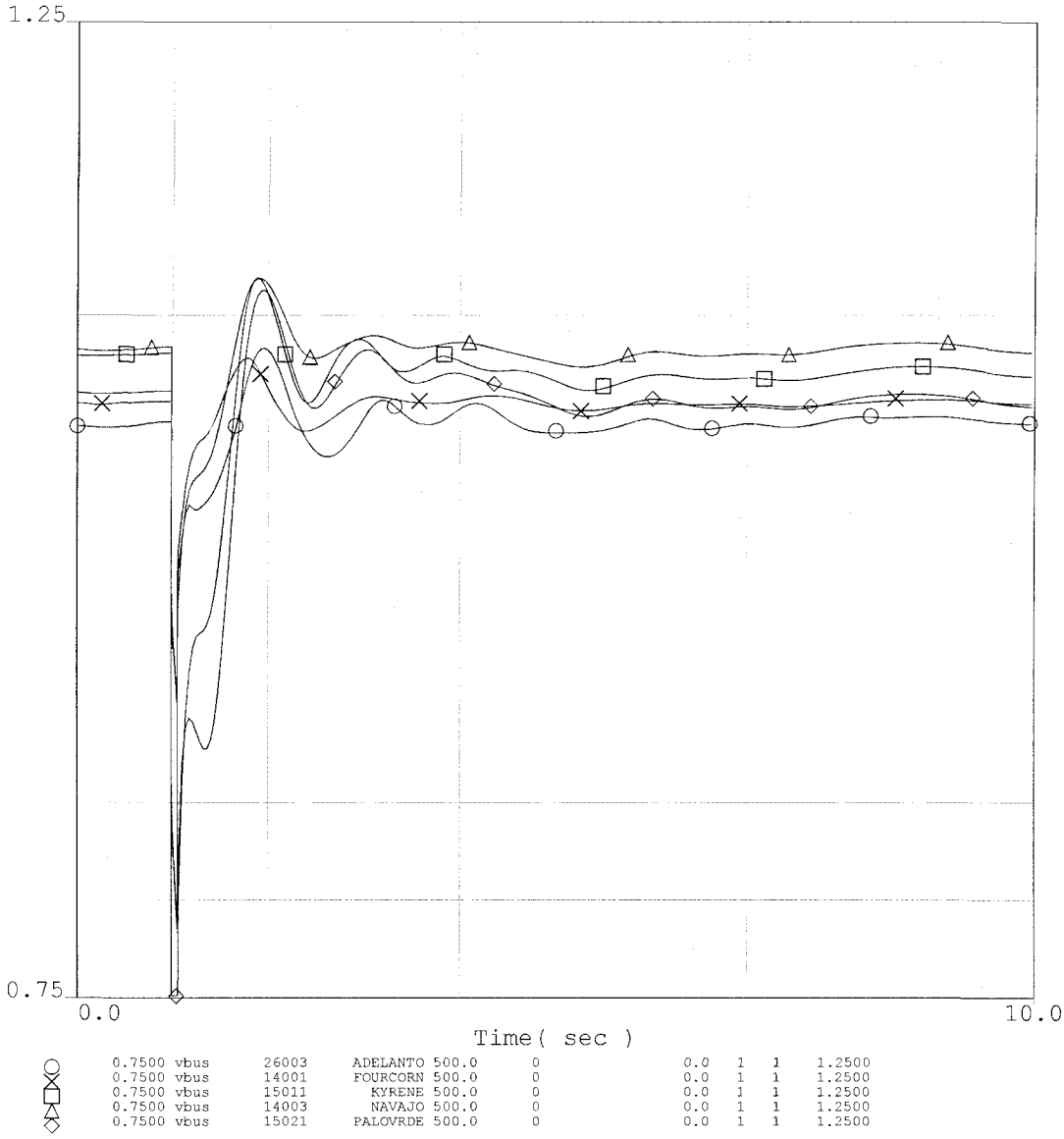
ARIZONA_voltages:



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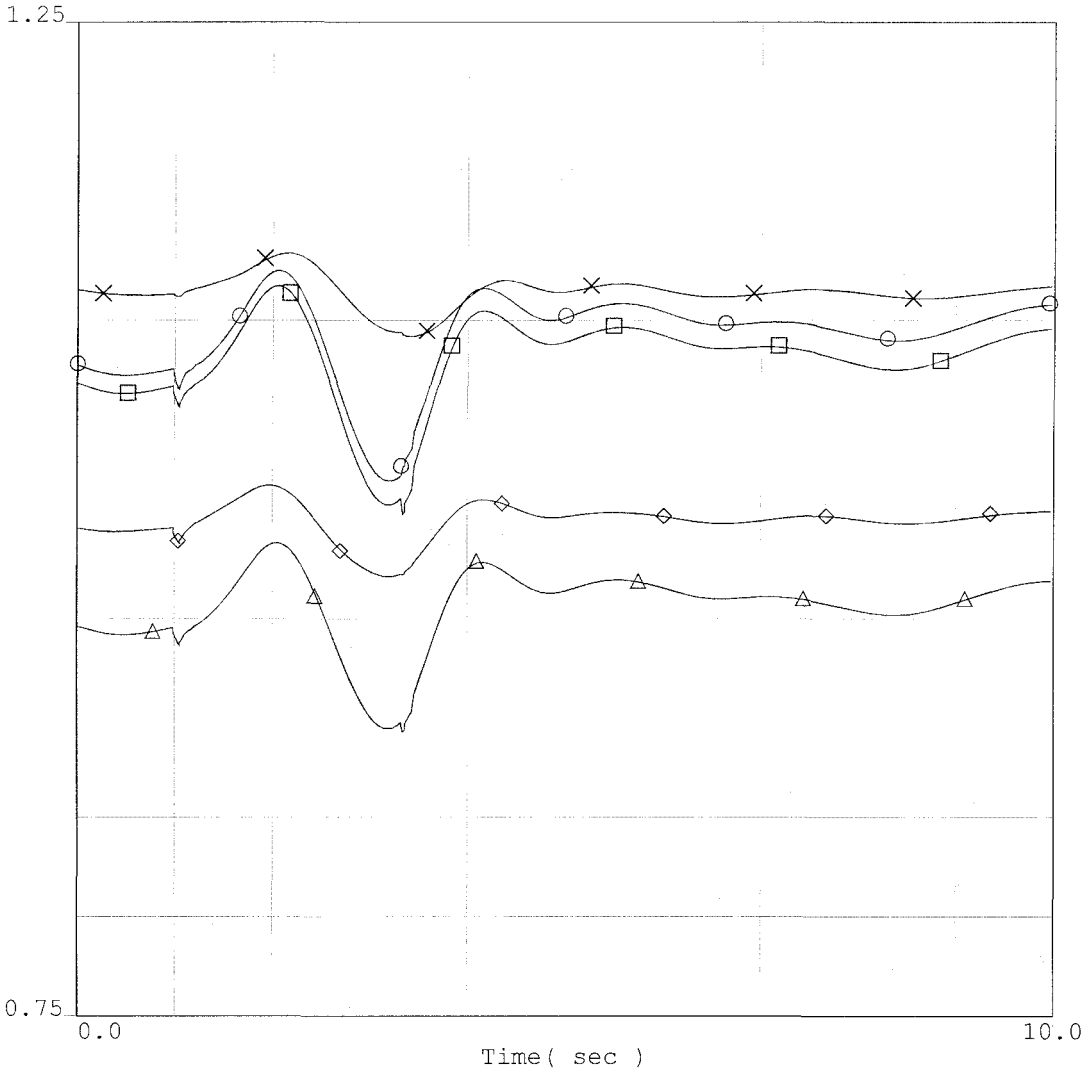
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

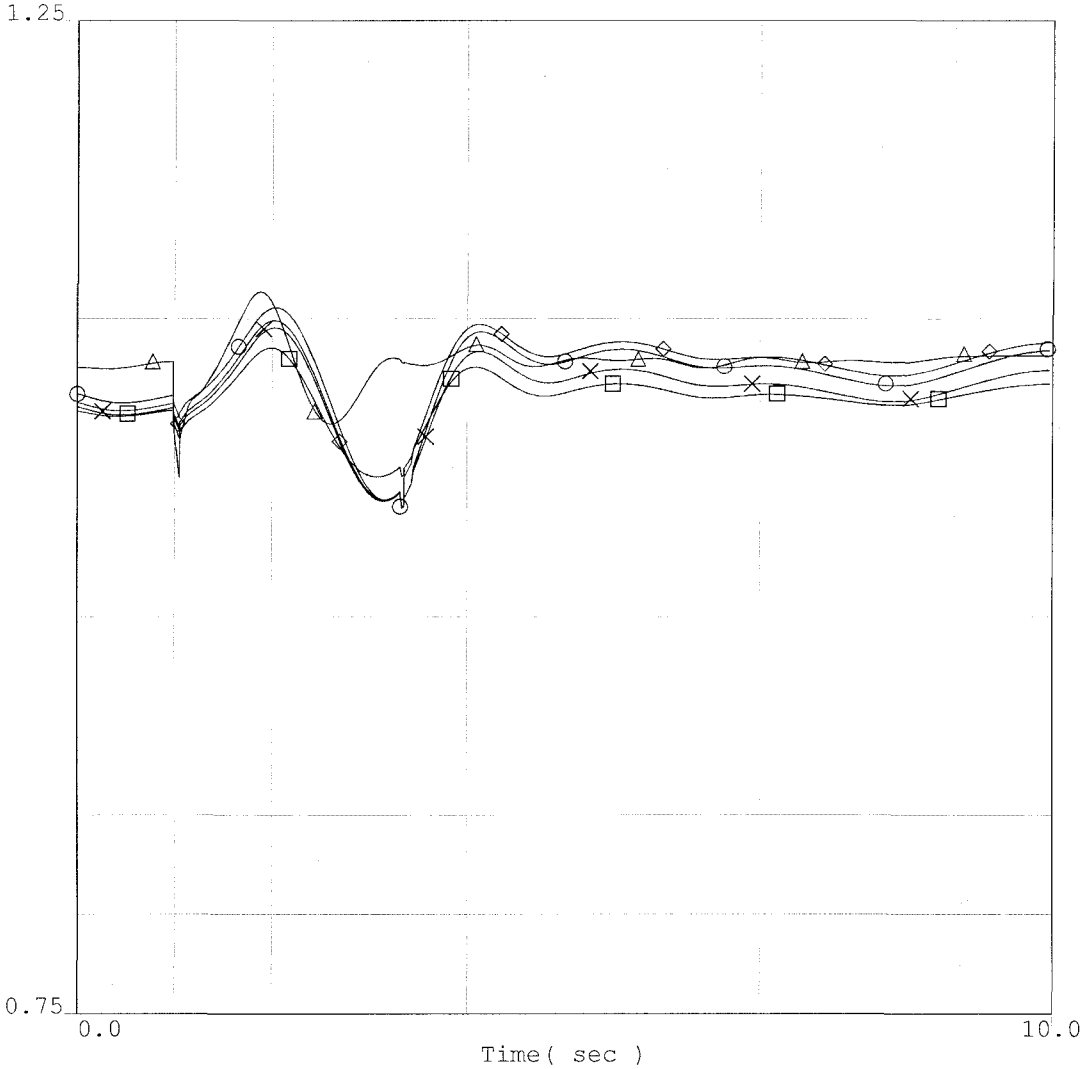
NORTHWEST_voltages:



○	0.7500	vbus	40489	GRIZZLY 500.0	0	0.0	1	1	1.2500
×	0.7500	vbus	40459	GARRISON 500.0	0	0.0	1	1	1.2500
□	0.7500	vbus	40687	MALIN 500.0	0	0.0	1	1	1.2500
△	0.7500	vbul	45215	NEWELL 69.0	0	0.0	1	1	1.2500
◇	0.7500	vbus	60235	MIDPOINT 345.0	0	0.0	1	1	1.2500

14HS-TS8:THREE PHASE FAULT CLEARING ON PALO VERDE-RUDD 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

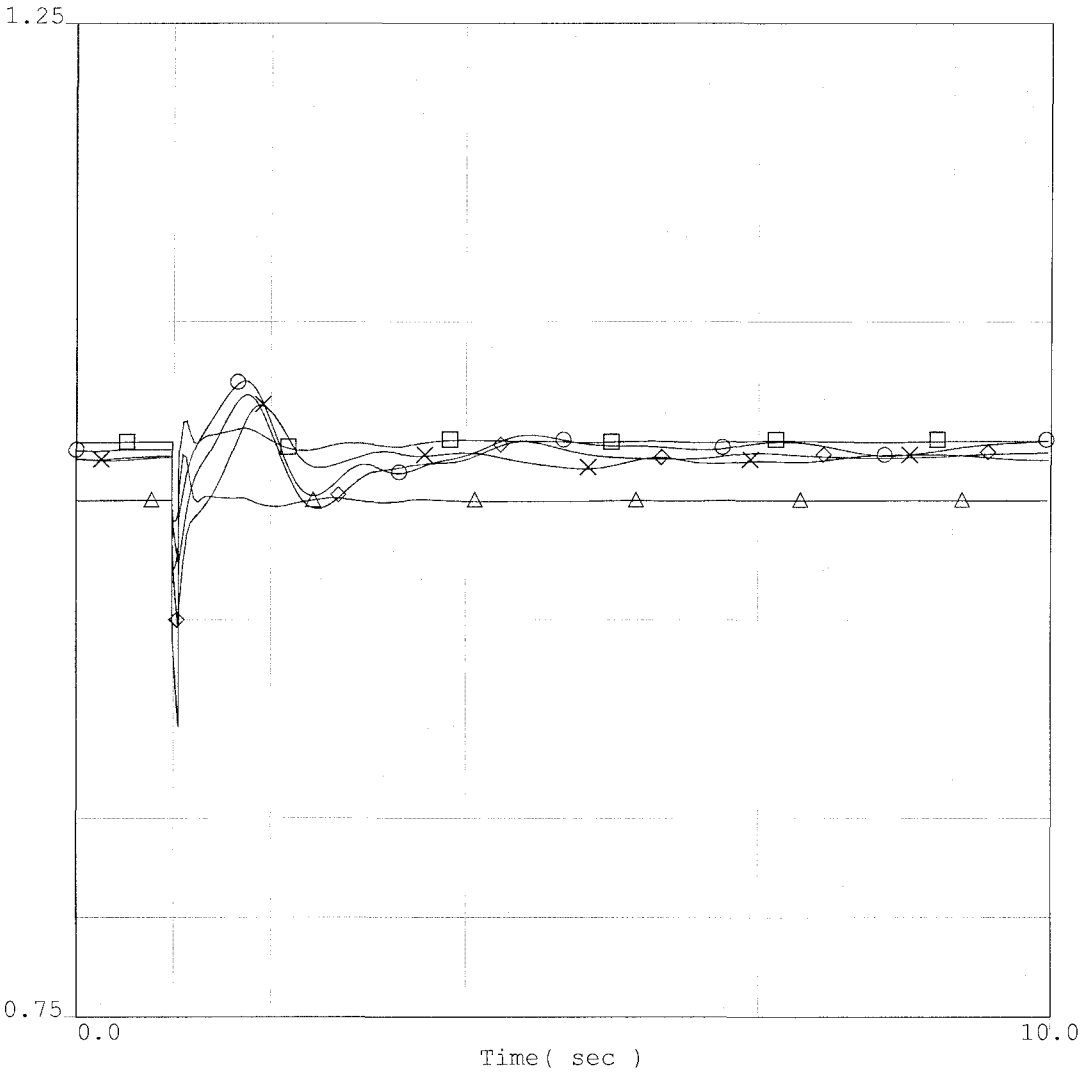
CALIFORNIA_voltages:



0.7500 vbus	30005	ROUND MT 500.0	0	0.0	1	1	1.2500
0.7500 vbus	30015	TABLE MT 500.0	0	0.0	1	1	1.2500
0.7500 vbus	30040	TESLA 500.0	0	0.0	1	1	1.2500
0.7500 vbus	30060	MIDWAY 500.0	0	0.0	1	1	1.2500
0.7500 vbus	30020	OLINDA 500.0	0	0.0	1	1	1.2500

14HS-TS8:THREE PHASE FAULT CLEARING ON PALO VERDE-RUDD 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

UTAH_voltages:



0.7500 vbus	66230	PINTO 138.0	0	0.0	1	1	1.2500
0.7500 vbus	18019	H ALLEN 230.0	0	0.0	1	1	1.2500
0.7500 vbus	66280	REDBUTTE 345.0	0	0.0	1	1	1.2500
0.7500 vbus	66420	SGSY 138.0	0	0.0	1	1	1.2500
0.7500 vbus	79023	DURANGO 115.0	0	0.0	1	1	1.2500

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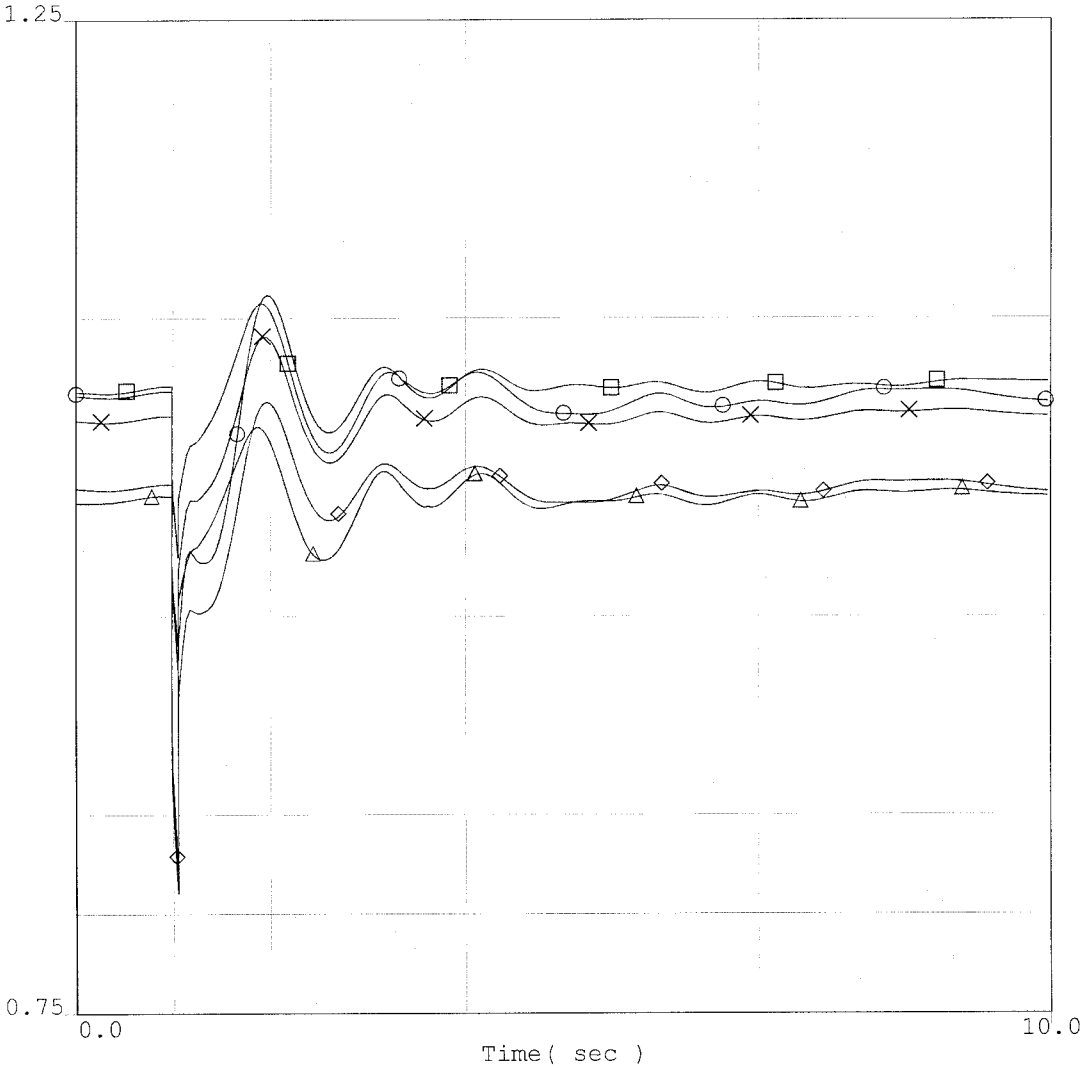
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

CALIFORNIA_voltages:



0.7500 vbus	24801	DEVERS 500.0	0	0.0	1	1	1.2500
0.7500 vbus	24086	LUGO 500.0	0	0.0	1	1	1.2500
0.7500 vbus	24156	VINCENT 500.0	0	0.0	1	1	1.2500
0.7500 vbus	26094	SYLMARLA 230.0	0	0.0	1	1	1.2500
0.7500 vbus	24804	DEVERS 230.0	0	0.0	1	1	1.2500

14HS-TS8:THREE PHASE FAULT CLEARING ON PALO VERDE-RUDD 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
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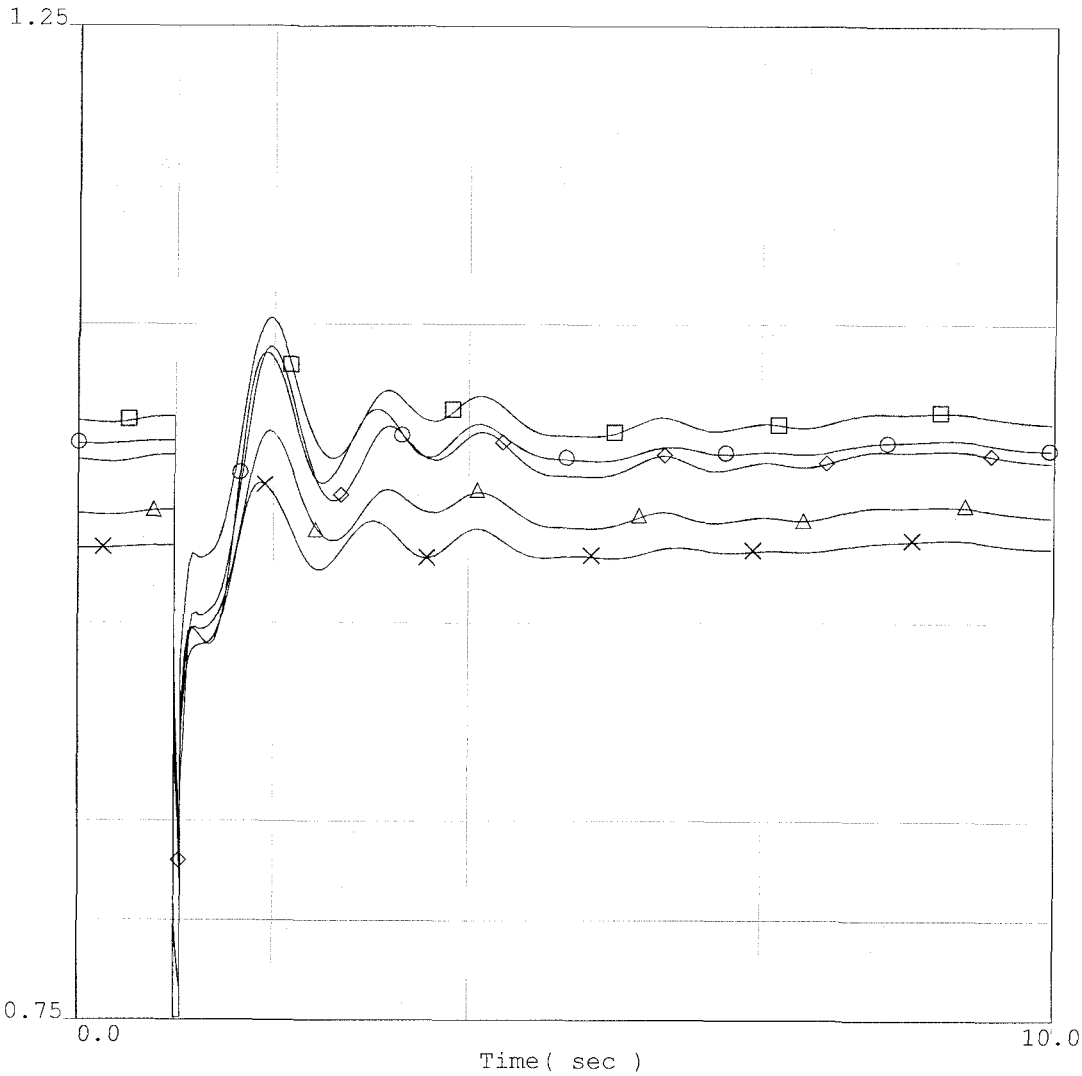
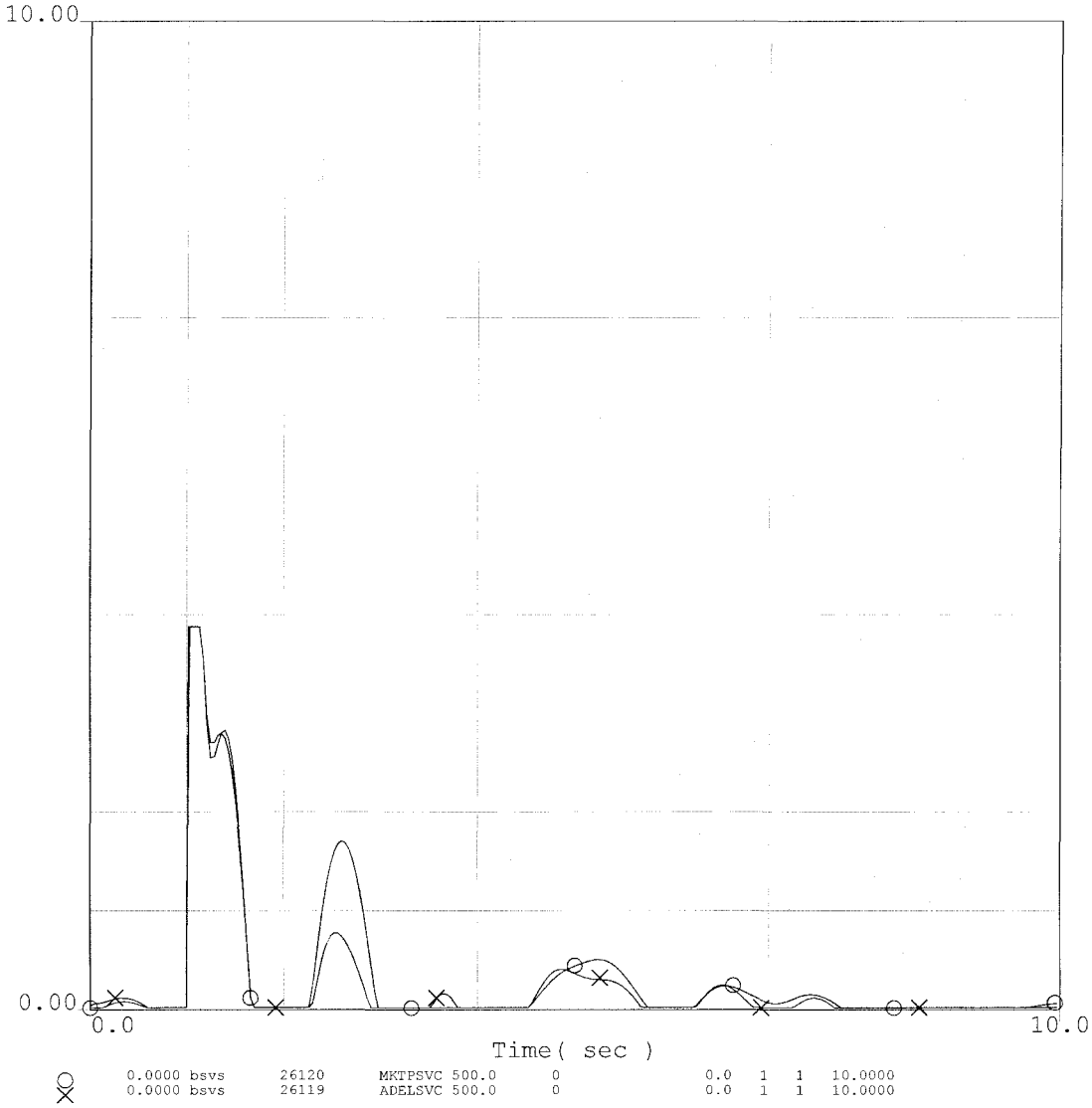
CALIFORNIA_voltages:



○	0.7500 vbus	22360	IMPRLVLY 500.0	0	0.0	1	1	1.2500
⊗	0.7500 vbug	22356	IMPRLVLY 230.0	0	0.0	1	1	1.2500
□	0.7500 vbus	24151	VALLEYSC 500.0	0	0.0	1	1	1.2500
△	0.7500 vbus	24805	DEVERS 115.0	0	0.0	1	1	1.2500
◇	0.7500 vbul	24229	VALLEY-S 115.0	0	0.0	1	1	1.2500

14HS-TS8:THREE PHASE FAULT CLEARING ON PALO VERDE-RUDD 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

SVC_output



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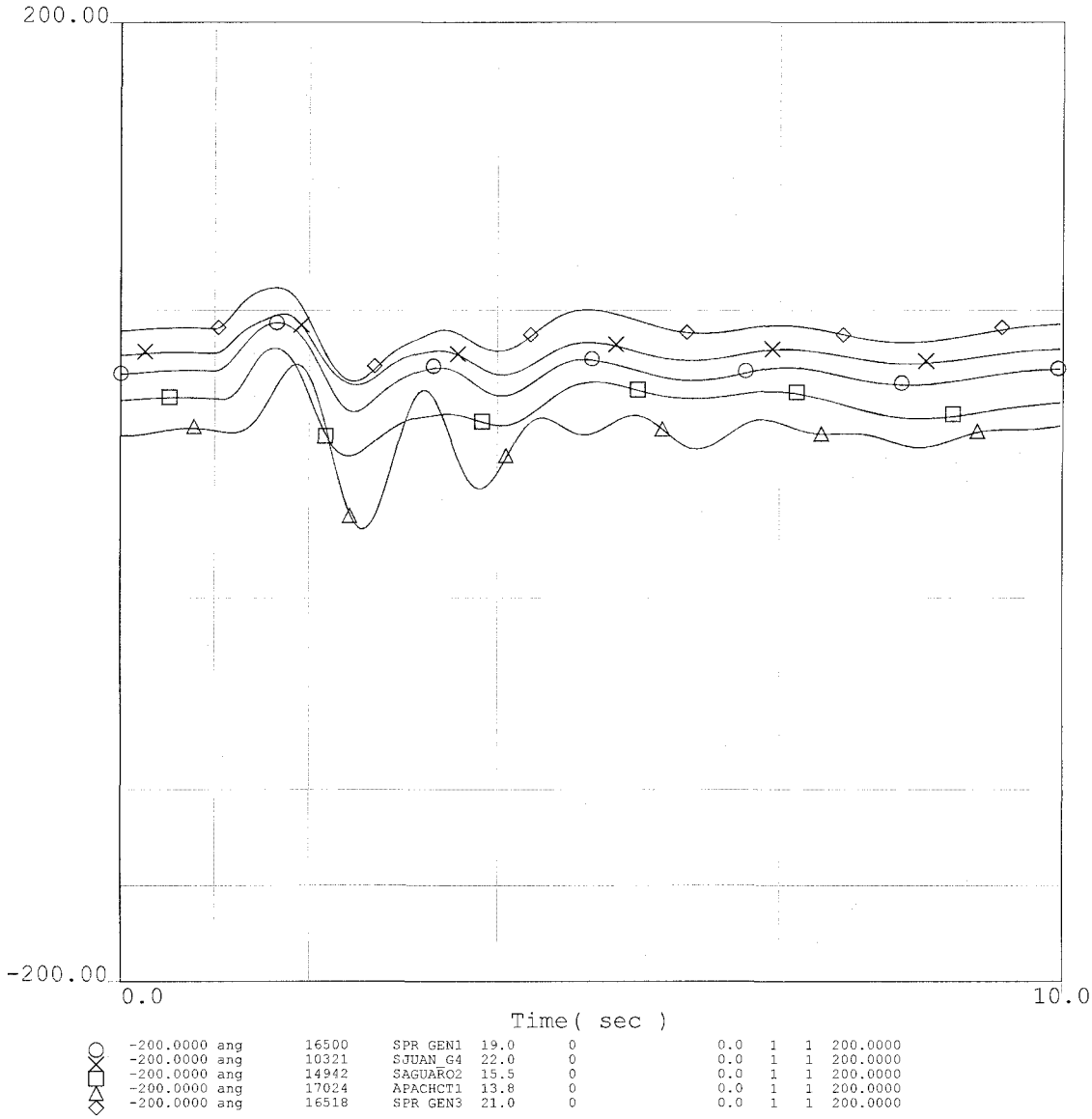
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

SYSTEM_Rotorangles



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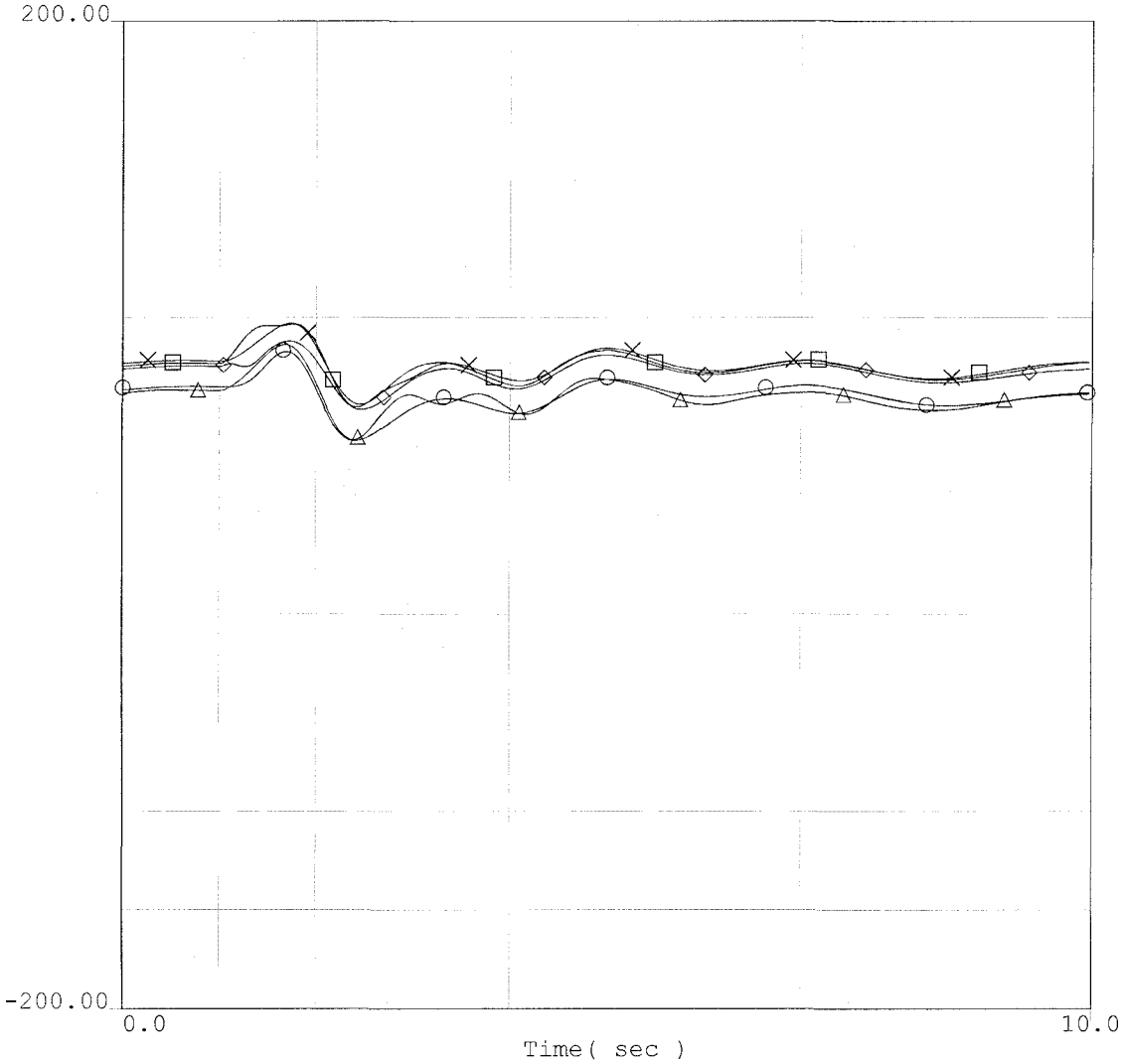
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

SYSTEM_Rotorangles



-200.0000 ang	15140	DBG-CT1	18.0	0	0.0	1	1	200.0000
-200.0000 ang	14945	SAG. CT3	13.8	0	0.0	1	1	200.0000
-200.0000 ang	14902	CHOLLA3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	15921	SANTAN 1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	14903	CHOLLA4	22.0	0	0.0	1	1	200.0000

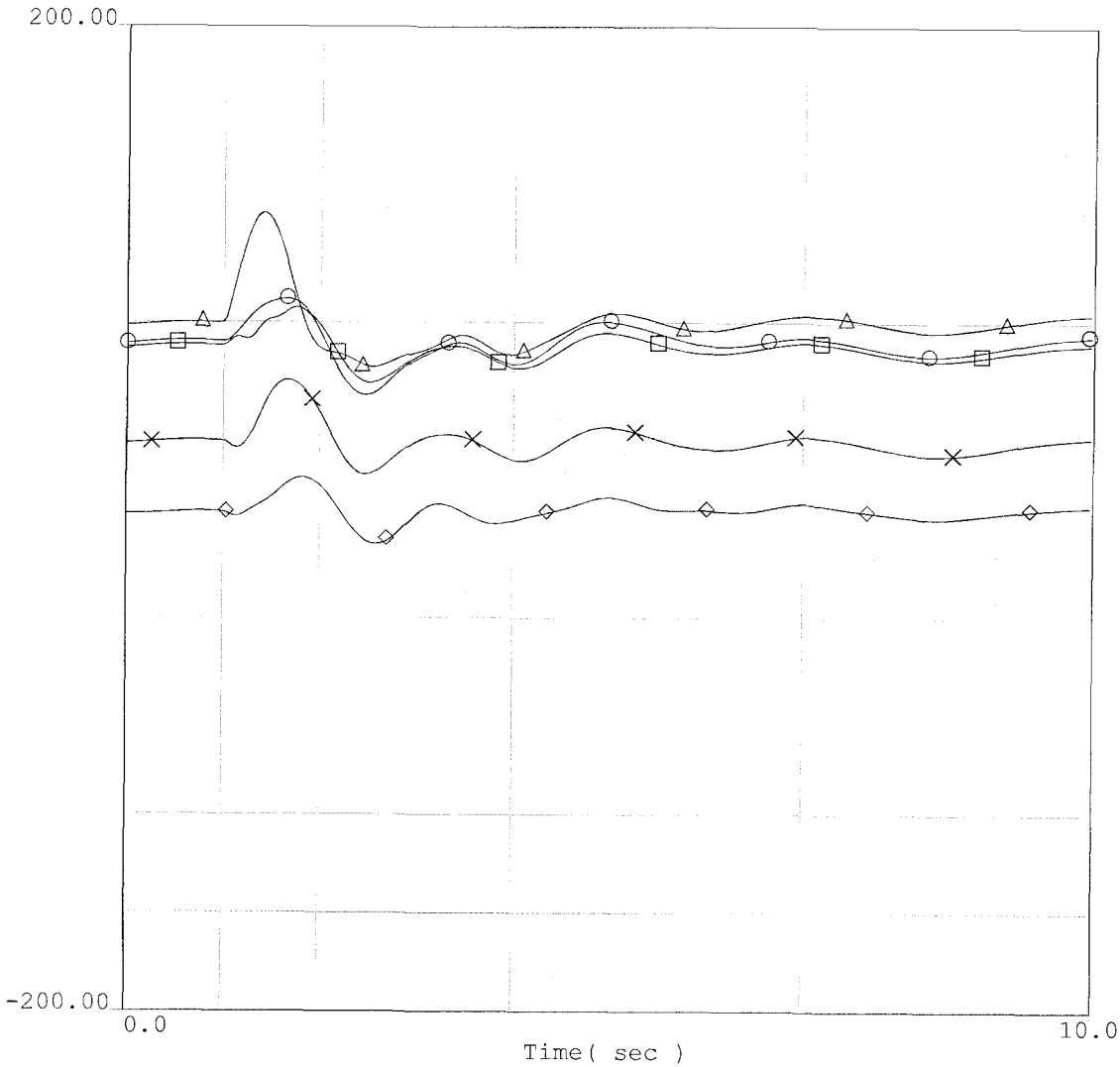
14HS-TS8:THREE PHASE FAULT CLEARING ON PALO VERDE-RUDD 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

14hs_q3_pv-rd.chf

c:\jim_work

Wed Mar 30 05:16:44 2011

SYSTEM_Rotorangles



○	-200.0000 ang	16518	SPR GEN3	21.0	0	0.0	1	1	200.0000
⊠	-200.0000 ang	16503	SUNDTGE4	18.0	0	0.0	1	1	200.0000
□	-200.0000 ang	14914	FCNGN4CC	22.0	0	0.0	H	1	200.0000
△	-200.0000 ang	14931	PALOVRD1	24.0	0	0.0	1	1	200.0000
◇	-200.0000 ang	24004	ALAMT4 G	18.0	0	0.0	H	1	200.0000

14HS-TS8:THREE PHASE FAULT CLEARING ON PALO VERDE-RUDD 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

14hs_q3_pv-rd.chf

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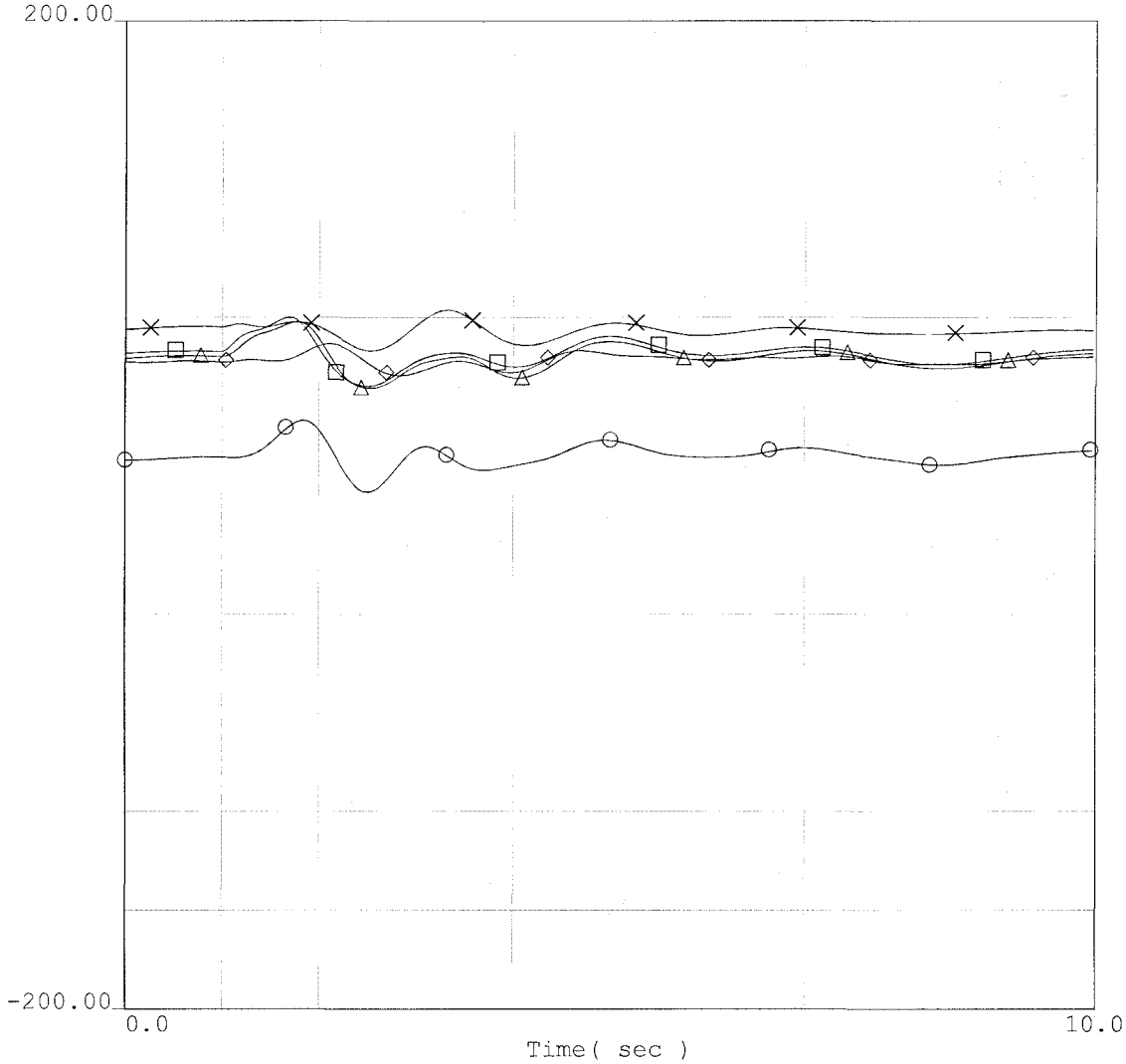
Wed Mar 30 05:16:45 2011

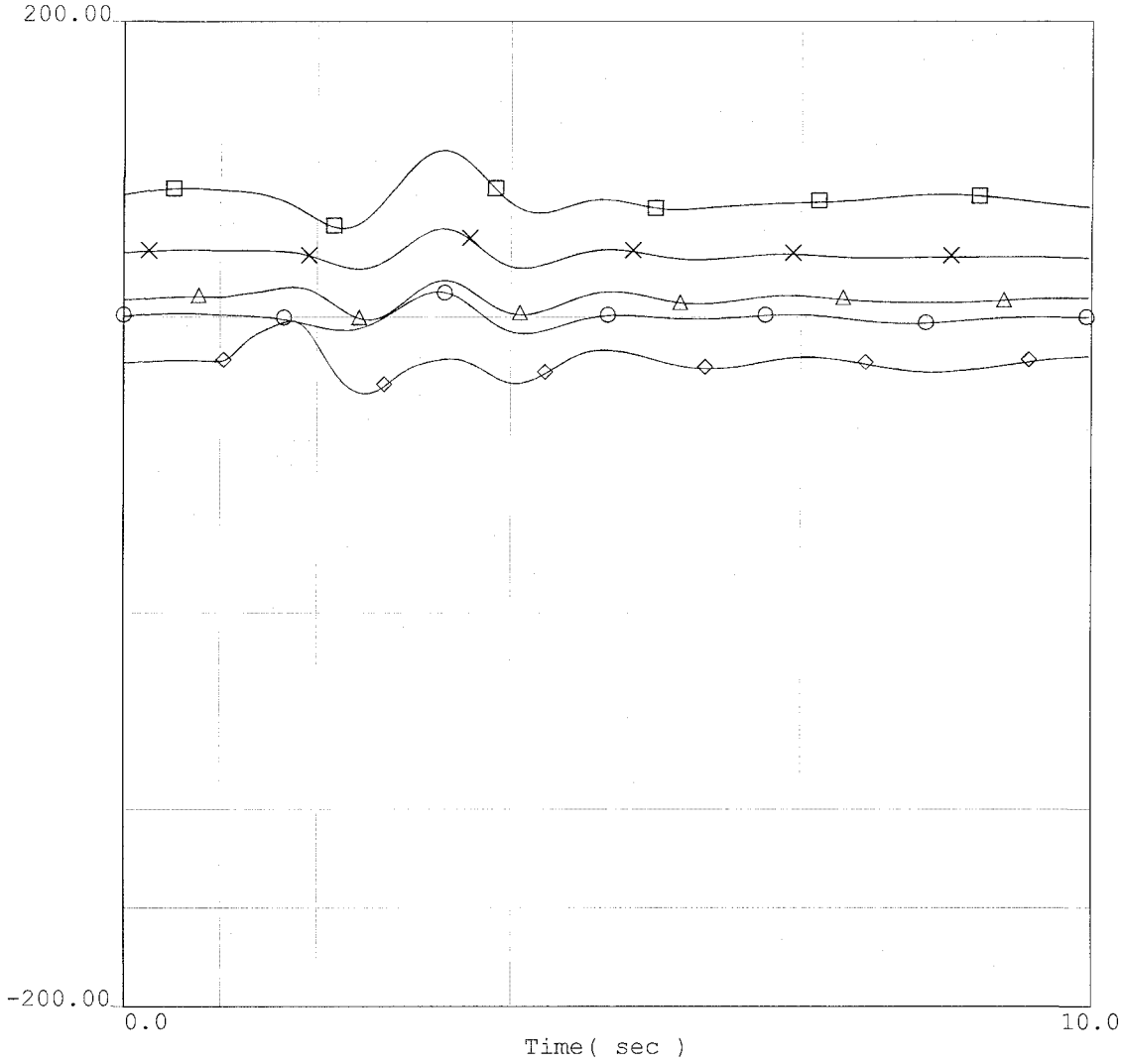
SYSTEM_Rotorangles



-200.0000 ang	24129	S.ONOFR2	22.0	0	0.0	1	1	200.0000
-200.0000 ang	26039	INTERM1G	26.0	0	0.0	1	1	200.0000
-200.0000 ang	15981	NAVAJO 1	26.0	0	0.0	1	1	200.0000
-200.0000 ang	10318	SJUAN_G1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	36411	DIABLO 1	25.0	0	0.0	1	1	200.0000

14HS-TS8:THREE PHASE FAULT CLEARING ON PALO VERDE-RUDD 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

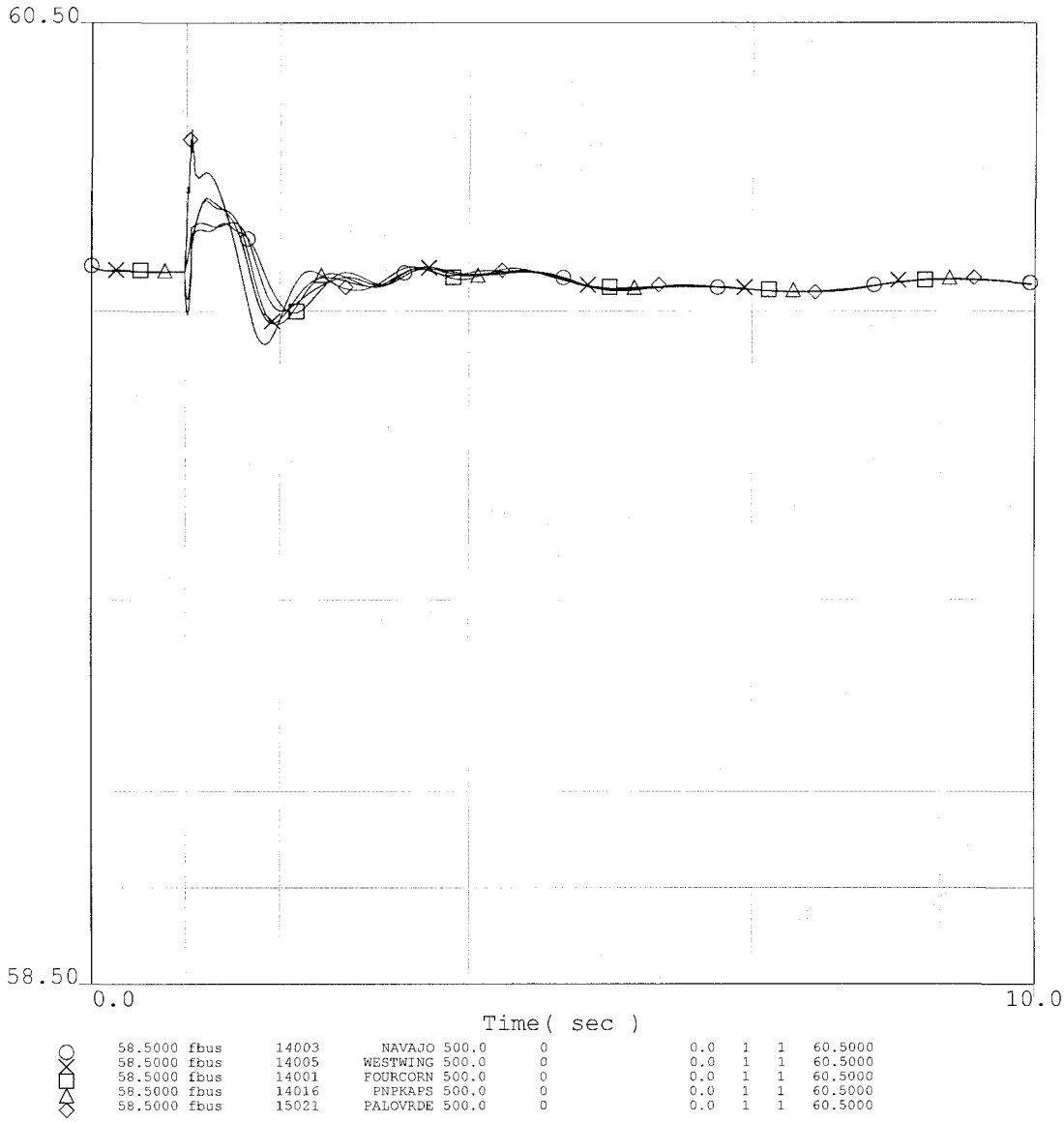
SYSTEM_Rotorangles



-200.0000 ang	73129	MBPP-1	24.0	0	0.0	1	1	200.0000
-200.0000 ang	60086	BRIDGER1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	62050	COLSTP 1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	65500	EHUNTR 3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	10321	SJUAN_G4	22.0	0	0.0	1	1	200.0000

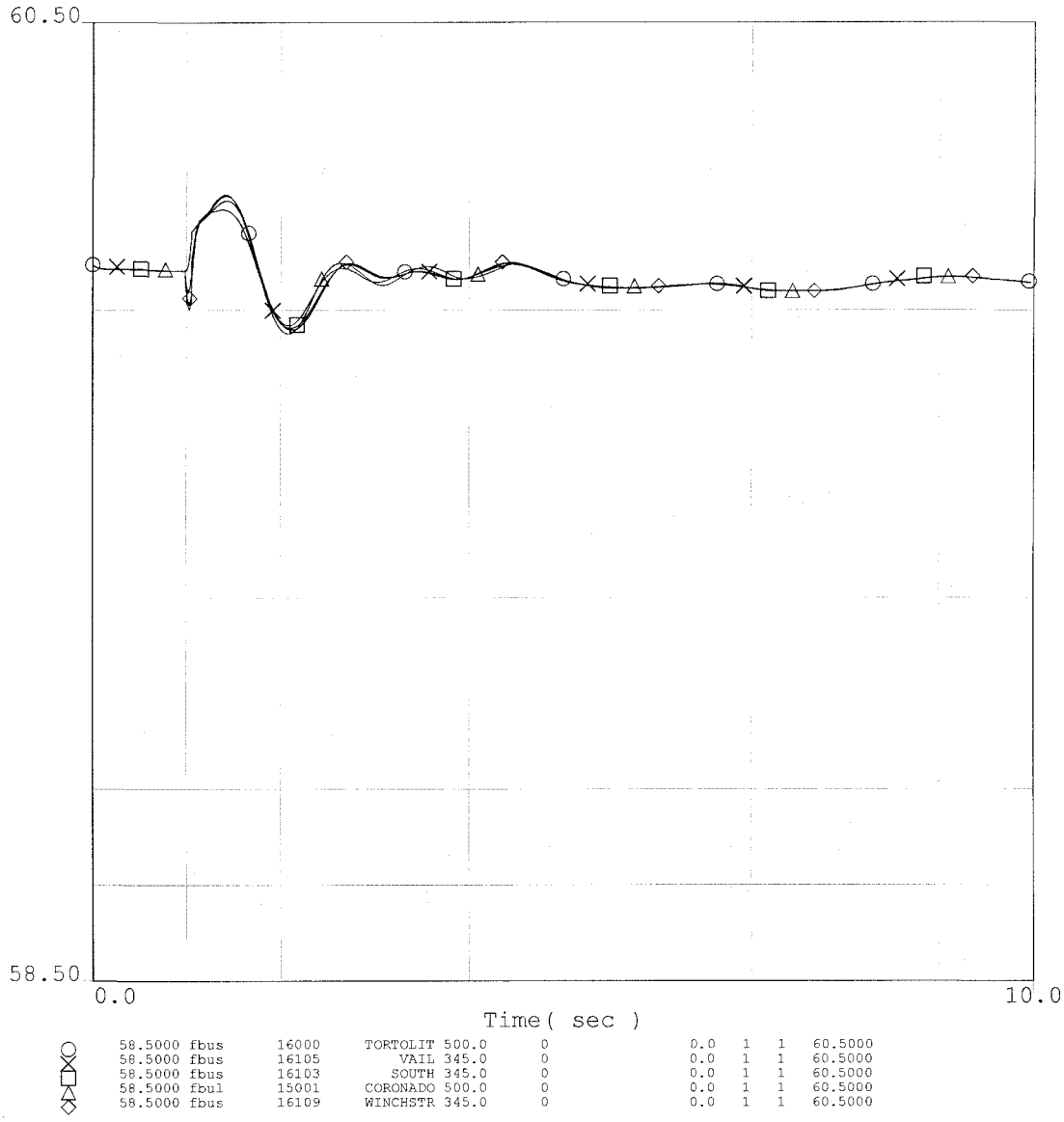
14HS-TS8:THREE PHASE FAULT CLEARING ON PALO VERDE-RUDD 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

Frequencies:



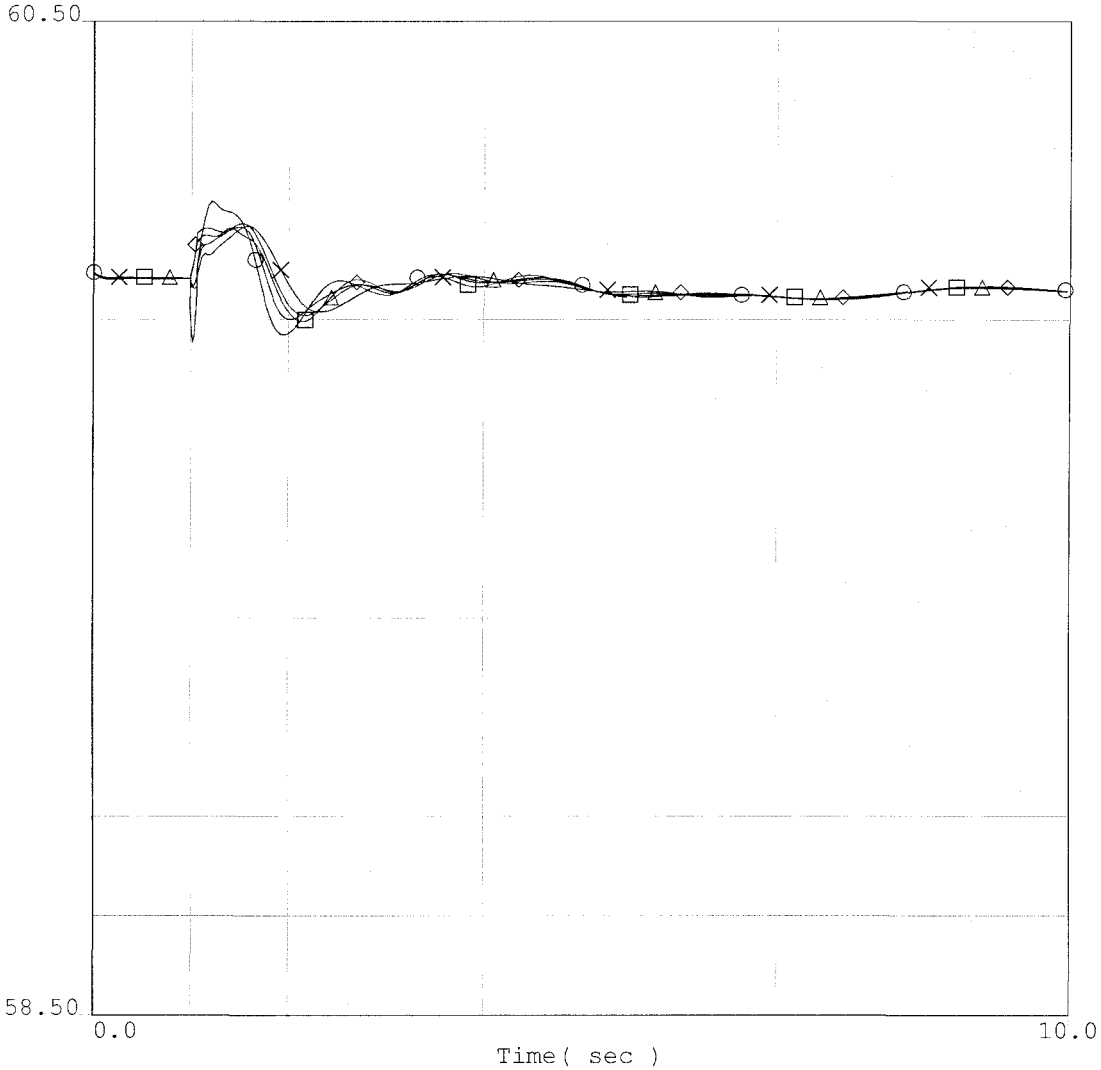
14HS-TS8:THREE PHASE FAULT CLEARING ON PALO VERDE-RUDD 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

Frequencies:



14HS-TS8:THREE PHASE FAULT CLEARING ON PALO VERDE-RUDD 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

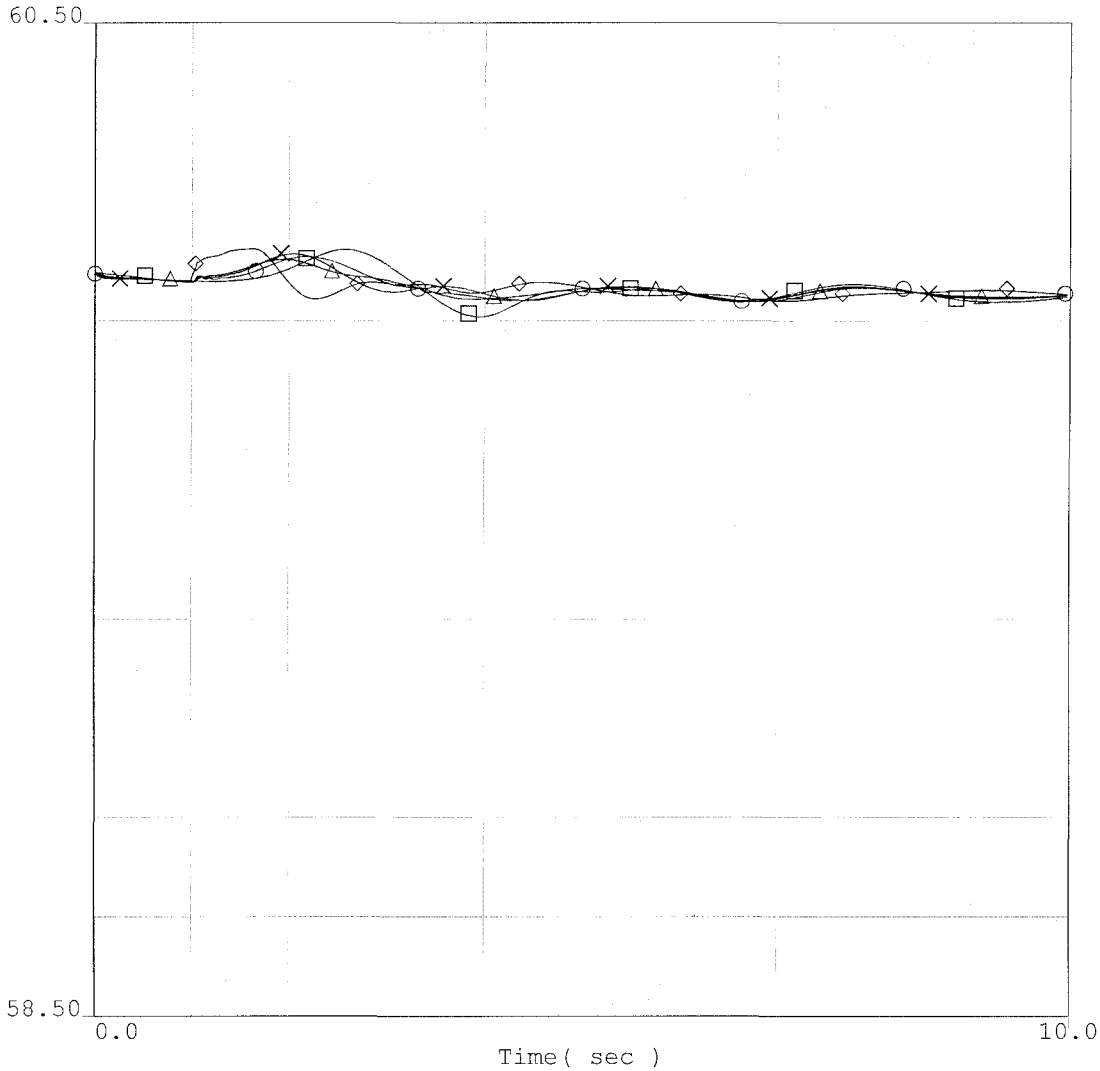
Frequencies:



58.5000 fbul	14231	WESTWNGW 230.0	0	0.0	1	1	60.5000
58.5000 fbus	26003	ADELANTO 500.0	0	0.0	1	1	60.5000
58.5000 fbus	14001	FOURCORN 500.0	0	0.0	1	1	60.5000
58.5000 fbus	26048	MCCULLGH 500.0	0	0.0	1	1	60.5000
58.5000 fbus	14003	NAVAJO 500.0	0	0.0	1	1	60.5000

14HS-TS8:THREE PHASE FAULT CLEARING ON PALO VERDE-RUDD 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

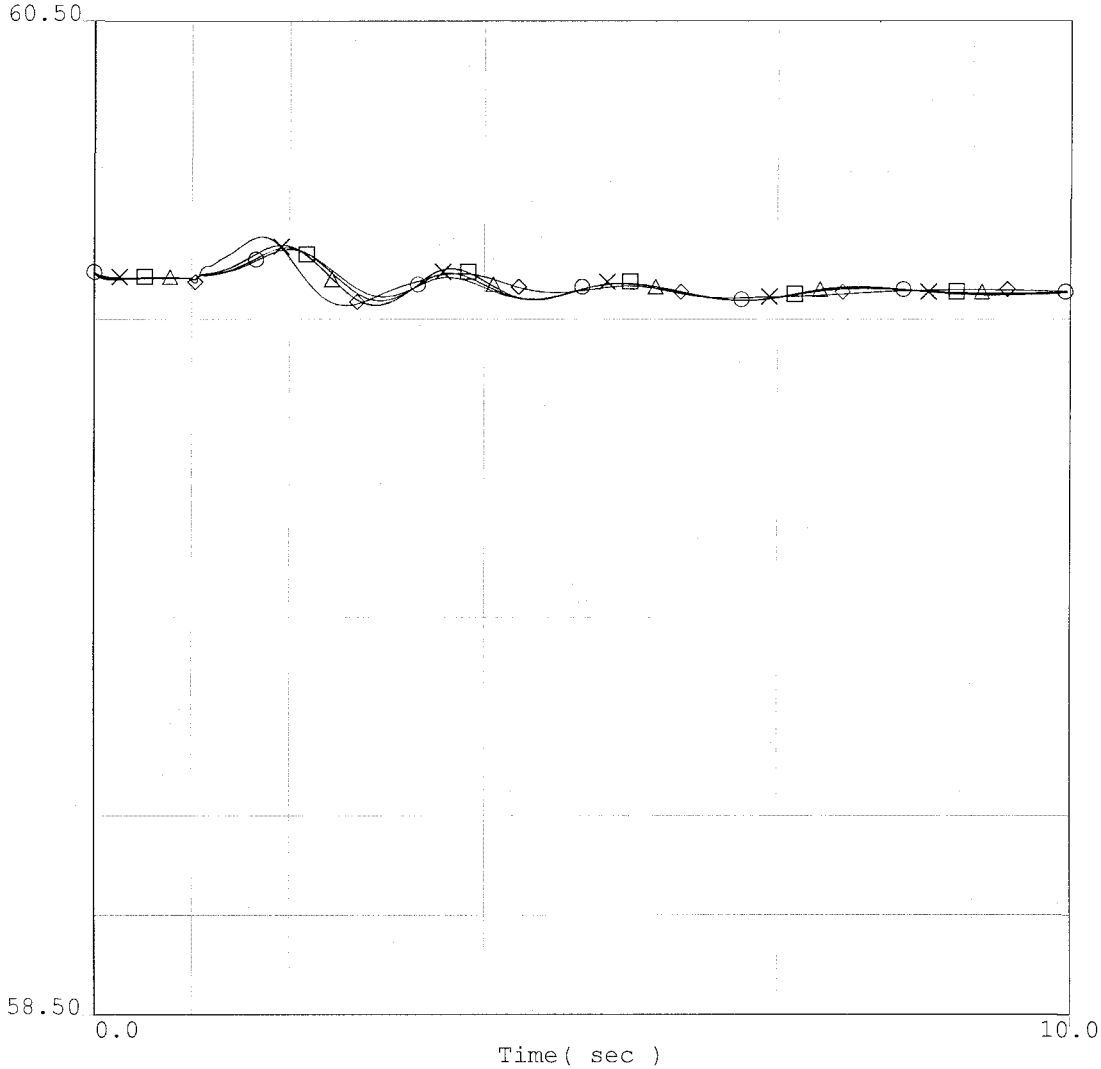
Frequencies:



58.5000 fbus	40489	GRIZZLY 500.0	0	0.0	1	1	60.5000
58.5000 fbus	40687	MALIN 500.0	0	0.0	1	1	60.5000
58.5000 fbus	40459	GARRISON 500.0	0	0.0	1	1	60.5000
58.5000 fbus	60235	MIDPOINT 345.0	0	0.0	1	1	60.5000
58.5000 fbus	66230	PINTO 138.0	0	0.0	1	1	60.5000

14HS-TS8:THREE PHASE FAULT CLEARING ON PALO VERDE-RUDD 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

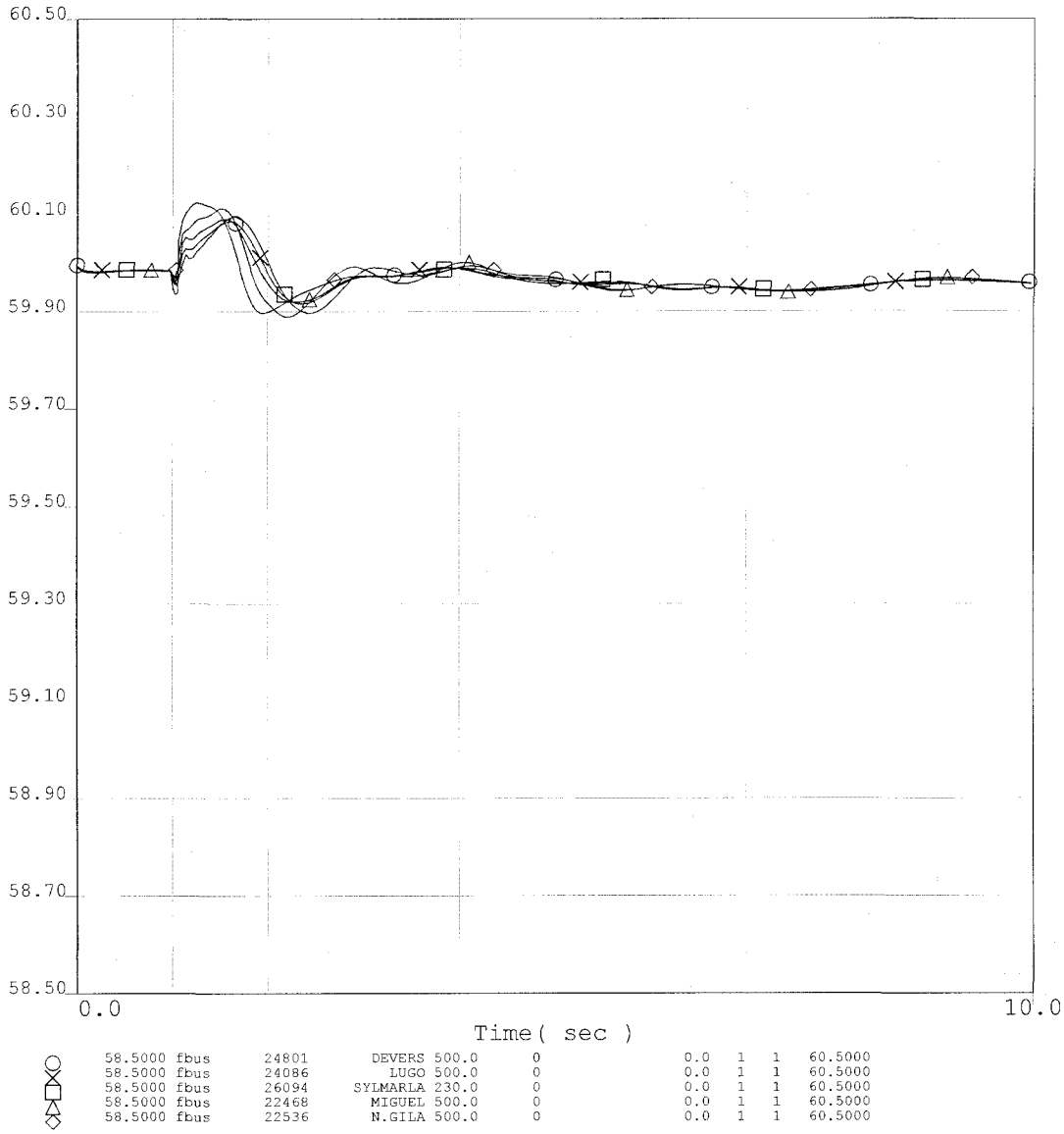
Frequencies:



58.5000 fbus	30005	ROUND MT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30015	TABLE MT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30035	TRACY 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30040	TESLA 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30060	MIDWAY 500.0	0	0.0	1	1	60.5000

14HS-TS8:THREE PHASE FAULT CLEARING ON PALO VERDE-RUDD 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

Frequencies:



14HS-TS8:THREE PHASE FAULT CLEARING ON PALO VERDE-RUDD 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

HIGHEST VOLTAGE DIP

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct	@time
14	GILABEND	230	vbul	1.016	0.899	11.5	1.525
14	PALOVRDE	500	vbus	1.059	0.924	12.8	1.525
24	DEVRSVC1	500	vbug	1.06	0.996	6	1.525

LOWEST FREQUENCY

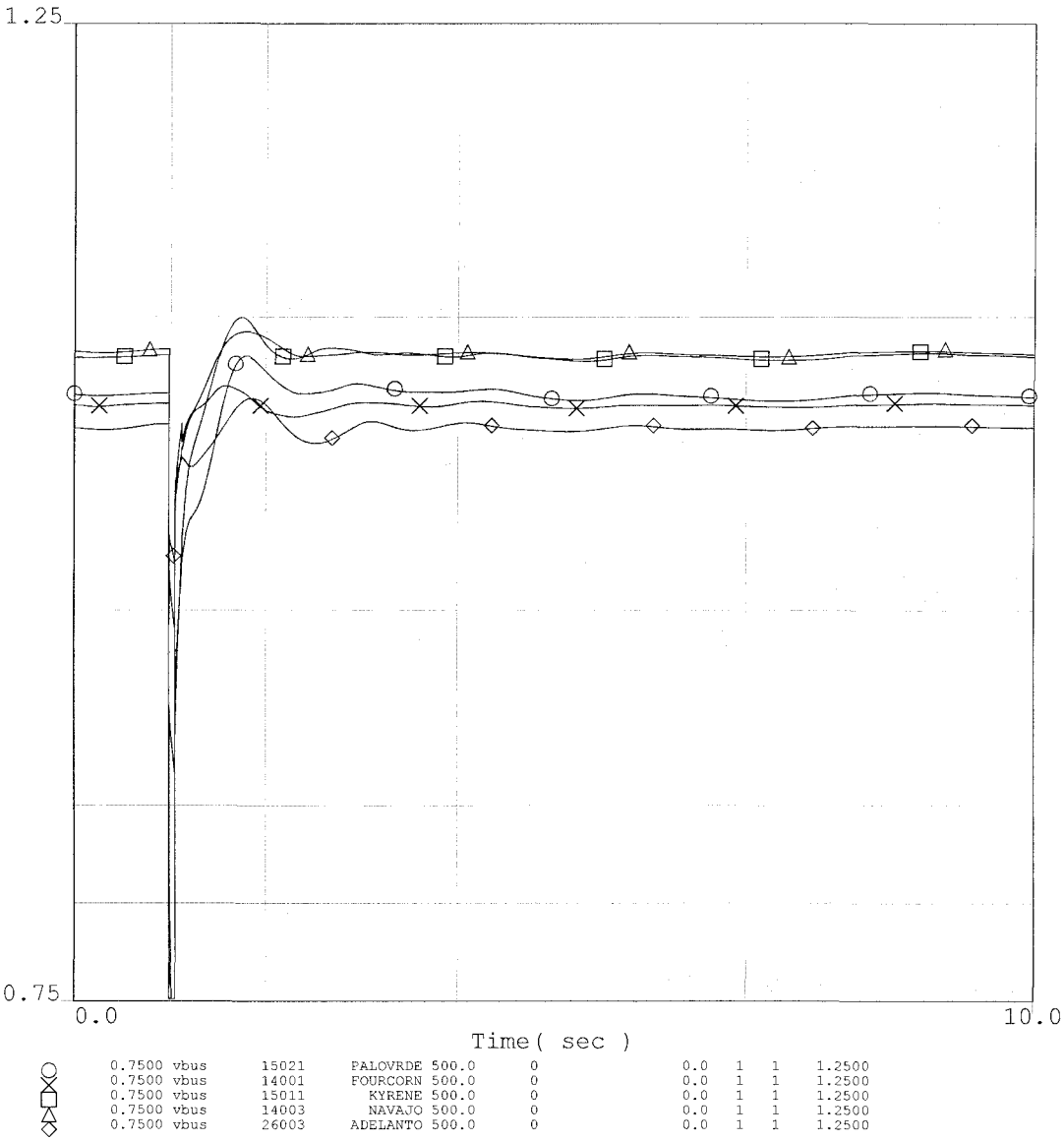
AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
14	WHITETNK	69	fbul	59.527	1.046
14	Q1COL1	34.5	fbus	59.368	1.021
14	HGC-ST3	13.8	fbug	59.745	1.825

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

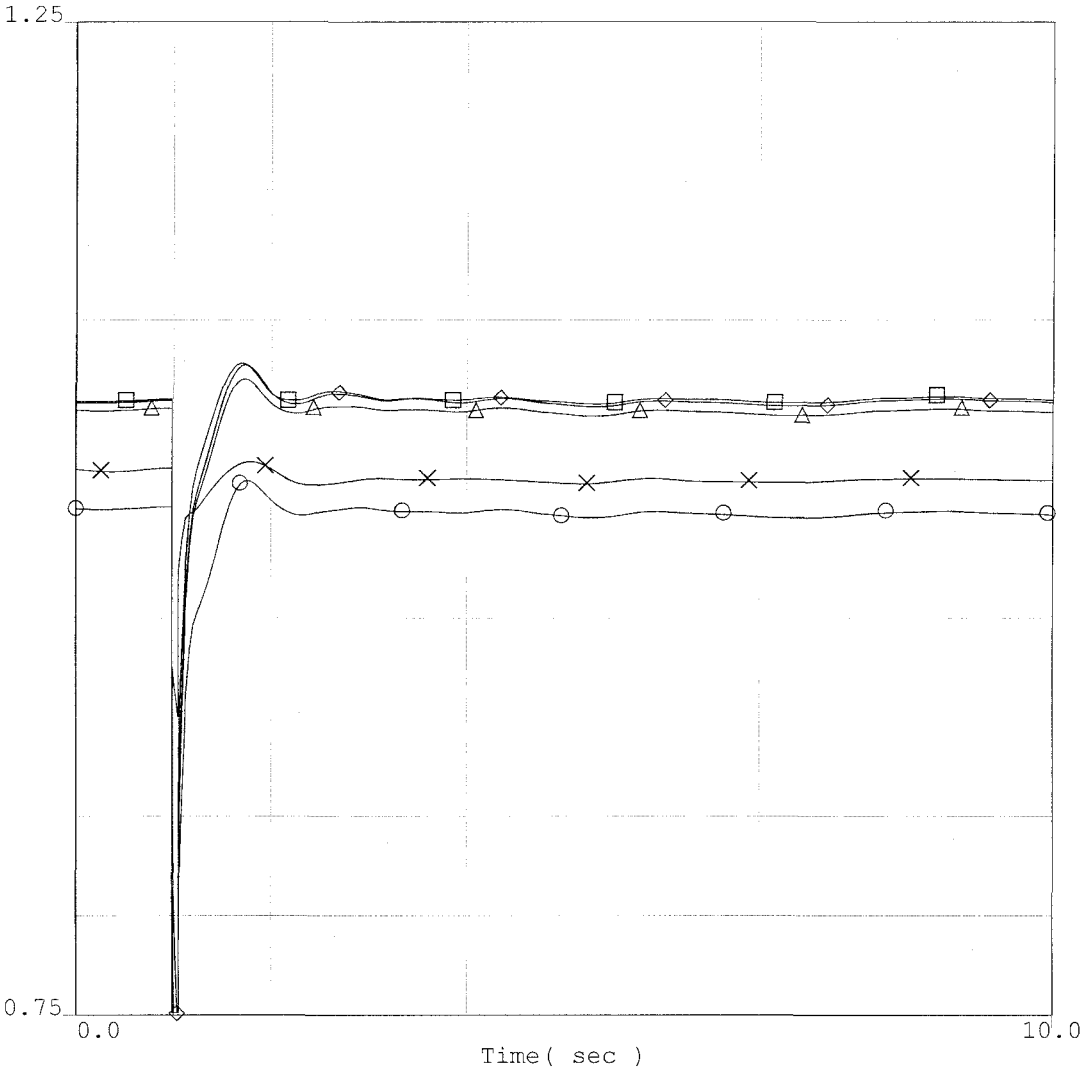
There were 0 violations of MORC criteria 1 (25% Voltage Dip) !
There were 0 violations of MORC criteria 2 (20% Voltage Dip for 20 Cycles)!
There were 0 violations of MORC criteria 3 (59.6 HZ for 6 Cycles)!

ARIZONA_voltages:



14HS-TS9:THREE PHASE FAULT CLEARING ON MEAD-PERKINS 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

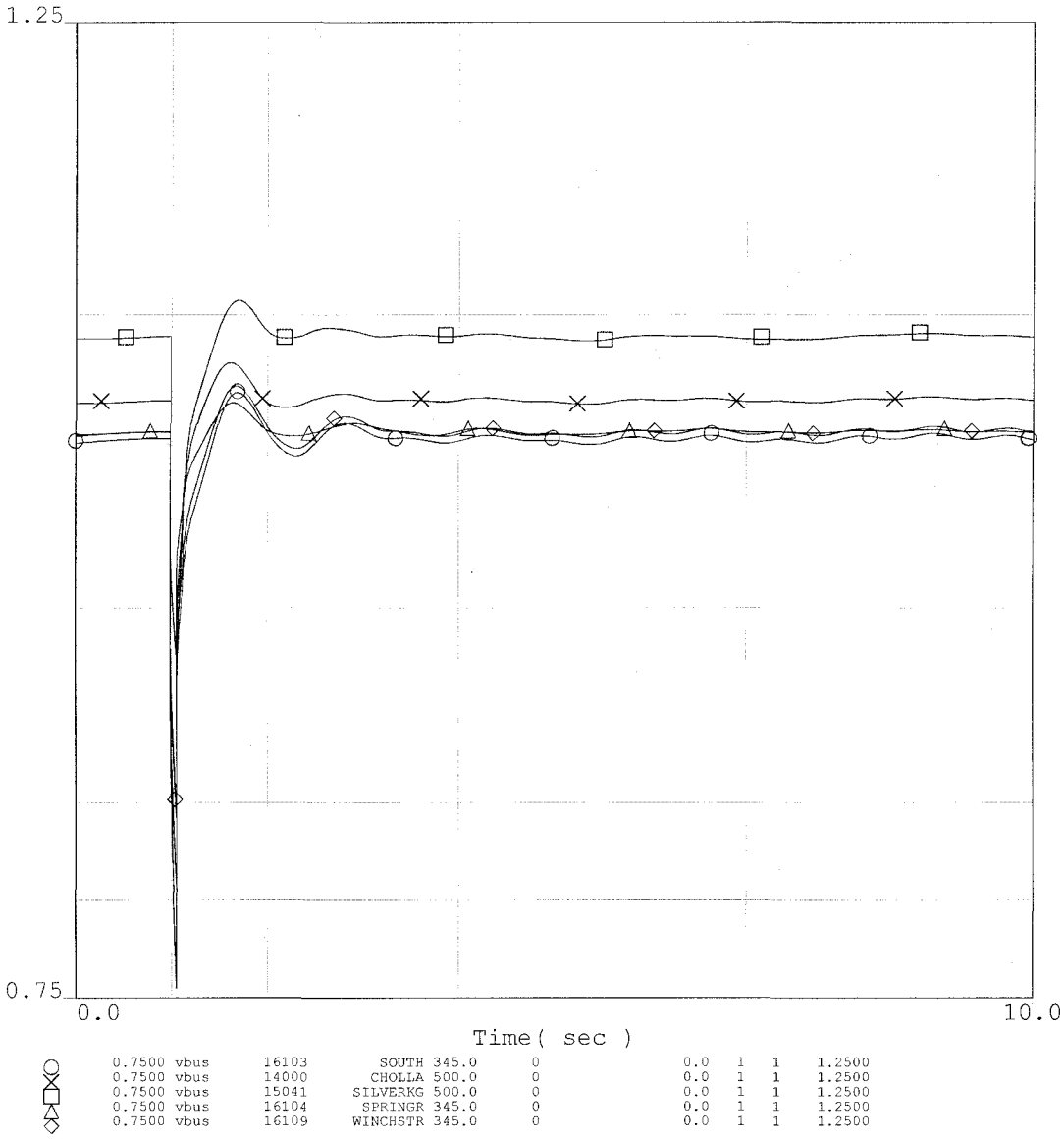
ARIZONA_voltages:



0.7500 vbul	14231	WESTWNGW 230.0	0	0.0	1	1	1.2500
0.7500 vbus	19011	MEAD N 230.0	0	0.0	1	1	1.2500
0.7500 vbus	15215	SILVERKG 230.0	0	0.0	1	1	1.2500
0.7500 vbul	14221	PPAPS W 230.0	0	0.0	1	1	1.2500
0.7500 vbus	15207	KYRENE 230.0	0	0.0	1	1	1.2500

14HS-TS9:THREE PHASE FAULT CLEARING ON MEAD-PERKINS 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

ARIZONA_voltages:



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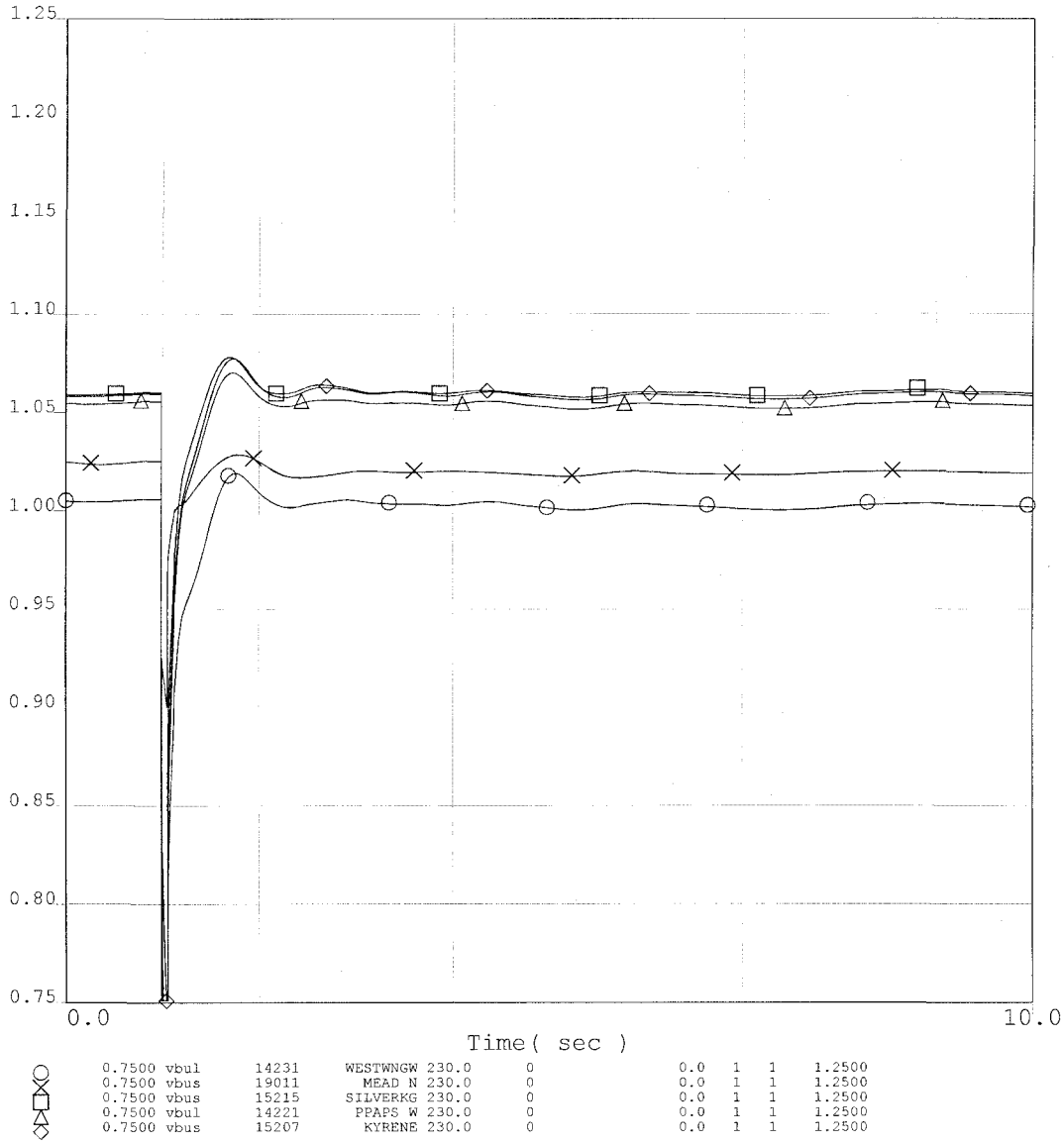
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

ARIZONA_voltages:



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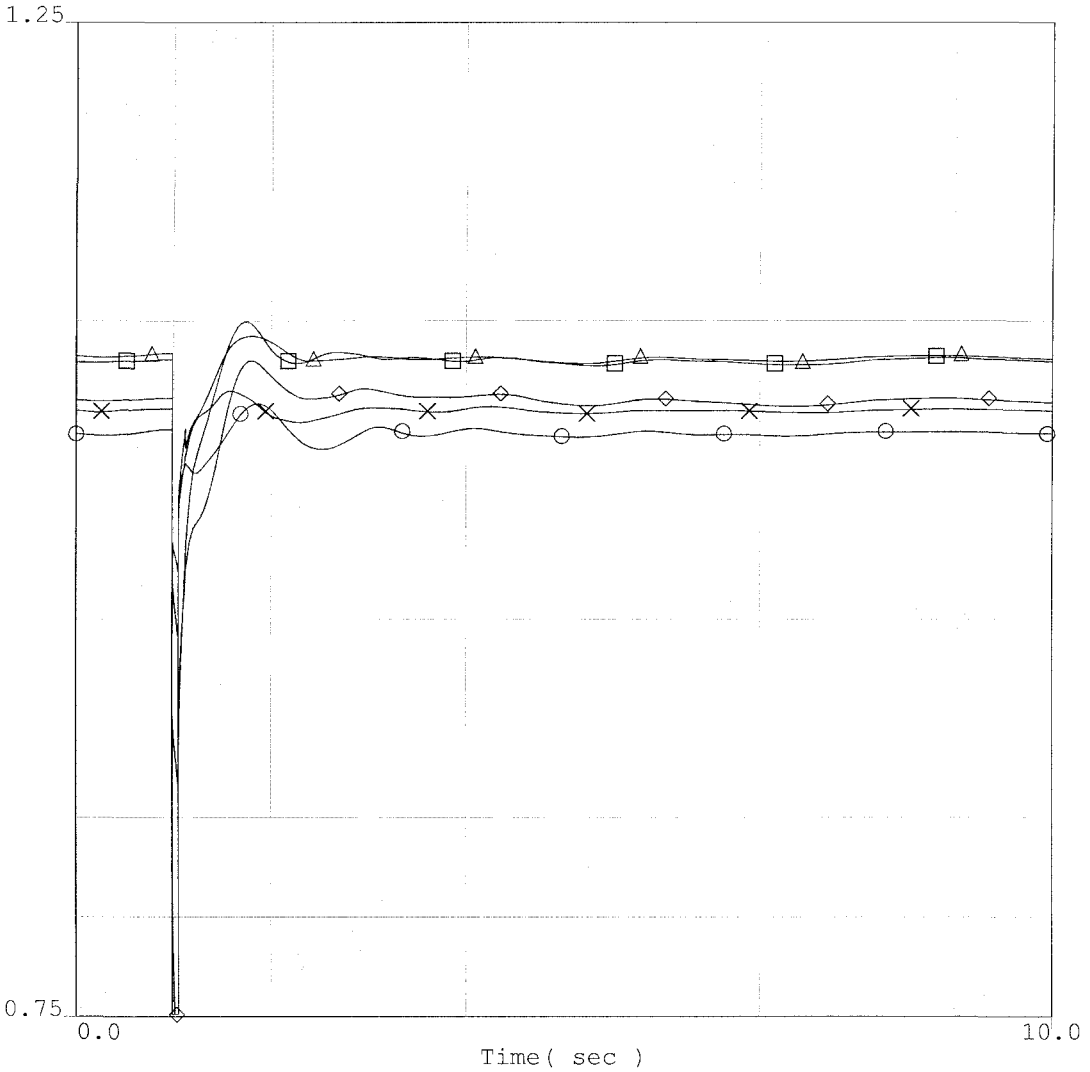
ARIZONA_voltages:



0.7500 vbus	26003	ADELANTO 500.0	0	0.0	1	1	1.2500
0.7500 vbus	14001	FOURCORN 500.0	0	0.0	1	1	1.2500
0.7500 vbus	15011	KYRENE 500.0	0	0.0	1	1	1.2500
0.7500 vbus	14003	NAVAJO 500.0	0	0.0	1	1	1.2500
0.7500 vbus	15021	PALOVRDE 500.0	0	0.0	1	1	1.2500

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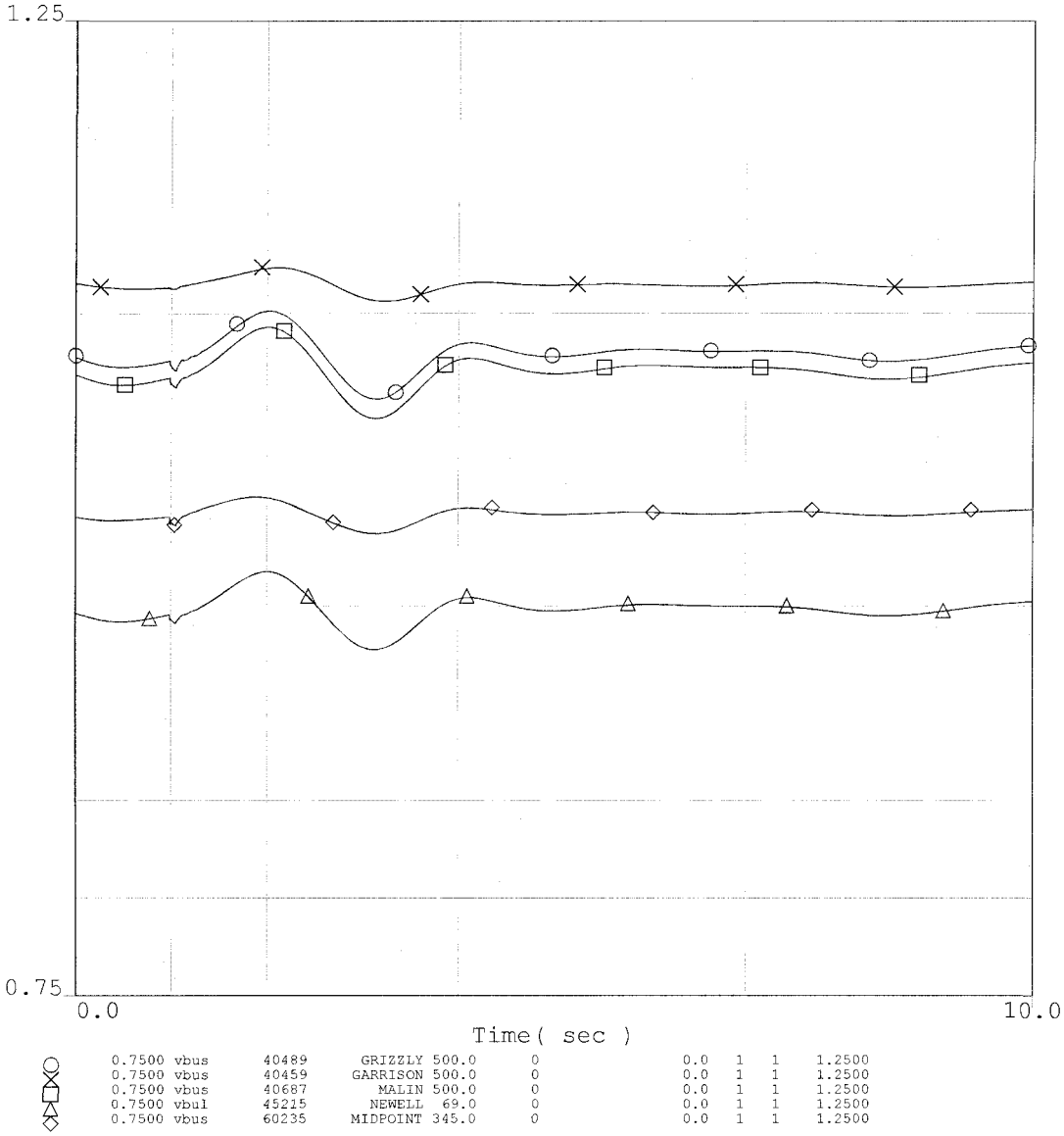
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

NORTHWEST_voltages:



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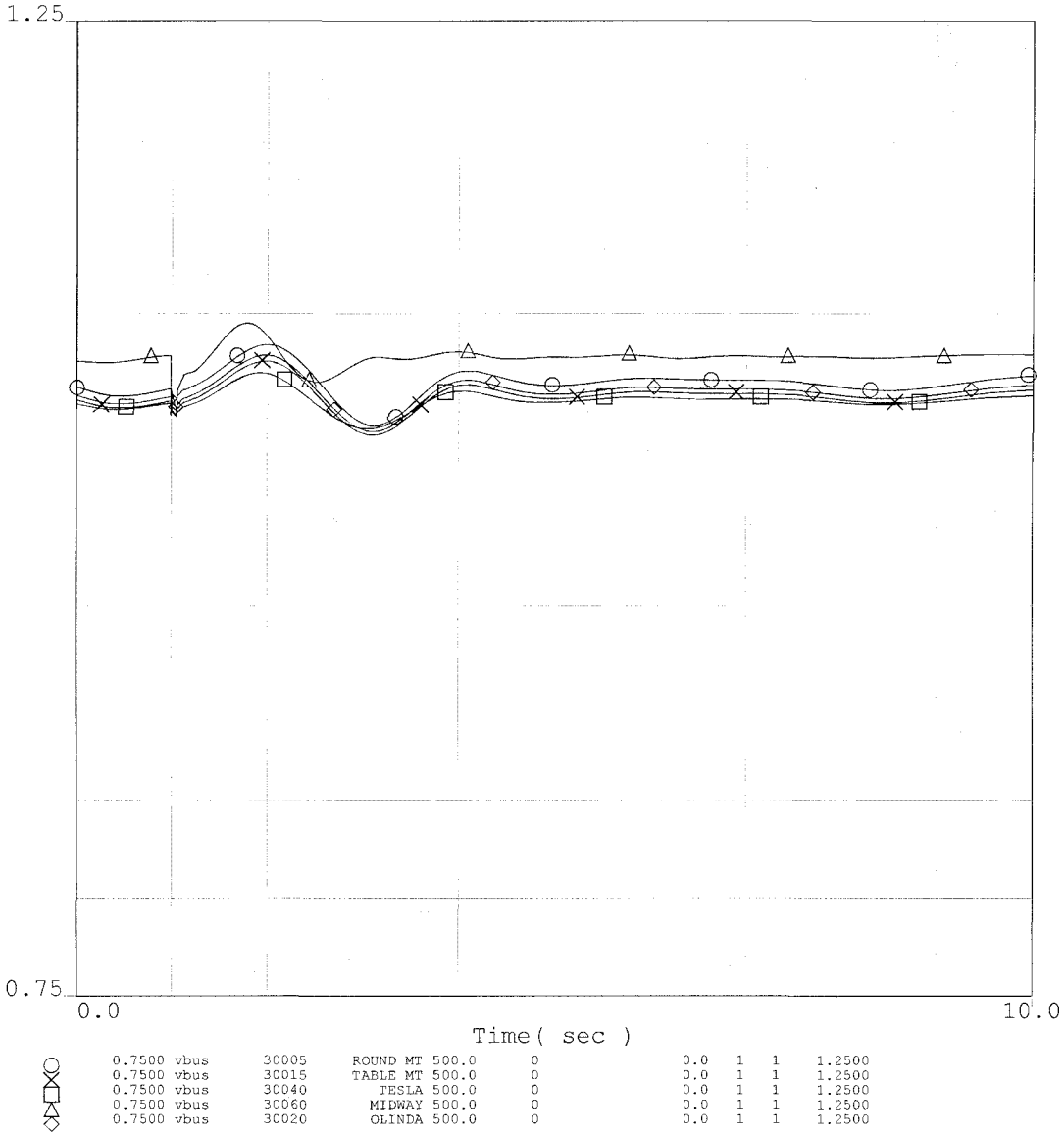
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

CALIFORNIA_voltages:



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SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

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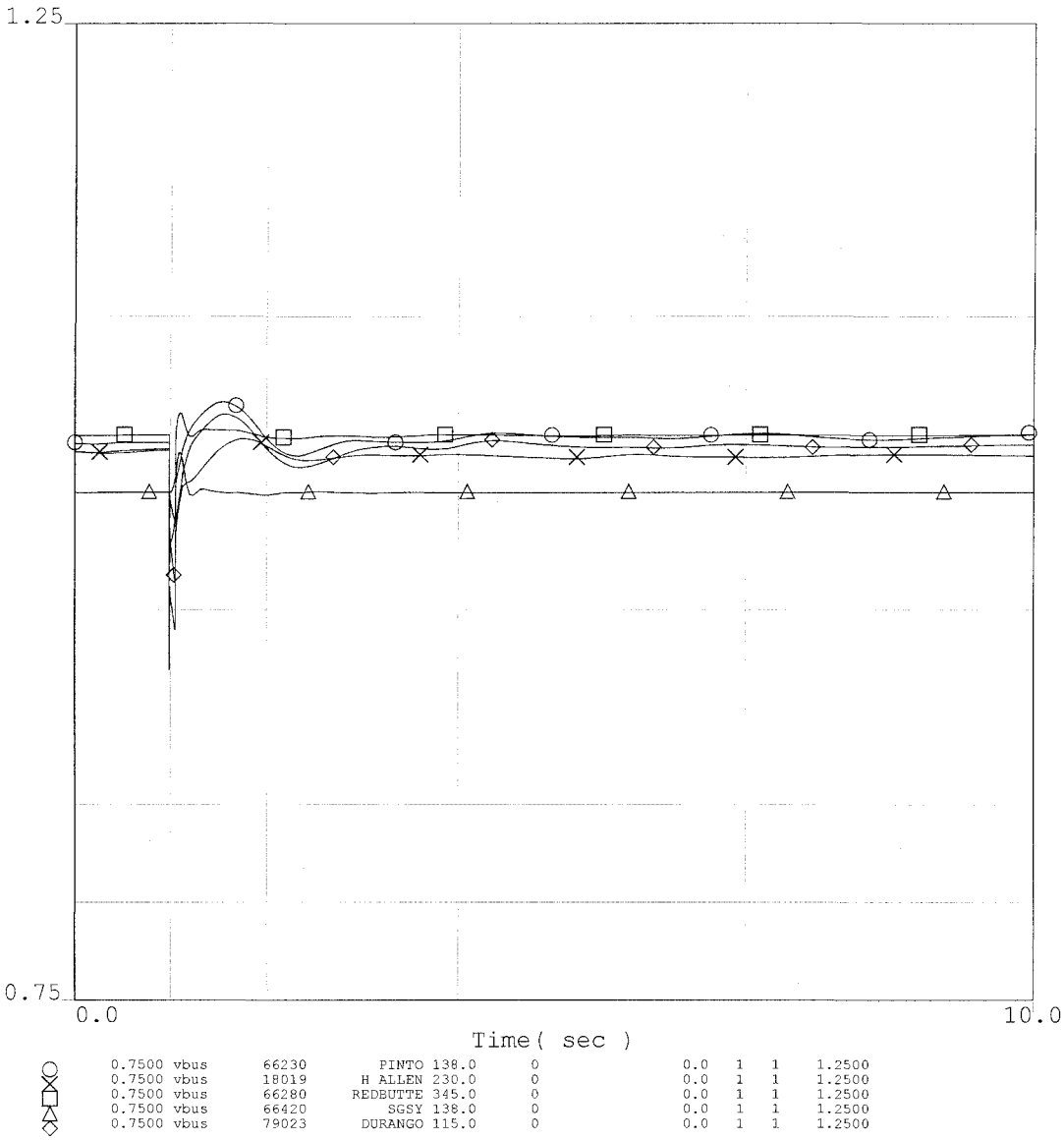

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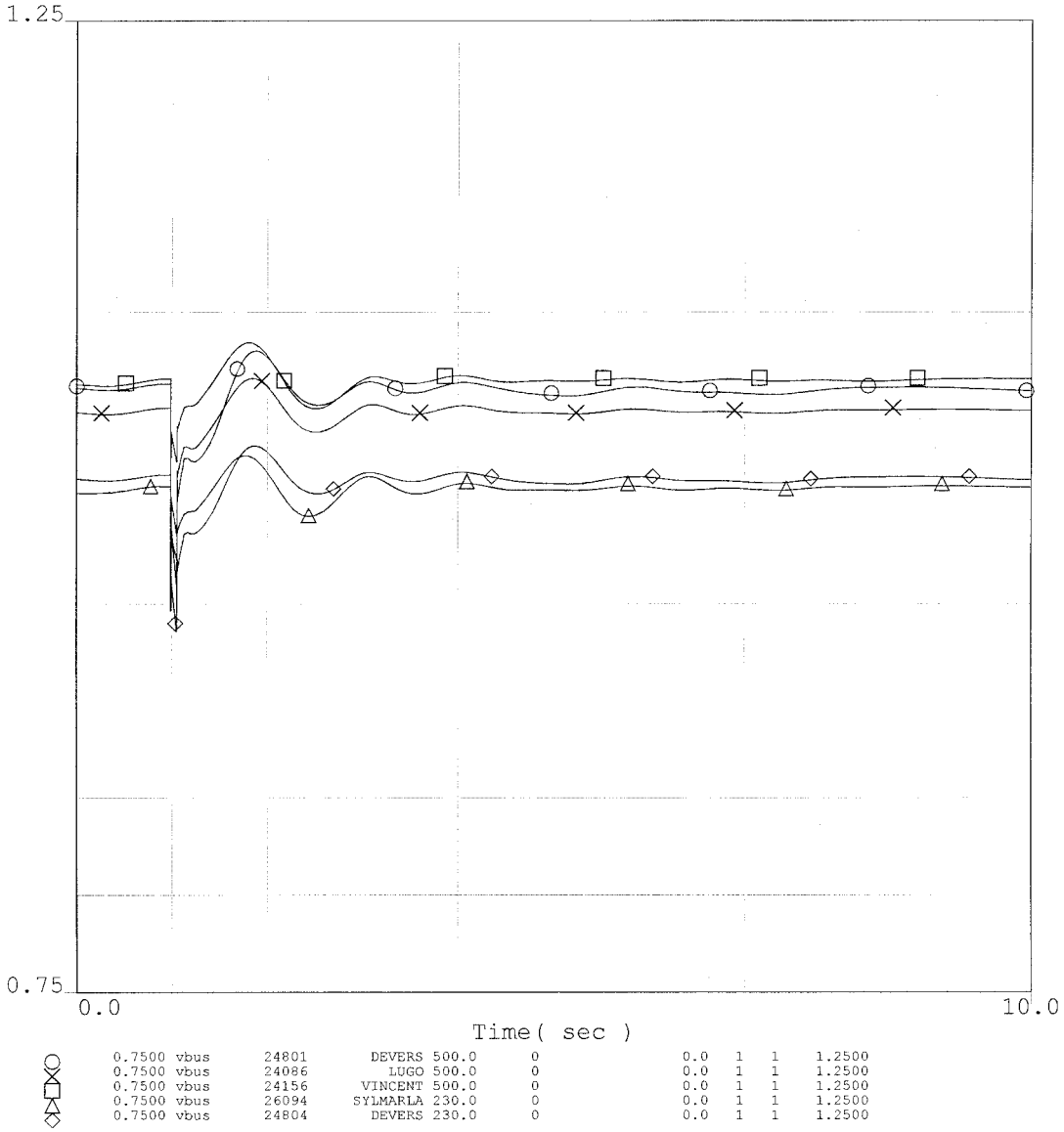
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

CALIFORNIA_voltages:



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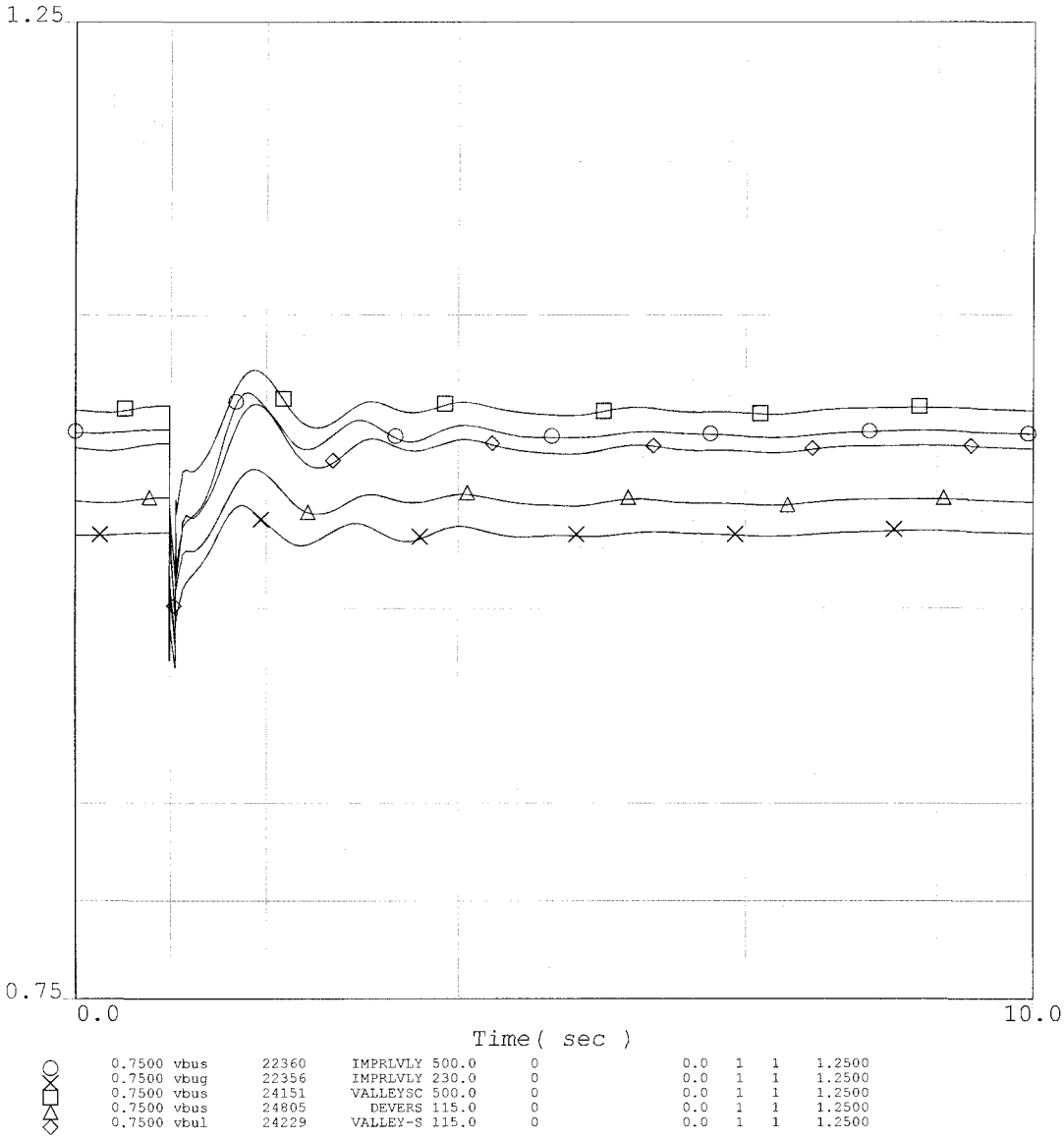
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

CALIFORNIA_voltages:



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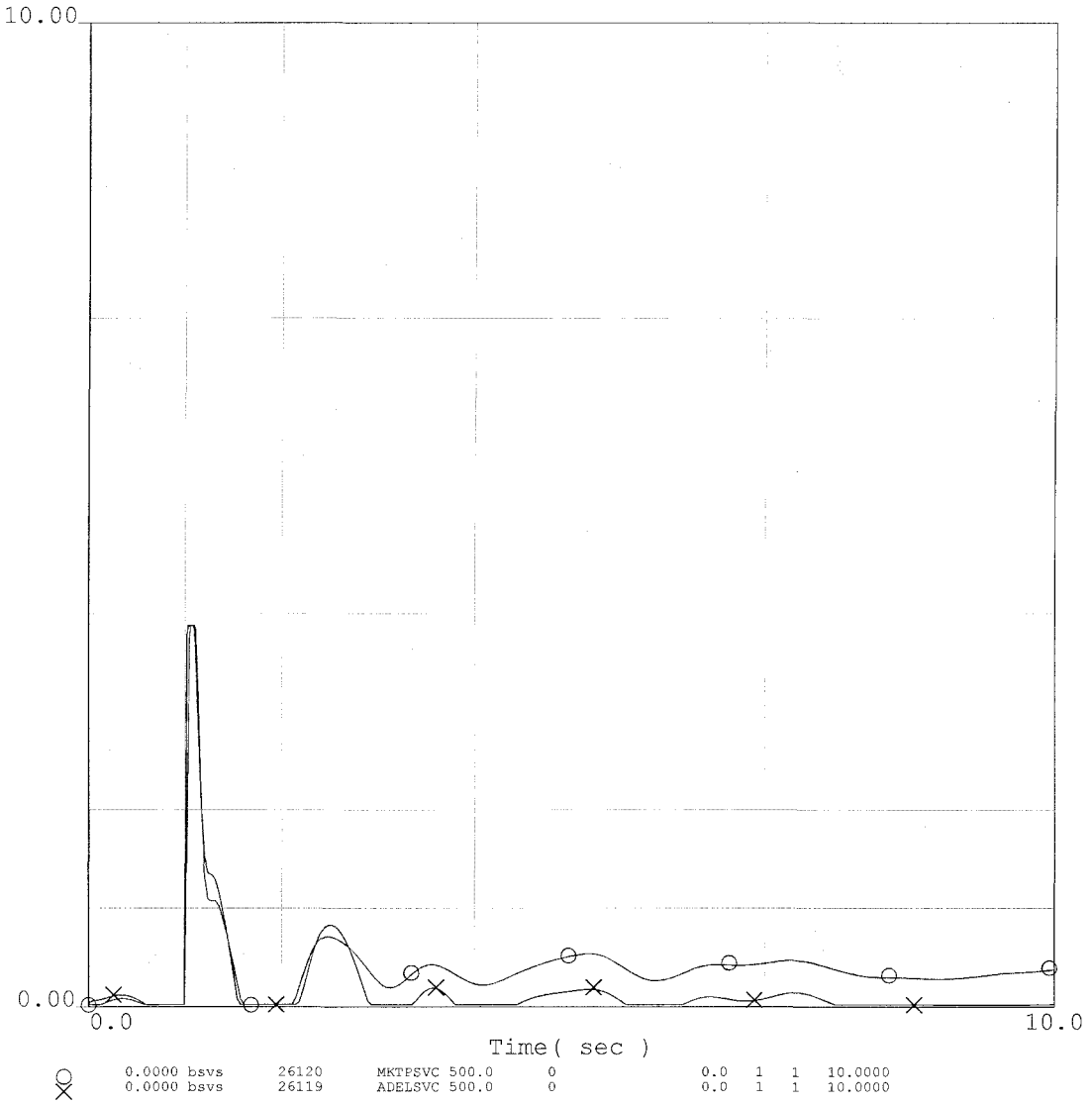
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

SVC_output



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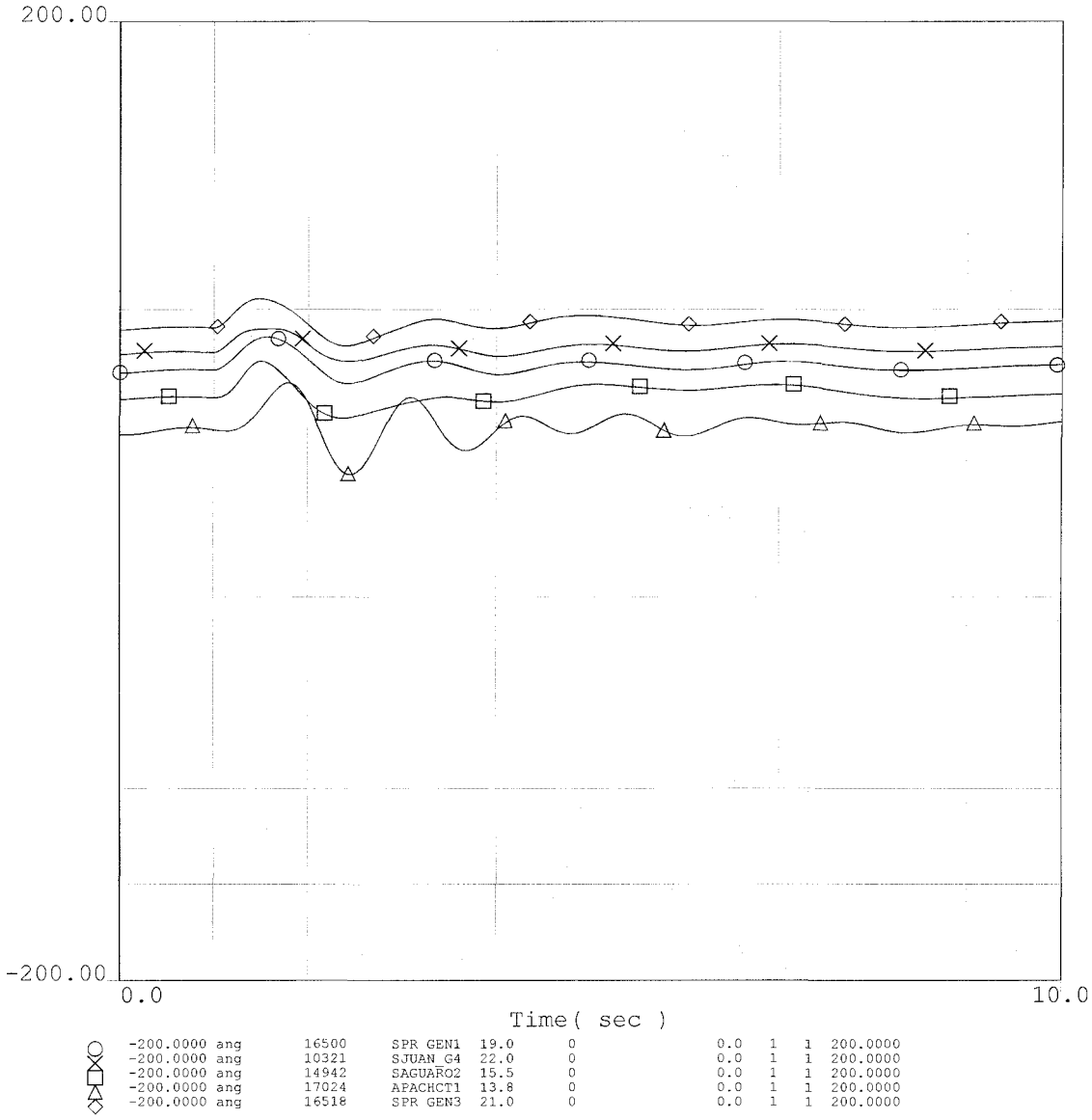
SYSTEM_Rotorangles



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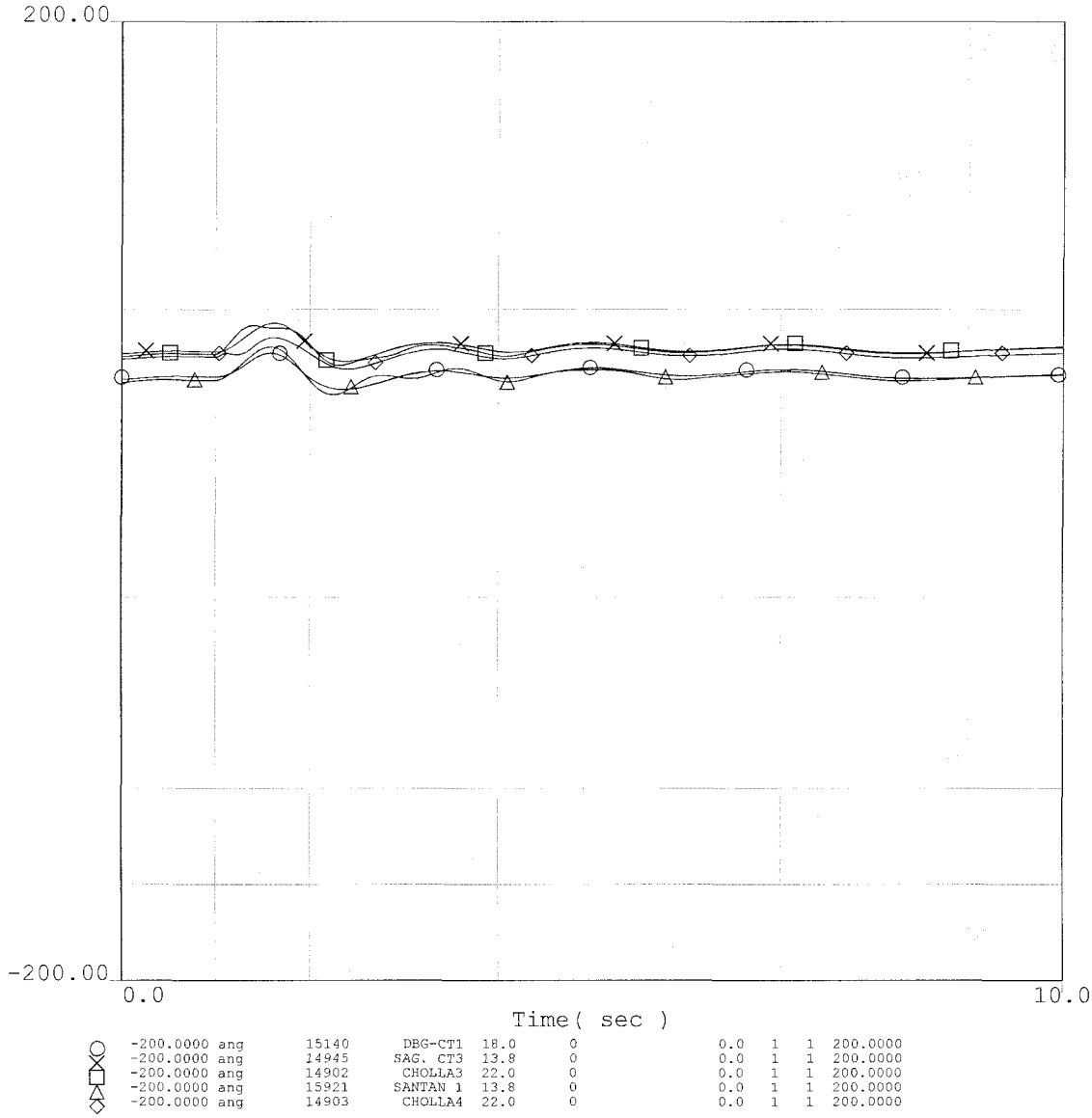

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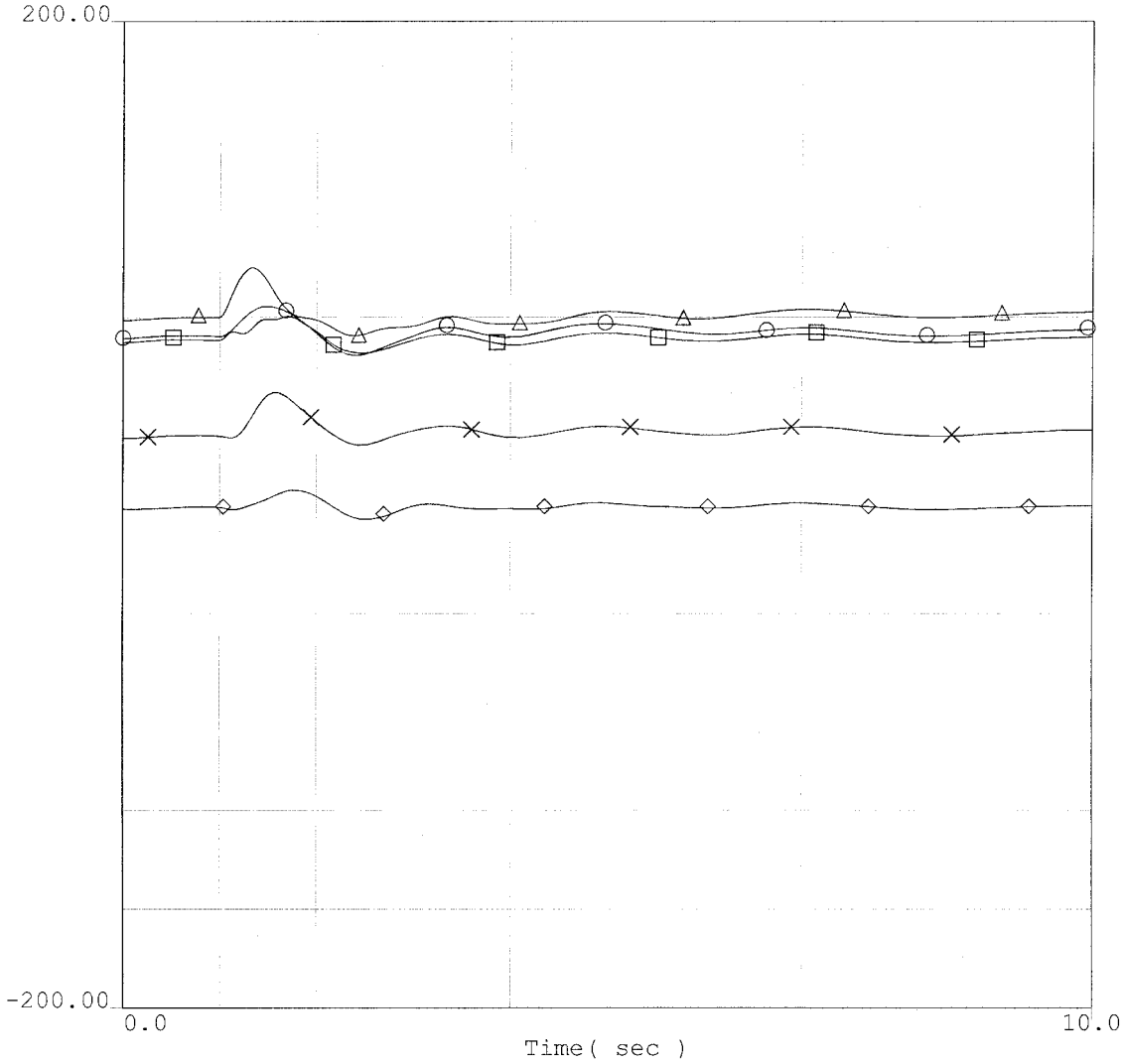

-200.0000 ang	16518	SPR GEN3	21.0	0	0.0	1	1	200.0000
-200.0000 ang	16503	SUNDTGE4	18.0	0	0.0	1	1	200.0000
-200.0000 ang	14914	FCNGN4CC	22.0	0	0.0	H	1	200.0000
-200.0000 ang	14931	PALOVRD1	24.0	0	0.0	1	1	200.0000
-200.0000 ang	24004	ALAMT4 G	18.0	0	0.0	H	1	200.0000

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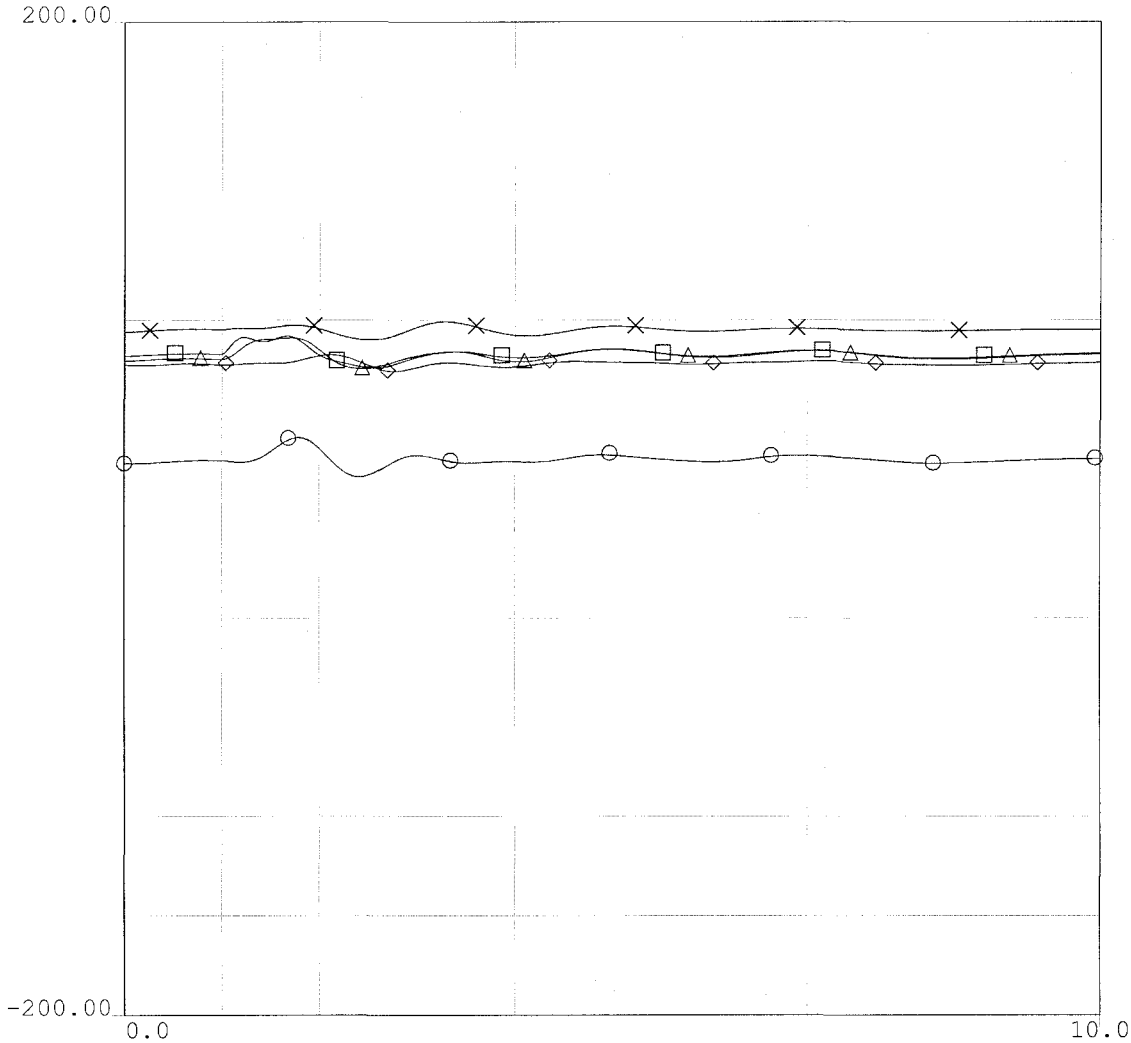

-200.0000 ang	24129	S.ONOFR2	22.0	0	0.0	1	1	200.0000
-200.0000 ang	26039	INTERM1G	26.0	0	0.0	1	1	200.0000
-200.0000 ang	15981	NAVAJO 1	26.0	0	0.0	1	1	200.0000
-200.0000 ang	10318	SJUAN_G1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	36411	DIABLO 1	25.0	0	0.0	1	1	200.0000

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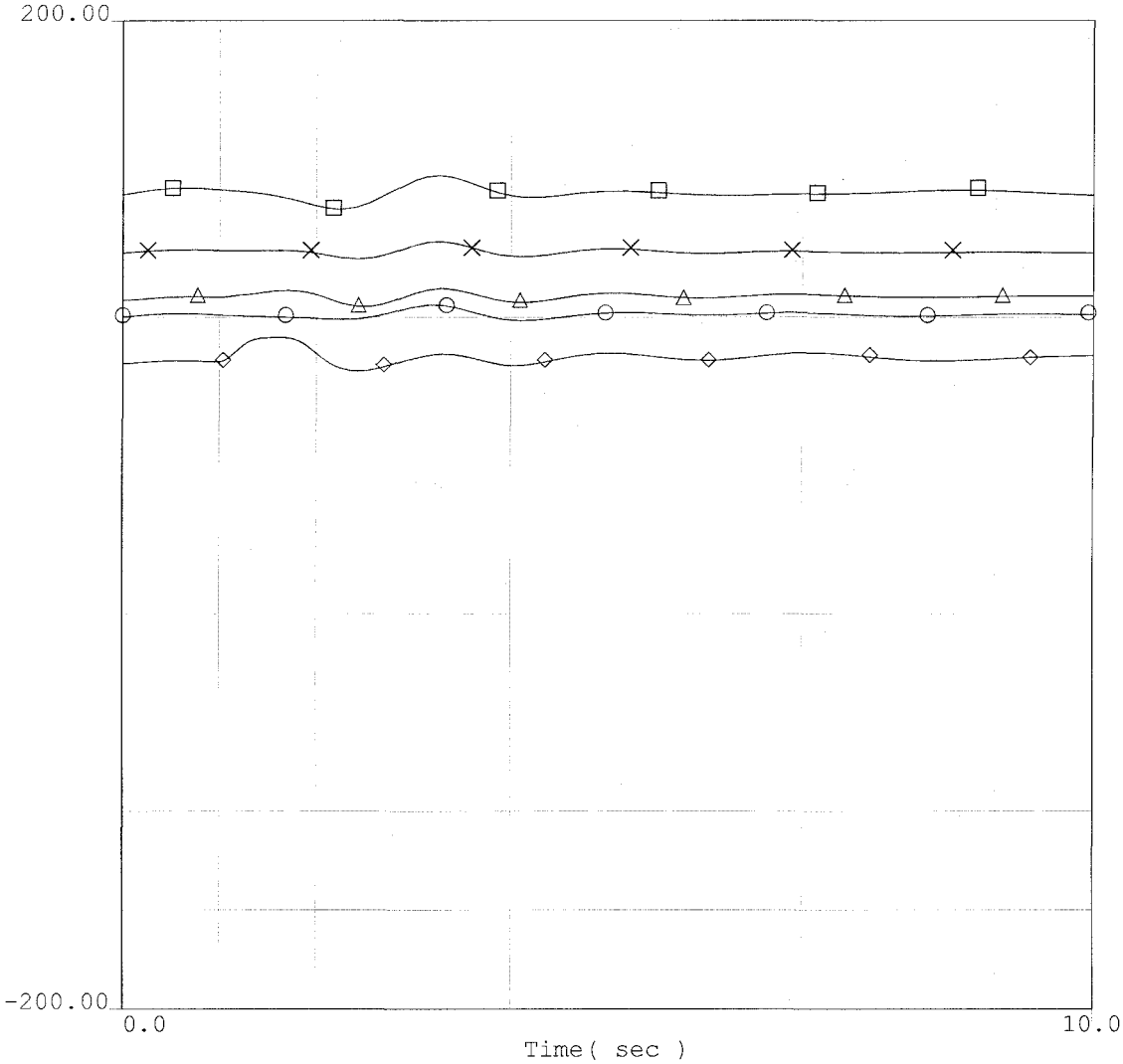
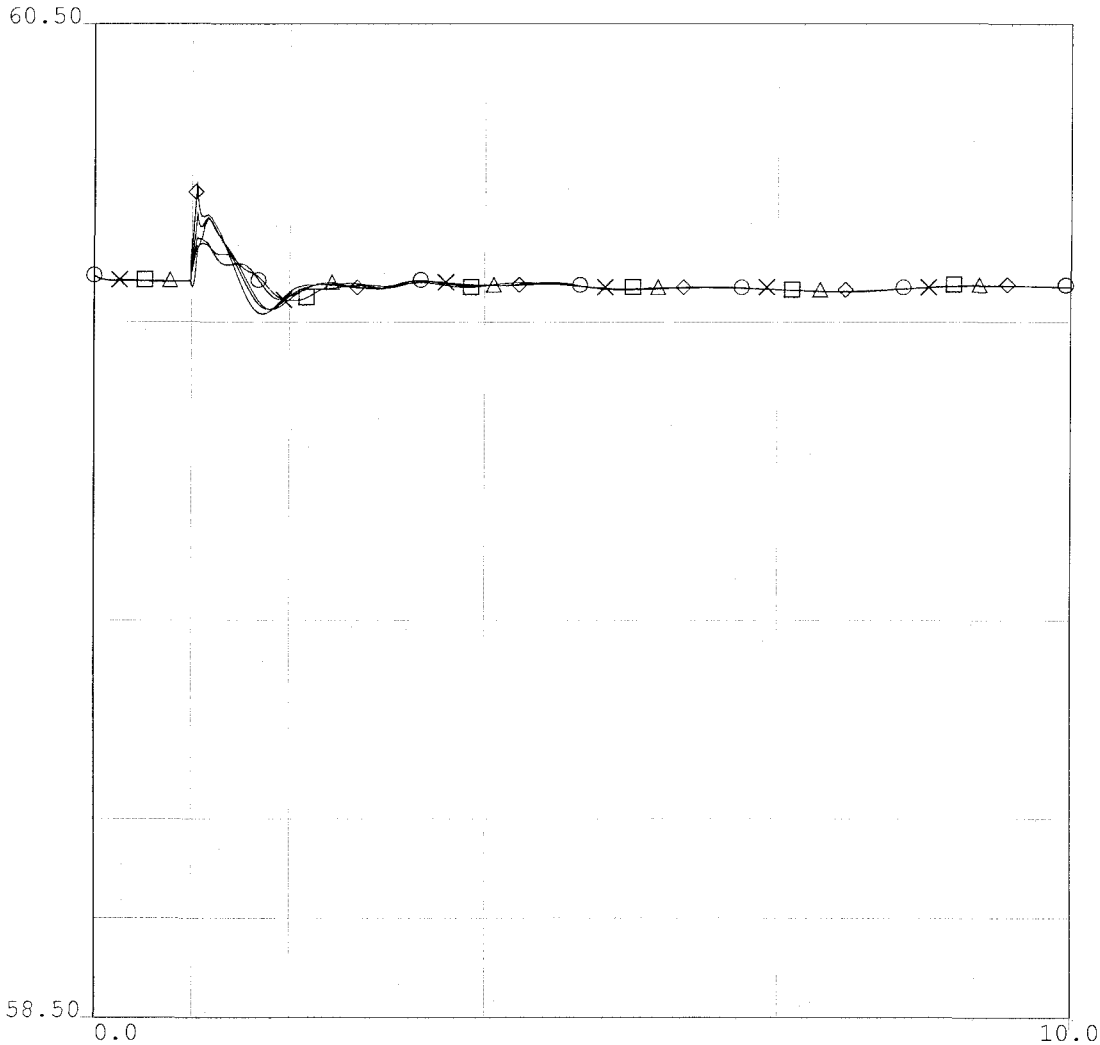


-200.0000 ang	73129	MBPP-1	24.0	0	0.0	1	1	200.0000
-200.0000 ang	60086	BRIDGER1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	62050	COLSTP 1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	65500	EHUNTR 3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	10321	SJUAN_G4	22.0	0	0.0	1	1	200.0000

14HS-TS9:THREE PHASE FAULT CLEARING ON MEAD-PERKINS 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

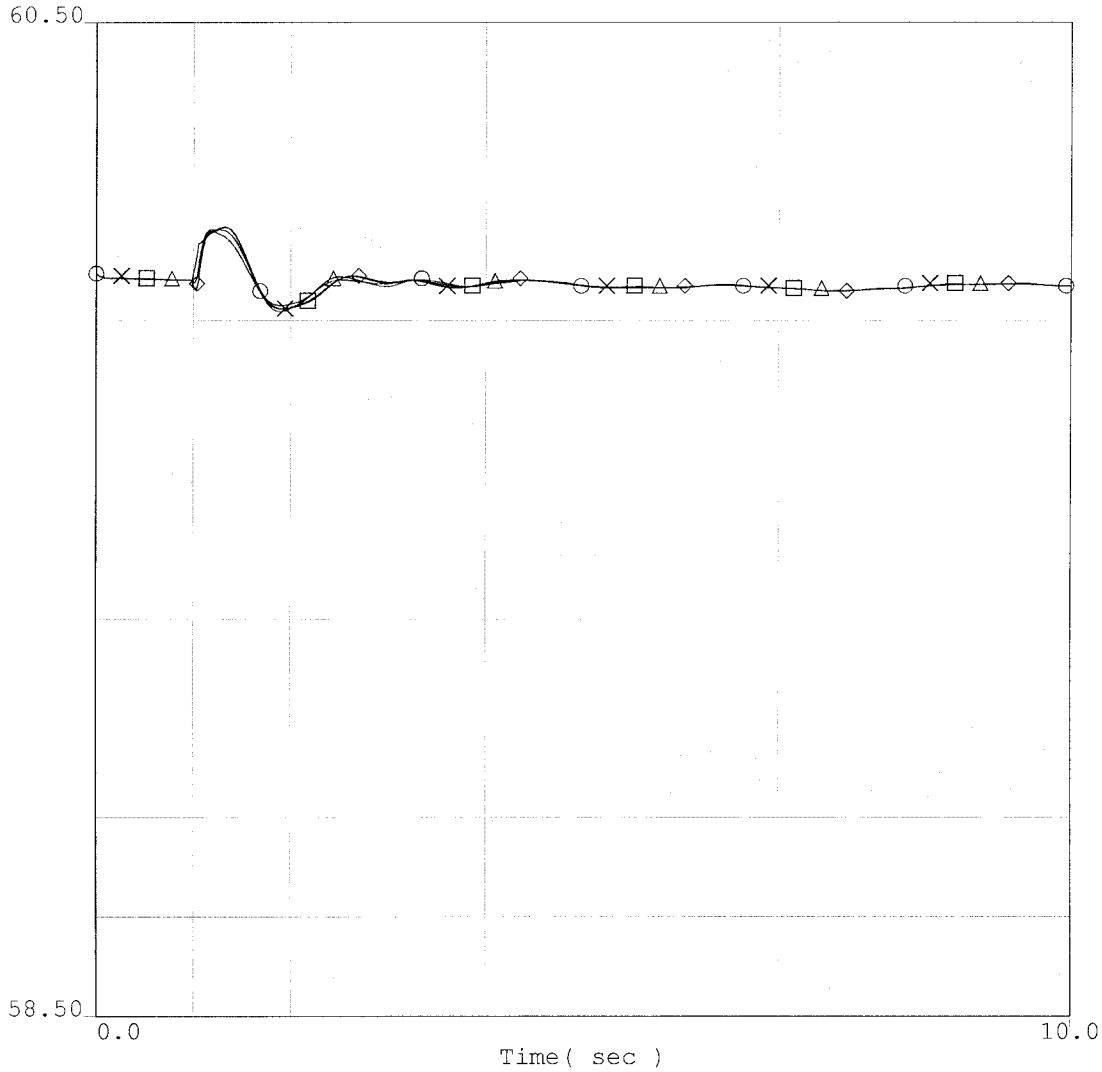
Frequencies:



○	58.5000 fbus	14003	NAVAJO 500.0	0	0.0	1	1	60.5000
⊗	58.5000 fbus	14005	WESTWING 500.0	0	0.0	1	1	60.5000
□	58.5000 fbus	14001	FOURCORN 500.0	0	0.0	1	1	60.5000
△	58.5000 fbus	14016	PNPKAPS 500.0	0	0.0	1	1	60.5000
◇	58.5000 fbus	15021	PALOVRDE 500.0	0	0.0	1	1	60.5000

14HS-TS9:THREE PHASE FAULT CLEARING ON MEAD-PERKINS 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

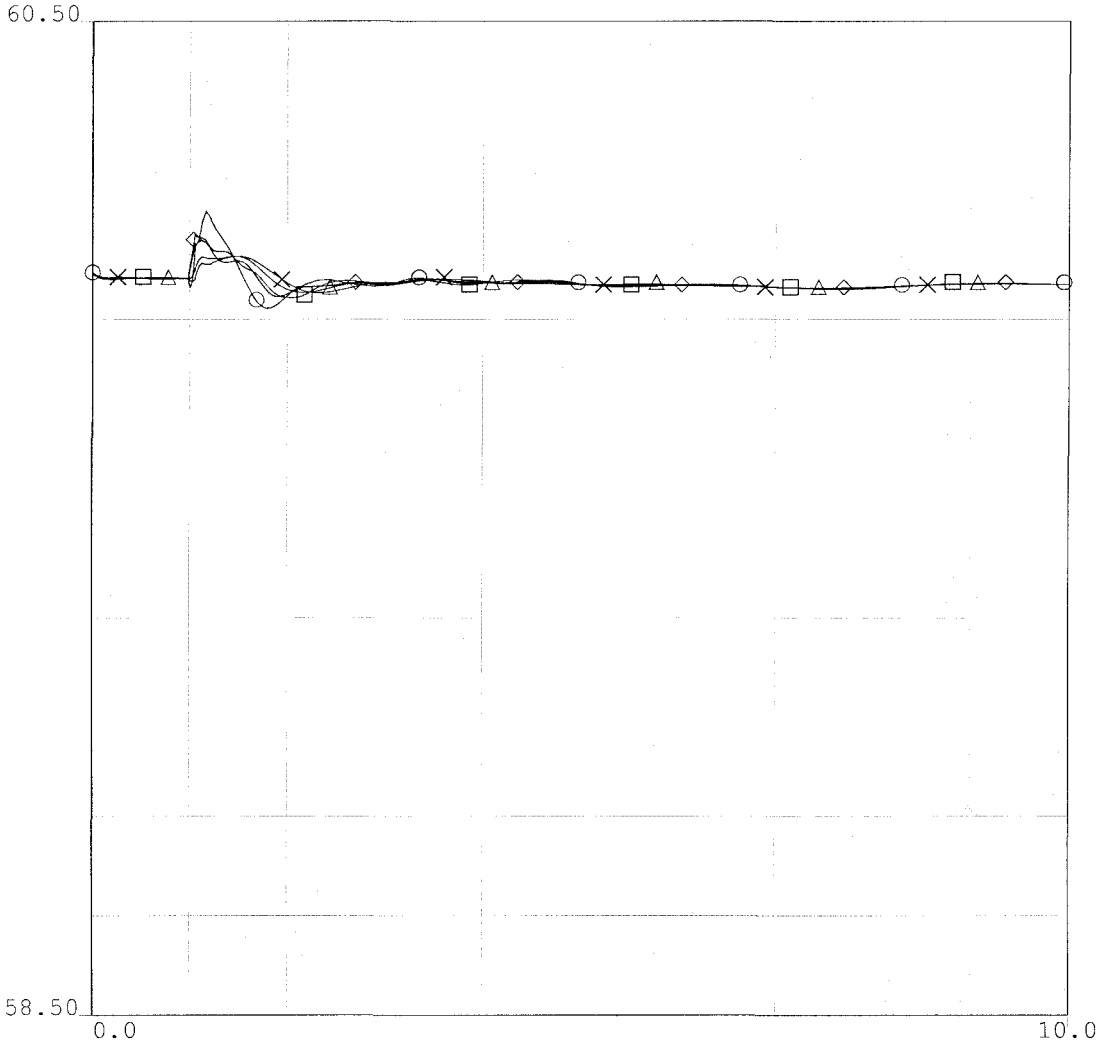
Frequencies:



58.5000	fbus	16000	TORTOLIT 500.0	0	0.0	1	1	60.5000
58.5000	fbus	16105	VAIL 345.0	0	0.0	1	1	60.5000
58.5000	fbus	16103	SOUTH 345.0	0	0.0	1	1	60.5000
58.5000	fbul	15001	CORONADO 500.0	0	0.0	1	1	60.5000
58.5000	fbus	16109	WINCHSTR 345.0	0	0.0	1	1	60.5000

14HS-TS9:THREE PHASE FAULT CLEARING ON MEAD-PERKINS 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

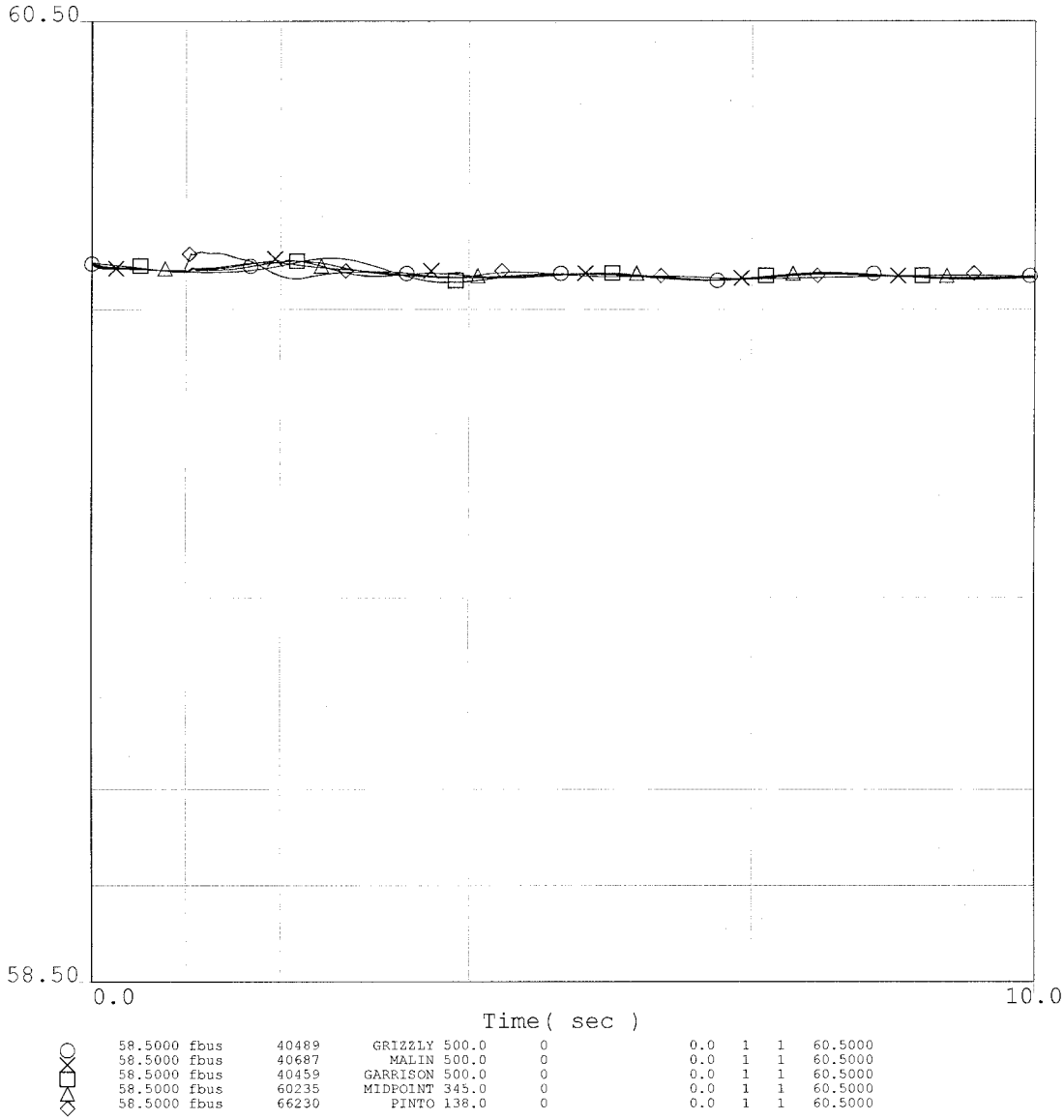
Frequencies:



58.5000	fbul	14231	WESTWNGW 230.0	0	0.0	1	1	60.5000
58.5000	fbus	26003	ADELANTO 500.0	0	0.0	1	1	60.5000
58.5000	fbus	14001	FOURCORN 500.0	0	0.0	1	1	60.5000
58.5000	fbus	26048	MCCULLGH 500.0	0	0.0	1	1	60.5000
58.5000	fbus	14003	NAVAJO 500.0	0	0.0	1	1	60.5000

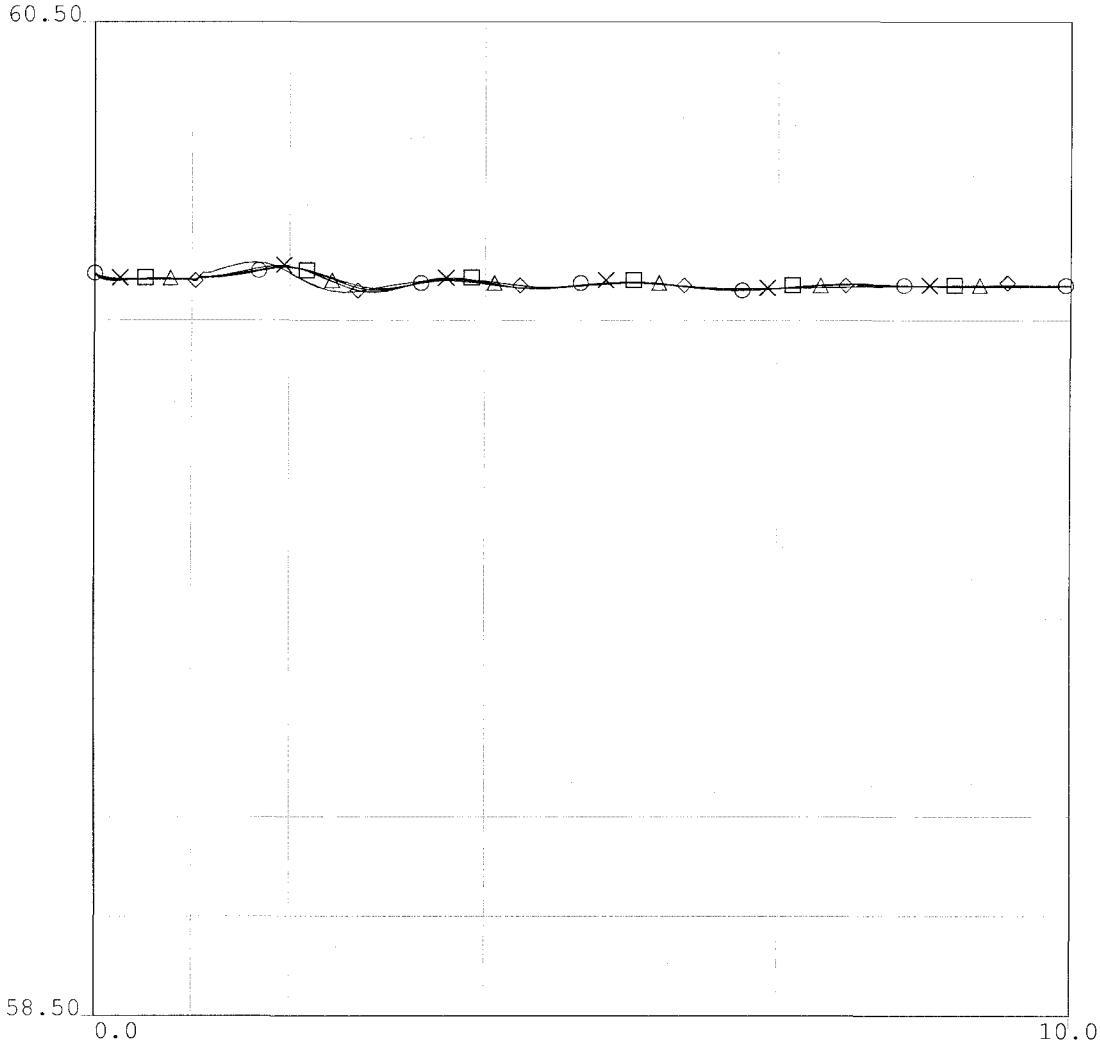
14HS-TS9:THREE PHASE FAULT CLEARING ON MEAD-PERKINS 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

Frequencies:



14HS-TS9:THREE PHASE FAULT CLEARING ON MEAD-PERKINS 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

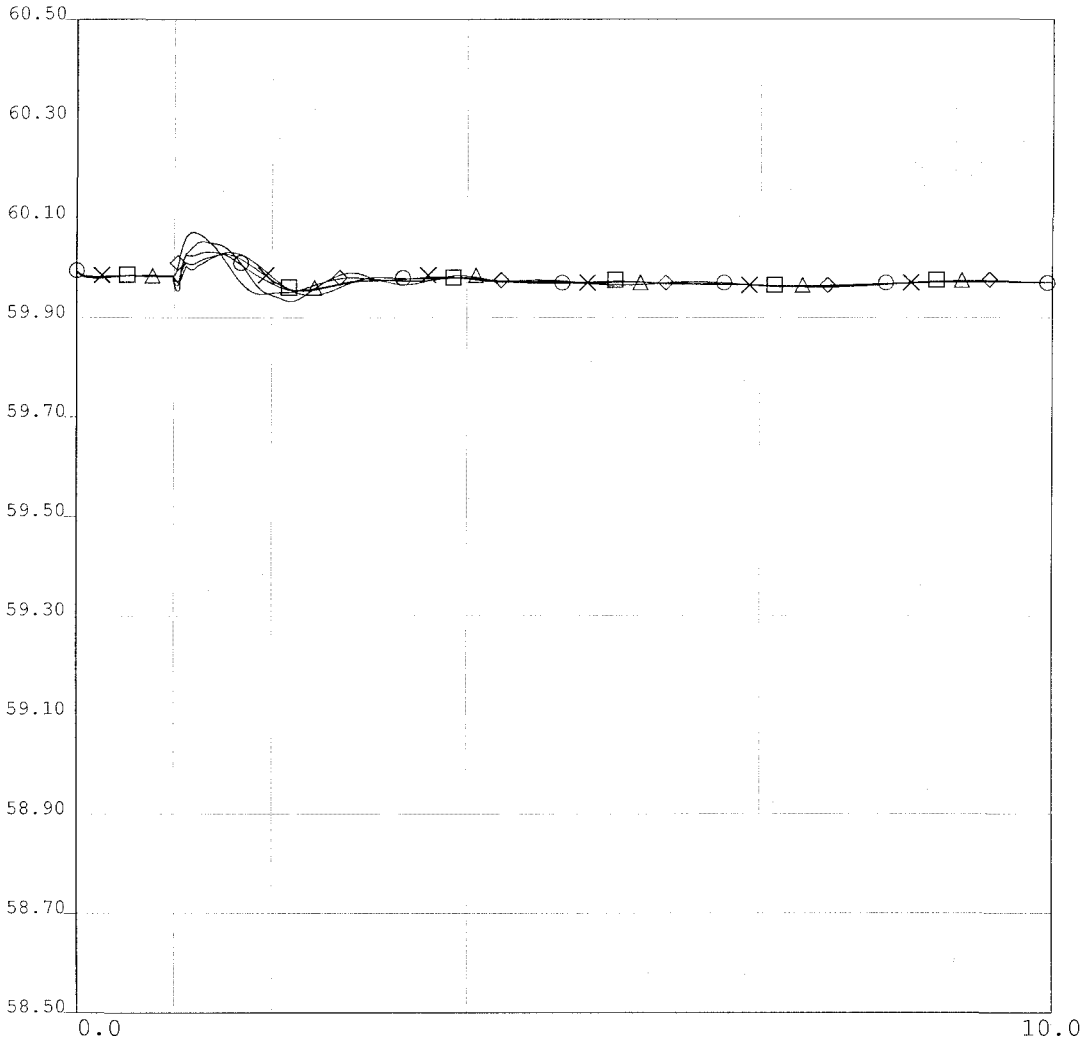
Frequencies:



58.5000 fbus	30005	ROUND MT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30015	TABLE MT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30035	TRACY 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30040	TESLA 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30060	MIDWAY 500.0	0	0.0	1	1	60.5000

14HS-TS9:THREE PHASE FAULT CLEARING ON MEAD-PERKINS 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

Frequencies:



58.5000 fbus	24801	DEVERS 500.0	0	0.0	1	1	60.5000
58.5000 fbus	24086	LUGO 500.0	0	0.0	1	1	60.5000
58.5000 fbus	26094	SYLMARLA 230.0	0	0.0	1	1	60.5000
58.5000 fbus	22468	MIGUEL 500.0	0	0.0	1	1	60.5000
58.5000 fbus	22536	N.GILA 500.0	0	0.0	1	1	60.5000

14HS-TS9:THREE PHASE FAULT CLEARING ON MEAD-PERKINS 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

HIGHEST VOLTAGE DIP

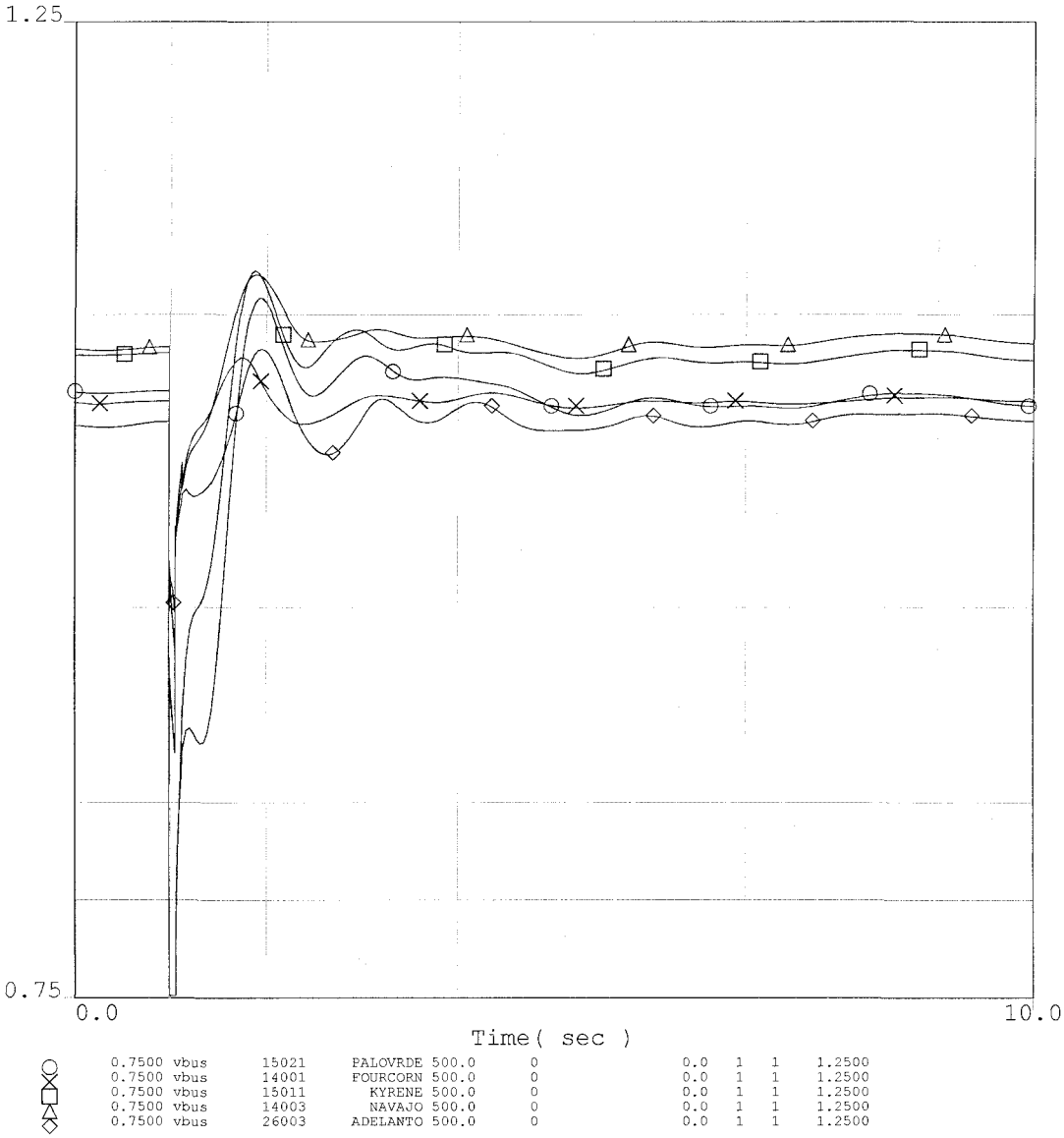
AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct	@time
14	AF-NORTH	69	vbul	1.03	1.009	2	1.517
24	COLRIVER	500	vbus	1.06	1.032	2.7	1.517
24	DEVRSVC1	500	vbug	1.06	1.045	1.4	1.517

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
14	BAGDAD	115	fbul	59.695	1.046
11	NEWMAN	115	fbus	59.852	2.2
11	NEWMN4C	13.8	fbug	59.822	2.2

There were 0 violations of MORC criteria 1 (25% Voltage Dip) !
There were 0 violations of MORC criteria 2 (20% Voltage Dip for 20 Cycles)!
There were 0 violations of MORC criteria 3 (59.6 HZ for 6 Cycles)!

ARIZONA_voltages:



14HS-TS10:THREE PHASE FAULT CLEARING ON ONE PALO VERDE-WESTWING LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

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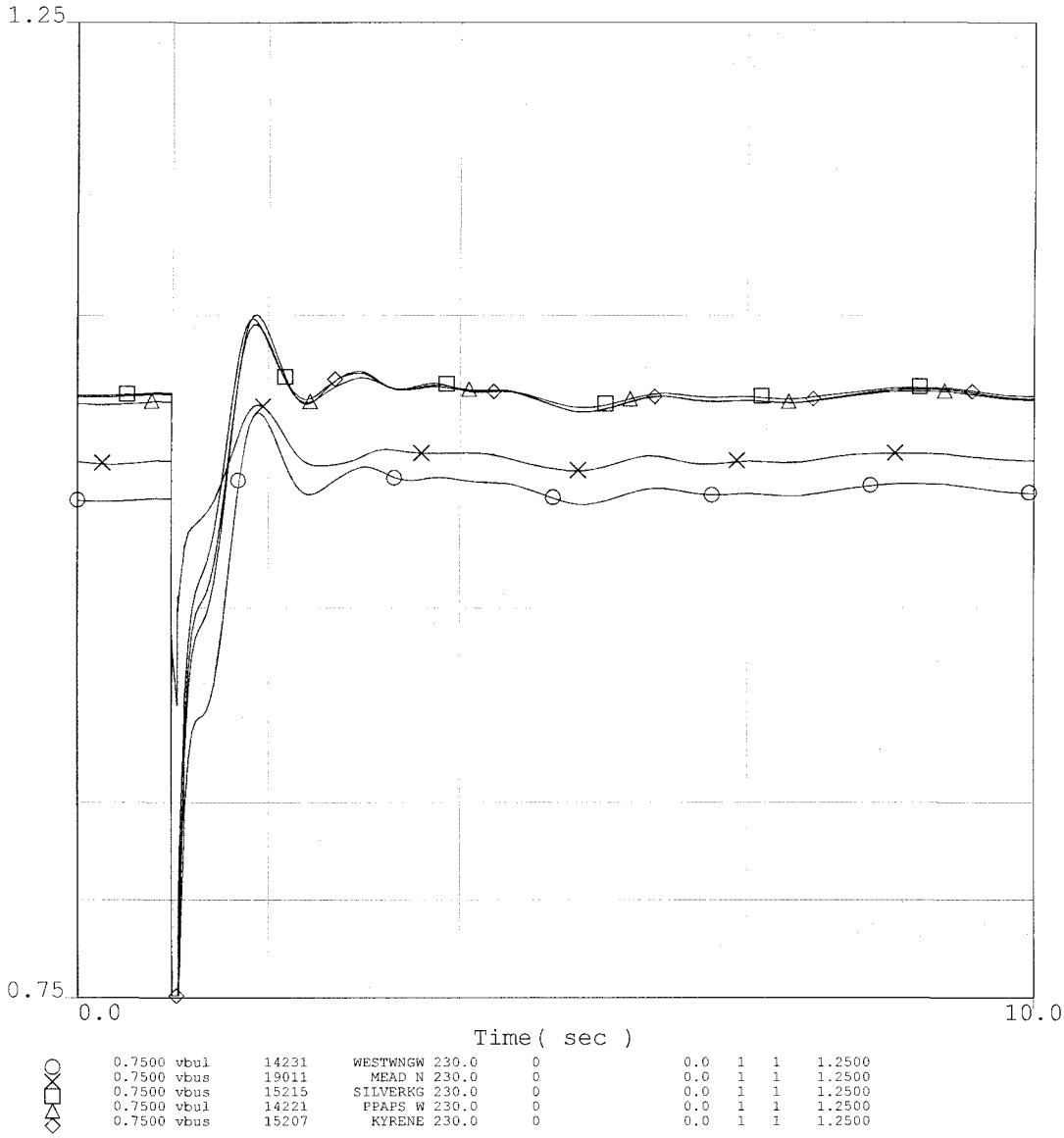
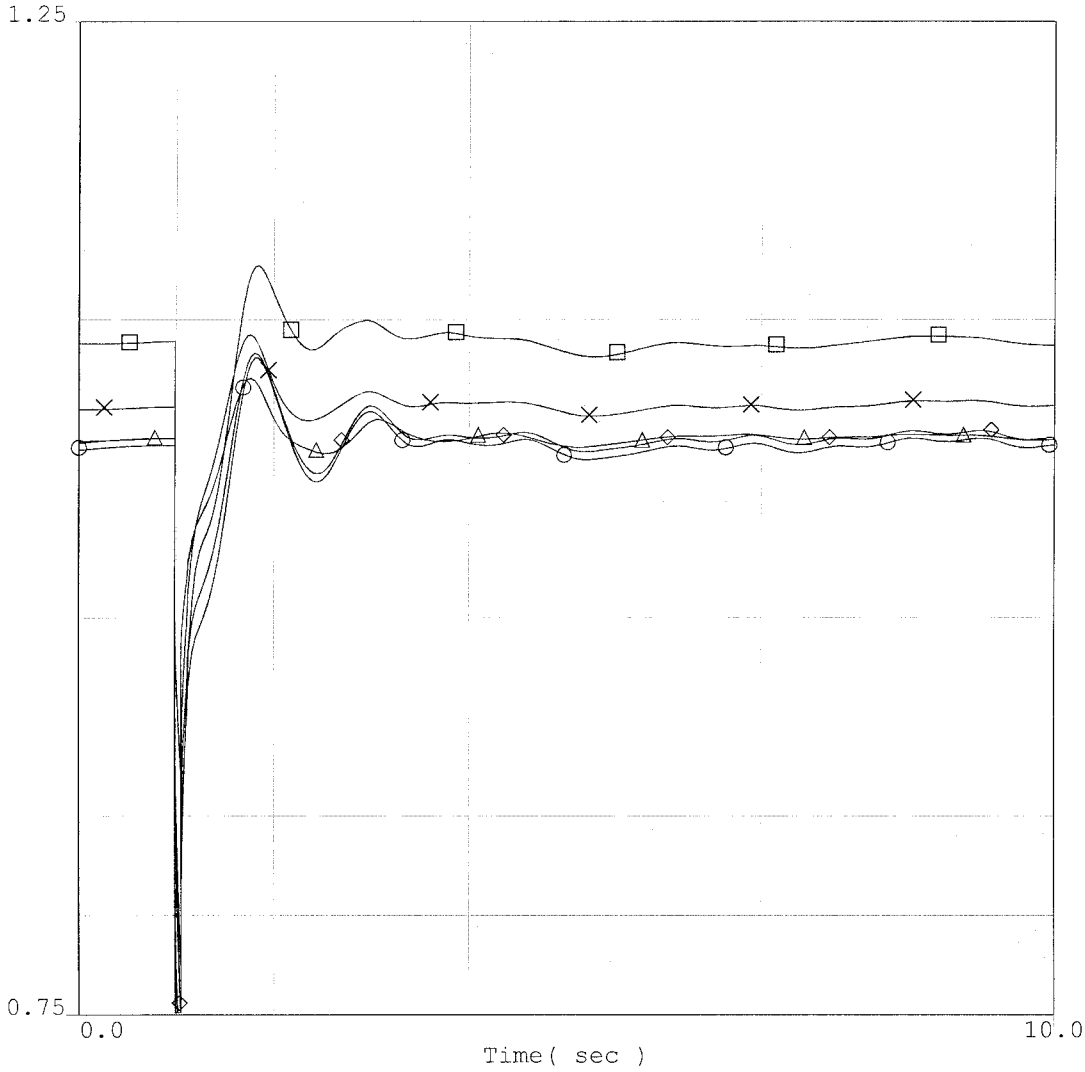
ARIZONA_voltages:



14HS-TS10:THREE PHASE FAULT CLEARING ON ONE PALO VERDE-WESTWING LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

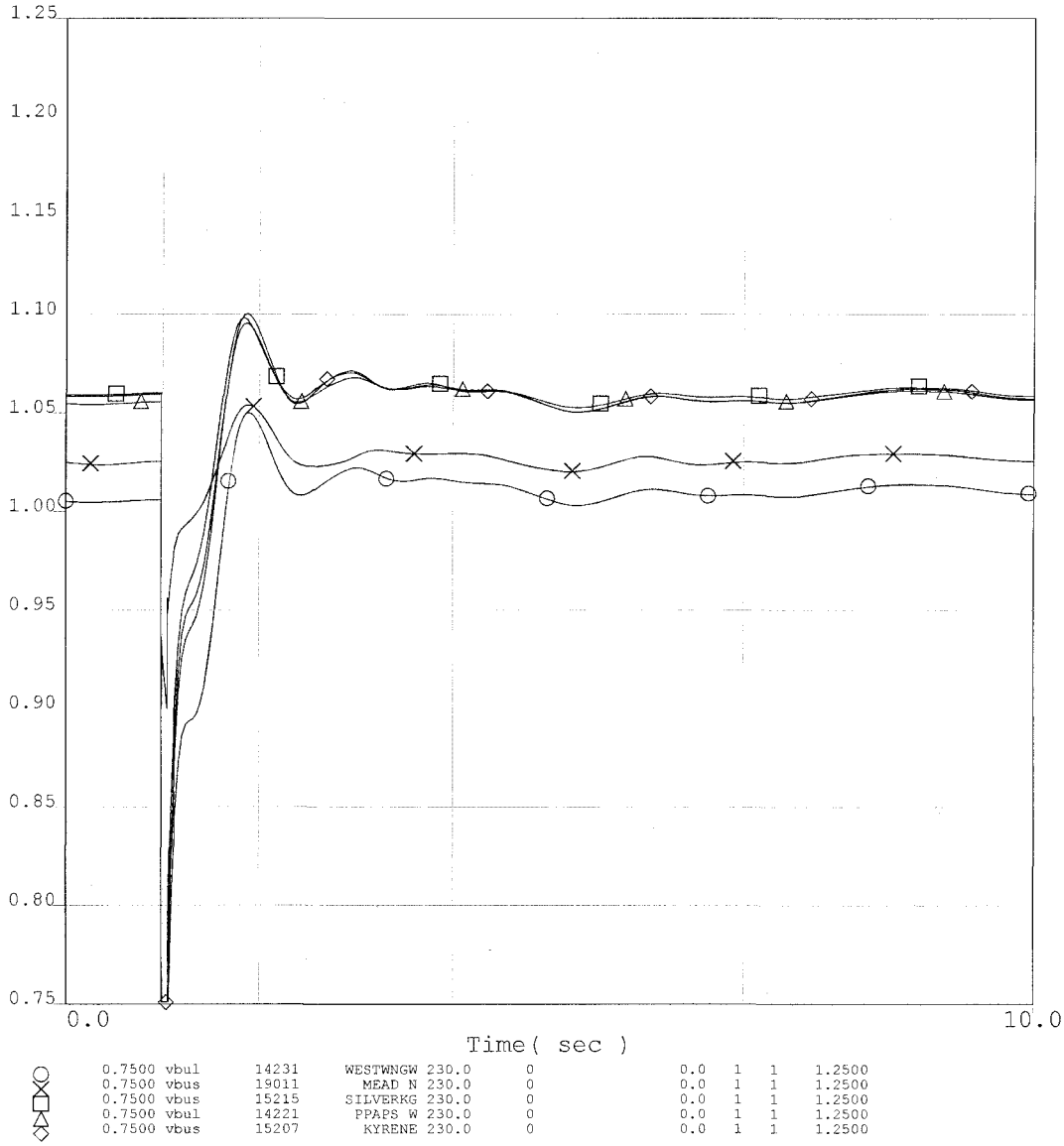
ARIZONA_voltages:



0.7500 vbus	16103	SOUTH 345.0	0	0.0	1	1	1.2500
0.7500 vbus	14000	CHOLLA 500.0	0	0.0	1	1	1.2500
0.7500 vbus	15041	SILVERKG 500.0	0	0.0	1	1	1.2500
0.7500 vbus	16104	SPRINGR 345.0	0	0.0	1	1	1.2500
0.7500 vbus	16109	WINCHSTR 345.0	0	0.0	1	1	1.2500

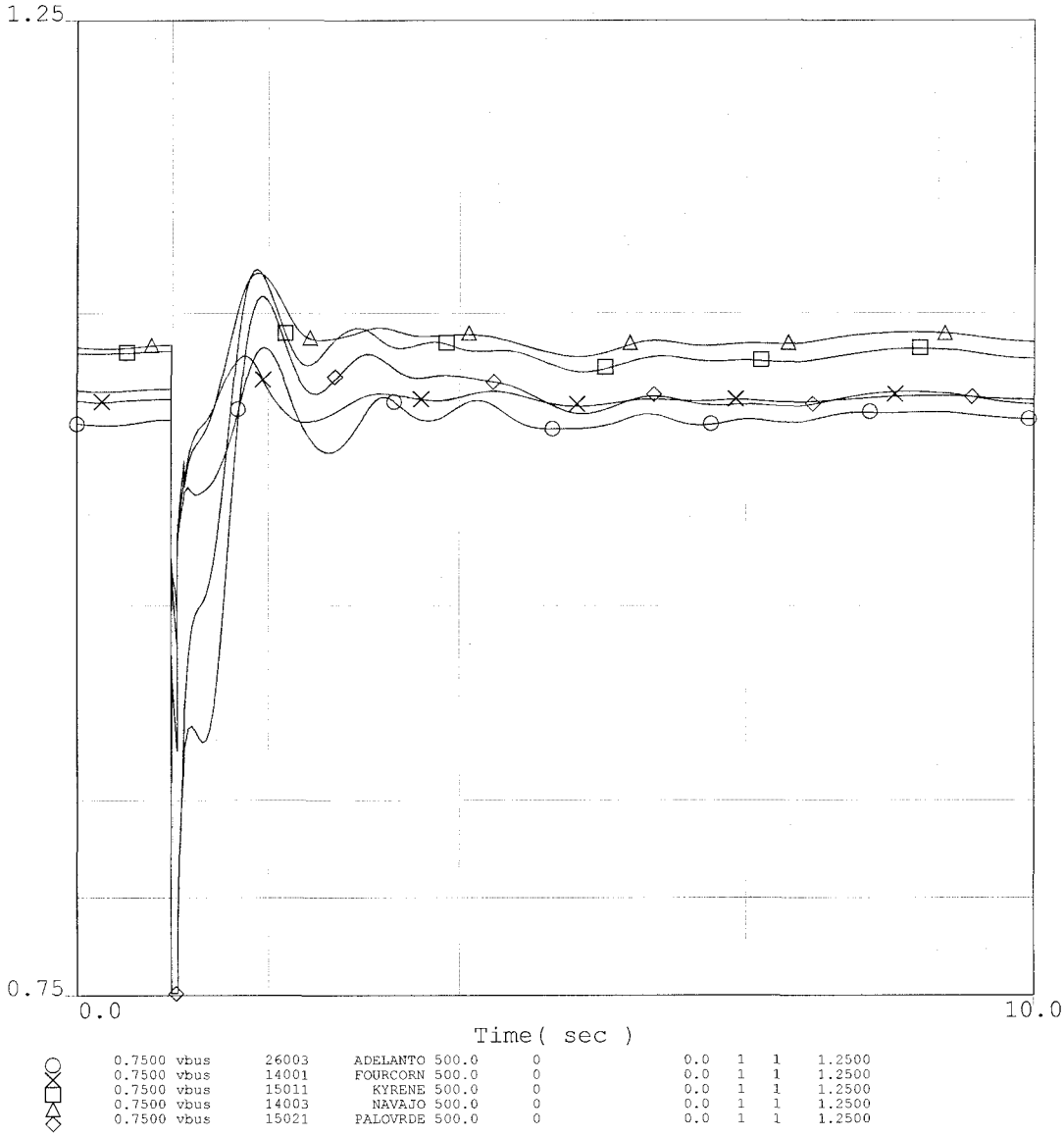
14HS-TS10:THREE PHASE FAULT CLEARING ON ONE PALO VERDE-WESTWING LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

ARIZONA_voltages:



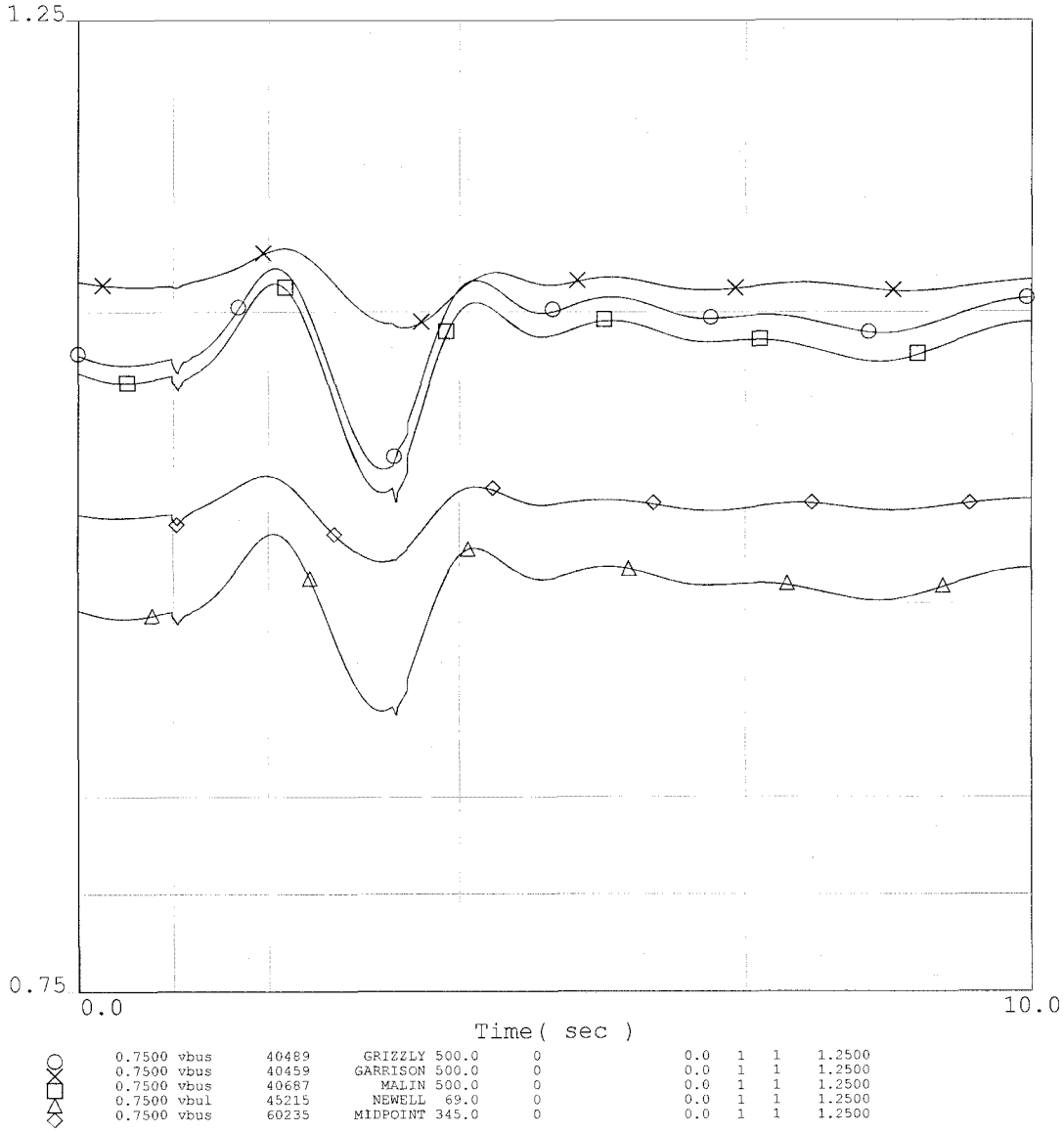
14HS-TS10:THREE PHASE FAULT CLEARING ON ONE PALO VERDE-WESTWING LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

ARIZONA_voltages:



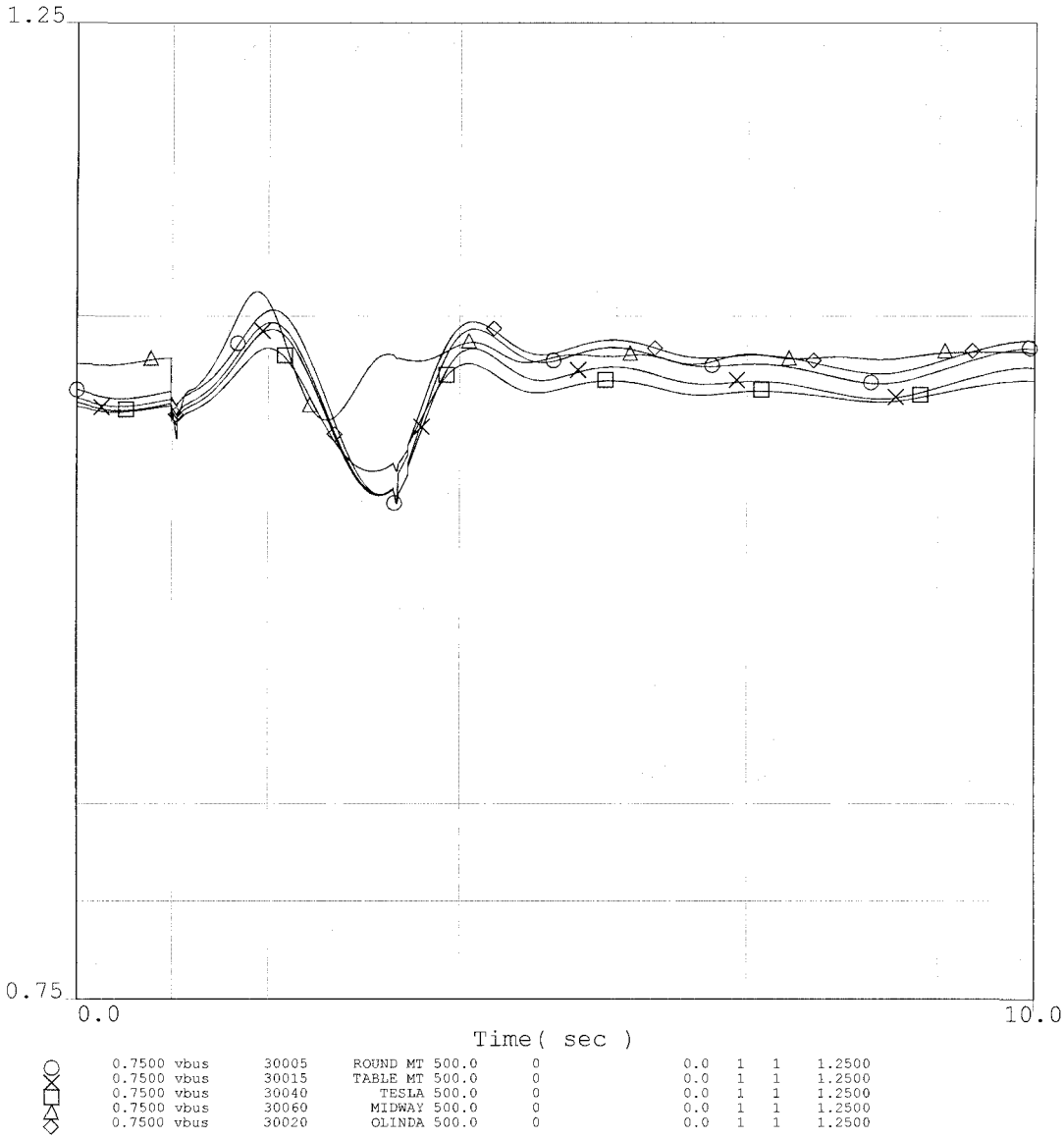
14HS-TS10:THREE PHASE FAULT CLEARING ON ONE PALO VERDE-WESTWING LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

NORTHWEST_voltages:



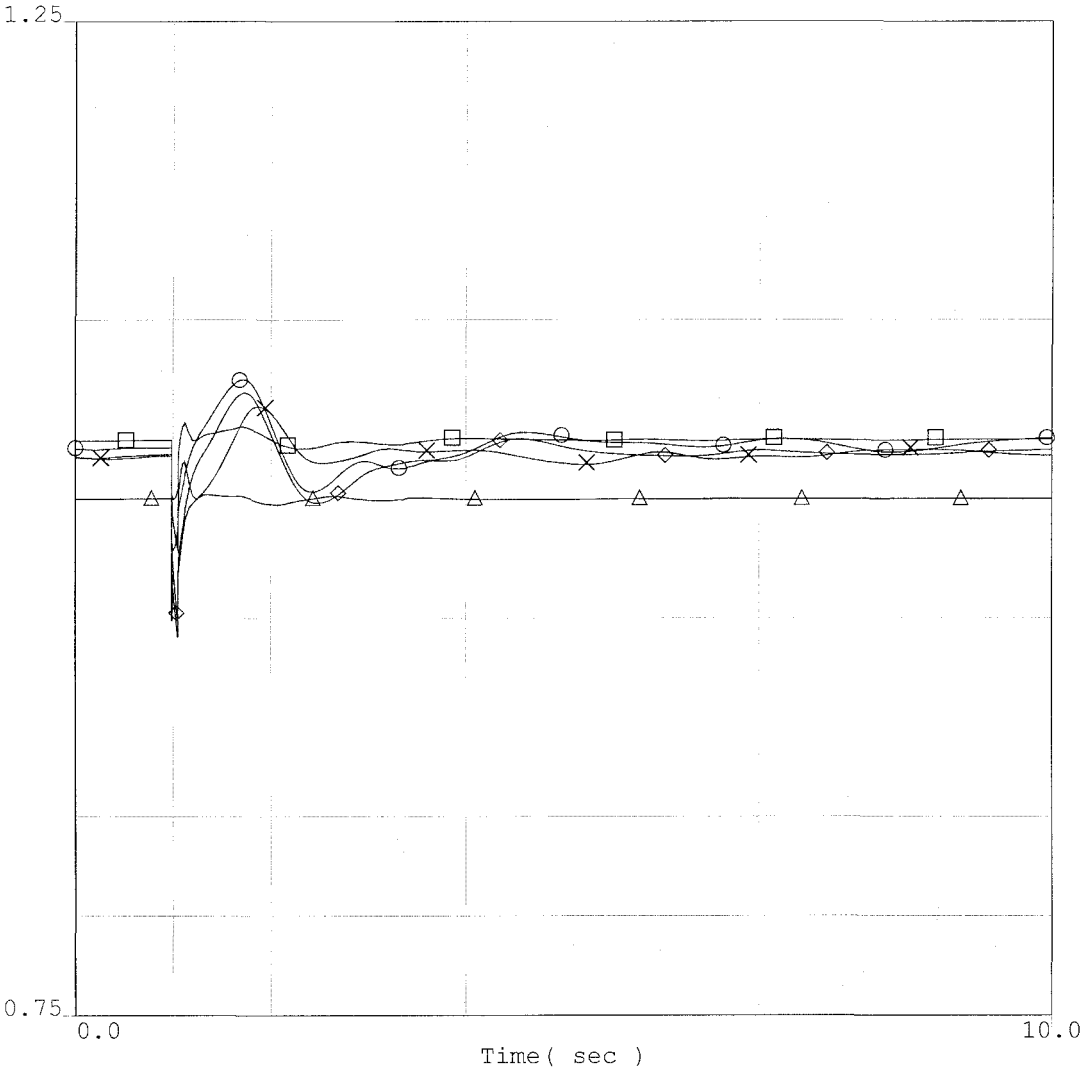
14HS-TS10:THREE PHASE FAULT CLEARING ON ONE PALO VERDE-WESTWING LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

CALIFORNIA_voltages:



14HS-TS10:THREE PHASE FAULT CLEARING ON ONE PALO VERDE-WESTWING LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

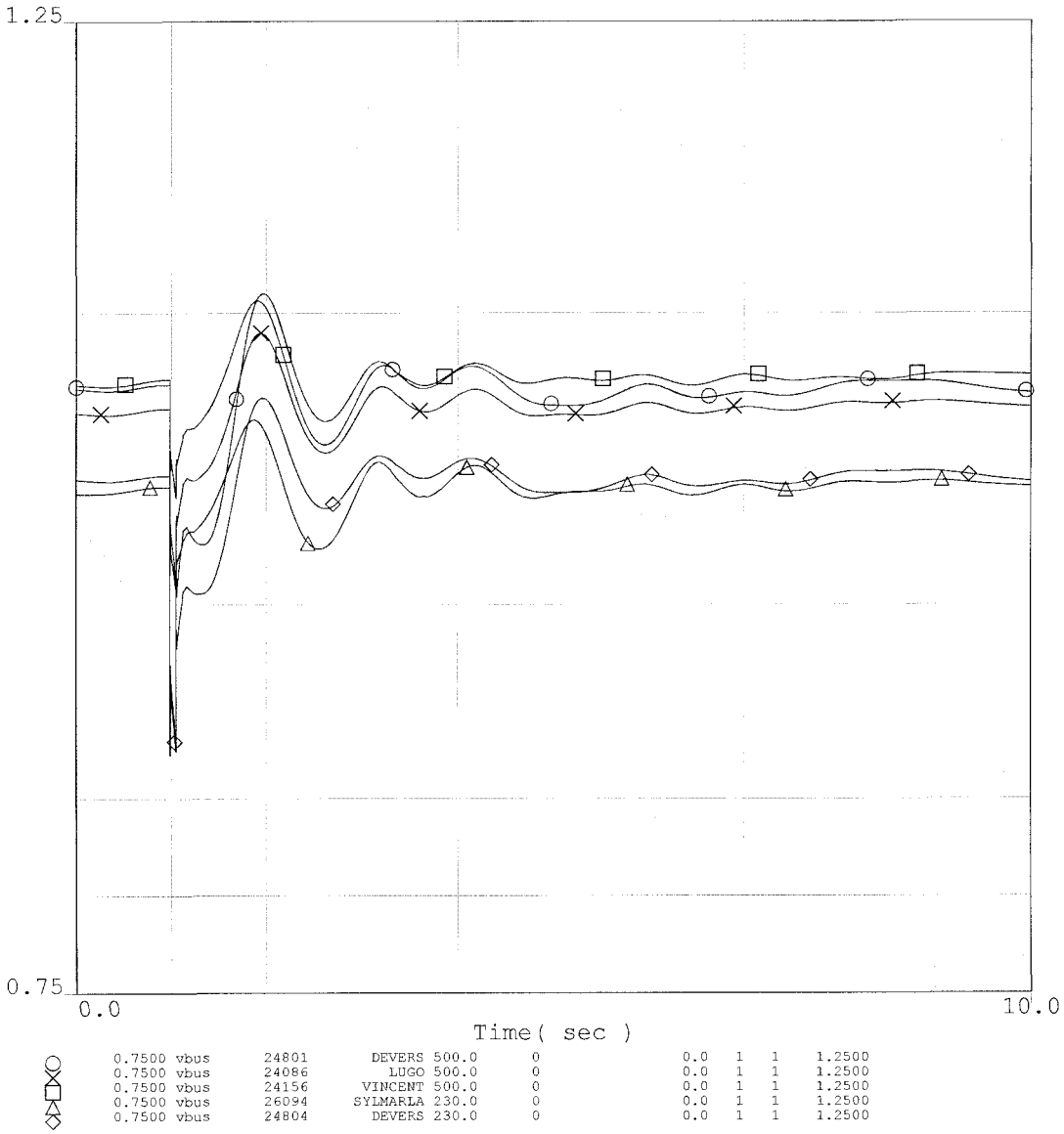
UTAH_voltages:



0.7500 vbus	66230	PINTO 138.0	0	0.0	1	1	1.2500
0.7500 vbus	18019	H ALLEN 230.0	0	0.0	1	1	1.2500
0.7500 vbus	66280	REDBUTTE 345.0	0	0.0	1	1	1.2500
0.7500 vbus	66420	SGSY 138.0	0	0.0	1	1	1.2500
0.7500 vbus	79023	DURANGO 115.0	0	0.0	1	1	1.2500

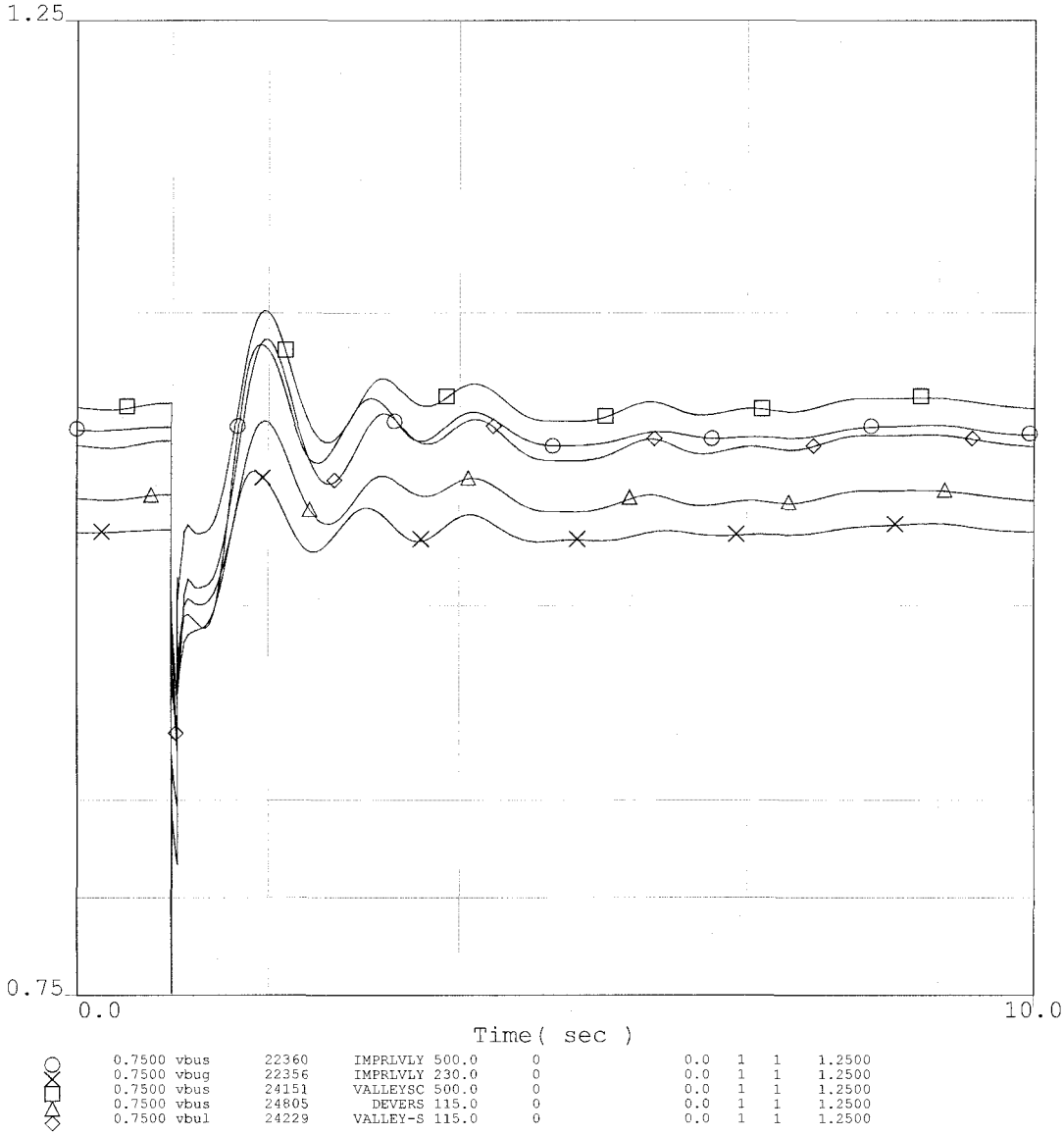
14HS-TS10:THREE PHASE FAULT CLEARING ON ONE PALO VERDE-WESTWING LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

CALIFORNIA_voltages:



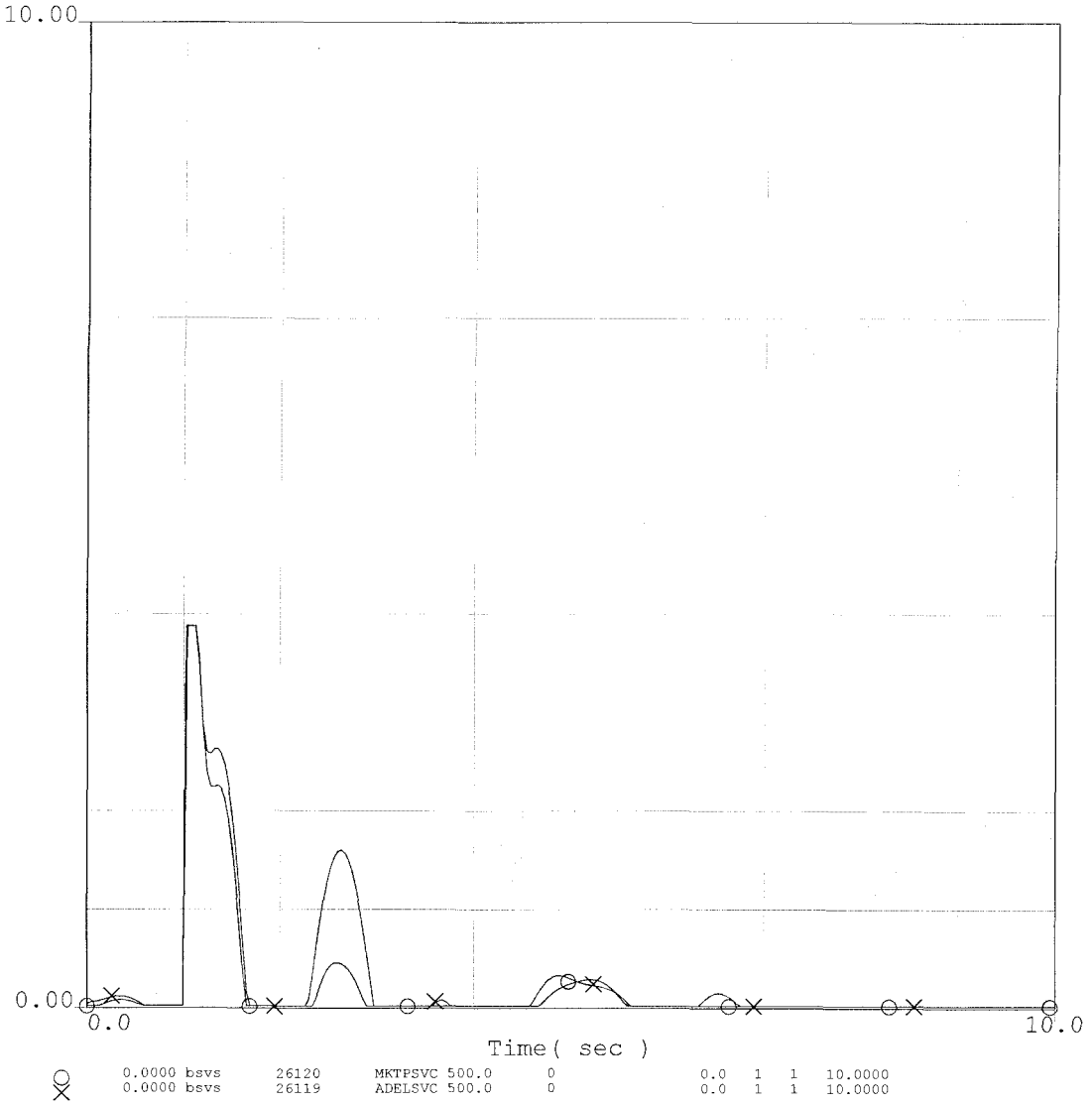
14HS-TS10:THREE PHASE FAULT CLEARING ON ONE PALO VERDE-WESTWING LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

CALIFORNIA_voltages:



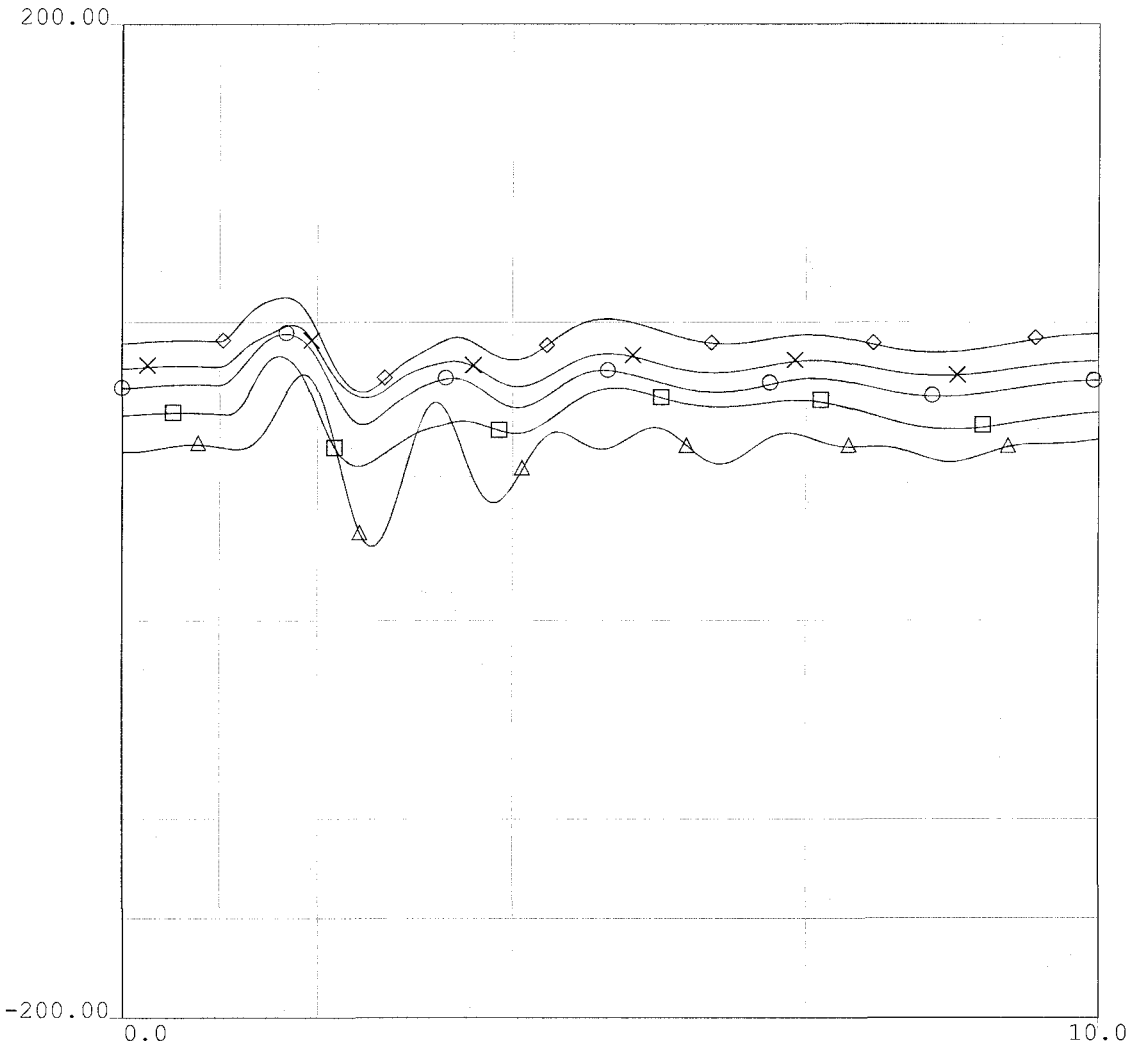
14HS-TS10:THREE PHASE FAULT CLEARING ON ONE PALO VERDE-WESTWING LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

SVC_output



14HS-TS10:THREE PHASE FAULT CLEARING ON ONE PALO VERDE-WESTWING LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

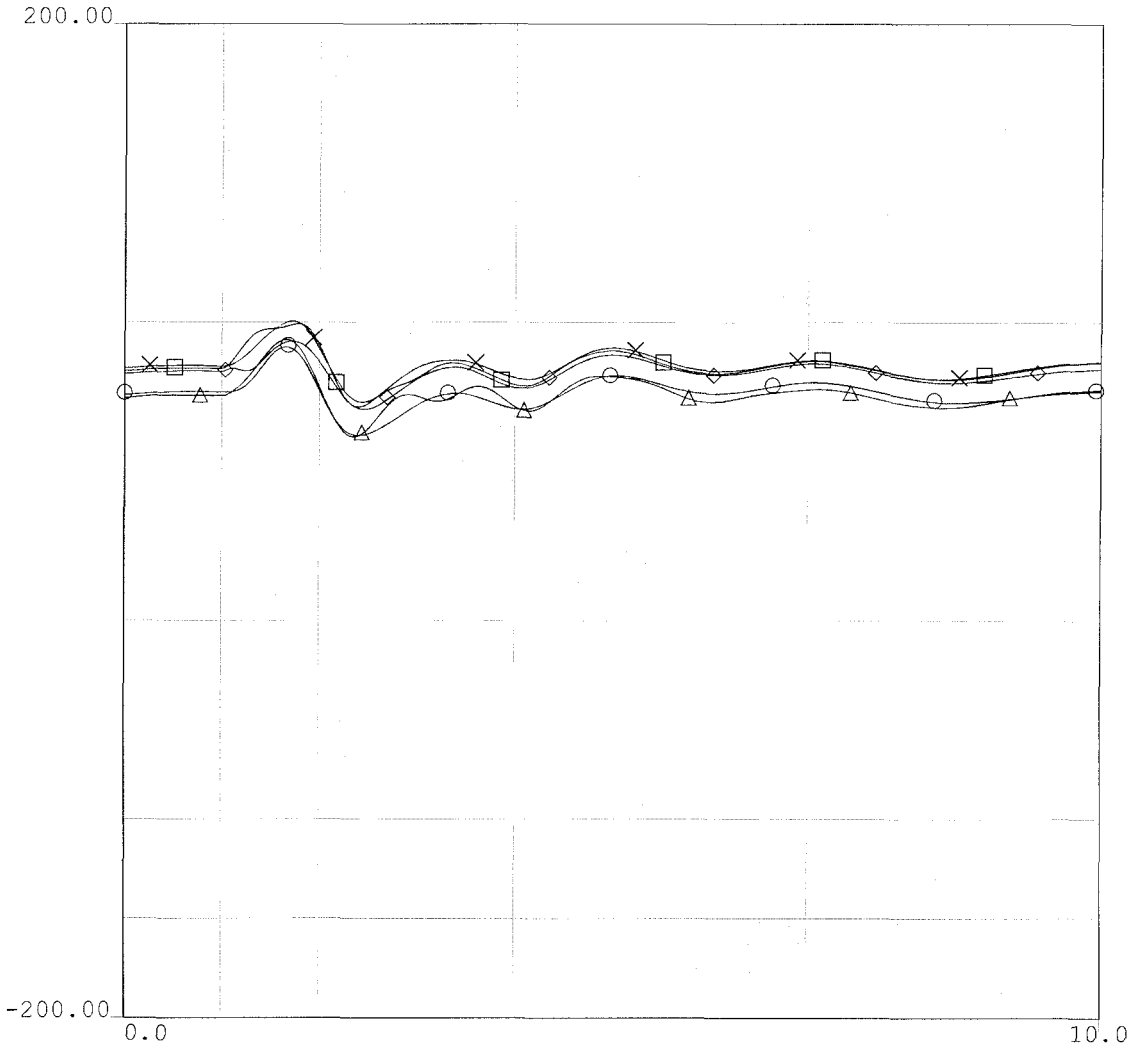
SYSTEM_Rotorangles



-200.0000 ang	16500	SPR GEN1	19.0	0	0.0	1	1	200.0000
-200.0000 ang	10321	SJUAN_G4	22.0	0	0.0	1	1	200.0000
-200.0000 ang	14942	SAGUARO2	15.5	0	0.0	1	1	200.0000
-200.0000 ang	17024	APACHCT1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	16518	SPR GEN3	21.0	0	0.0	1	1	200.0000

14HS-TS10:THREE PHASE FAULT CLEARING ON ONE PALO VERDE-WESTWING LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

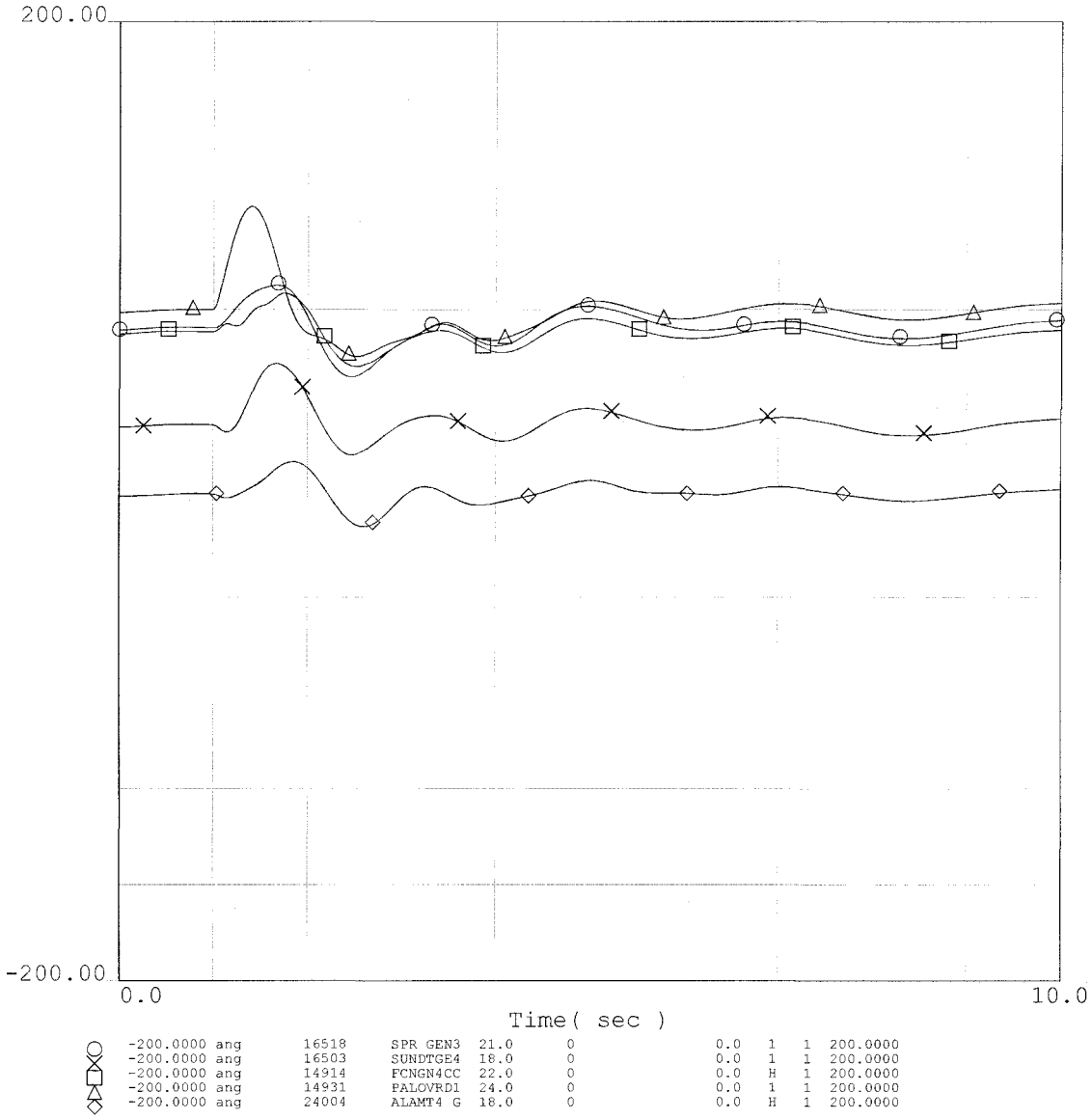
SYSTEM_Rotorangles



-200.0000 ang	15140	DBG-CT1	18.0	0	0.0	1	1	200.0000
-200.0000 ang	14945	SAG. CT3	13.8	0	0.0	1	1	200.0000
-200.0000 ang	14902	CHOLLA3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	15921	SANTAN 1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	14903	CHOLLA4	22.0	0	0.0	1	1	200.0000

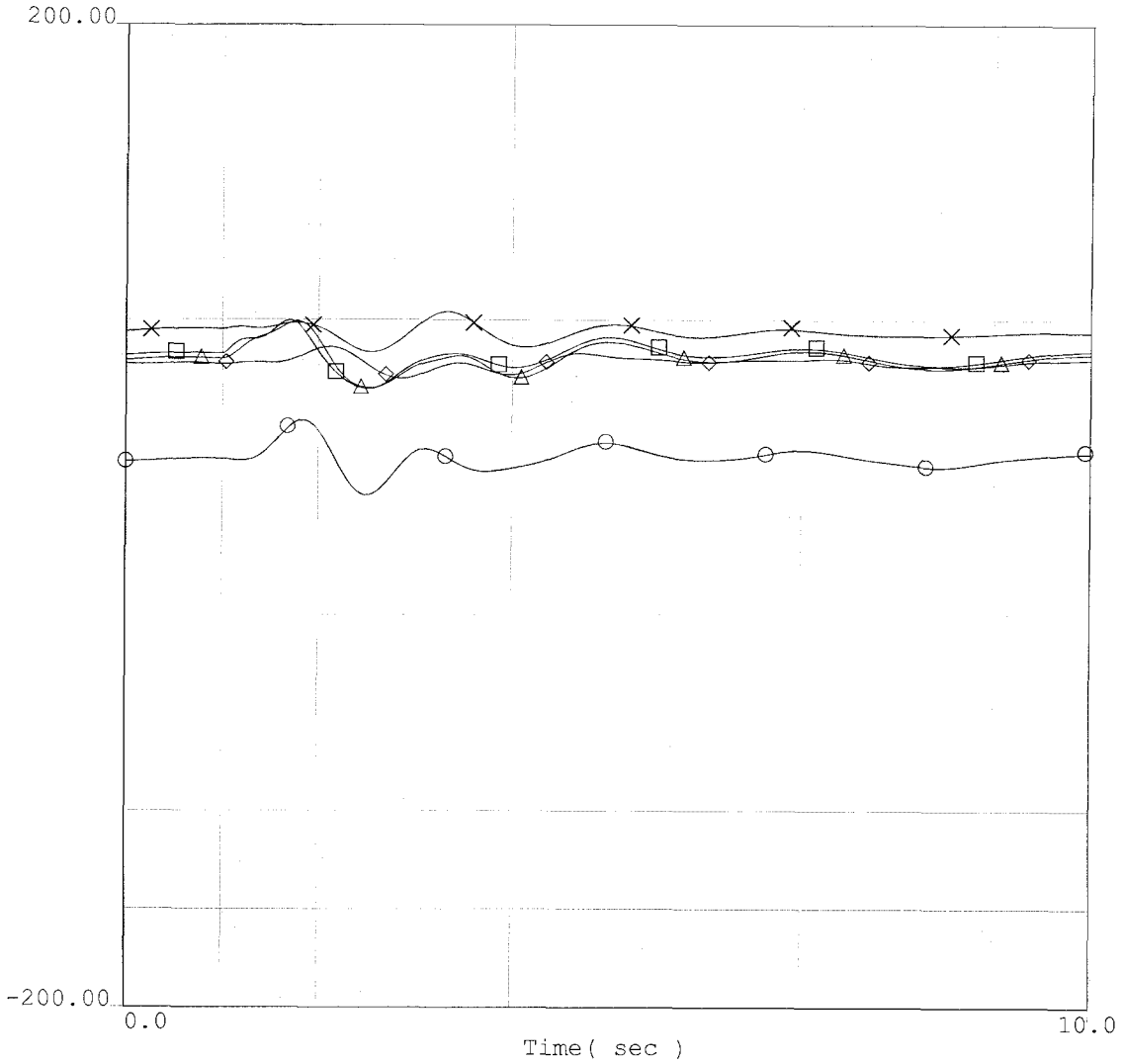
14HS-TS10:THREE PHASE FAULT CLEARING ON ONE PALO VERDE-WESTWING LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

SYSTEM_Rotorangles



14HS-TS10:THREE PHASE FAULT CLEARING ON ONE PALO VERDE-WESTWING LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

SYSTEM_Rotorangles



-200.0000 ang	24129	S.ONOFR2	22.0	0	0.0	1	1	200.0000
-200.0000 ang	26039	INTERM1G	26.0	0	0.0	1	1	200.0000
-200.0000 ang	15981	NAVAJO 1	26.0	0	0.0	1	1	200.0000
-200.0000 ang	10318	SJUAN_G1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	36411	DIABLO 1	25.0	0	0.0	1	1	200.0000

14HS~TS10:THREE PHASE FAULT CLEARING ON ONE PALO VERDE-WESTWING LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

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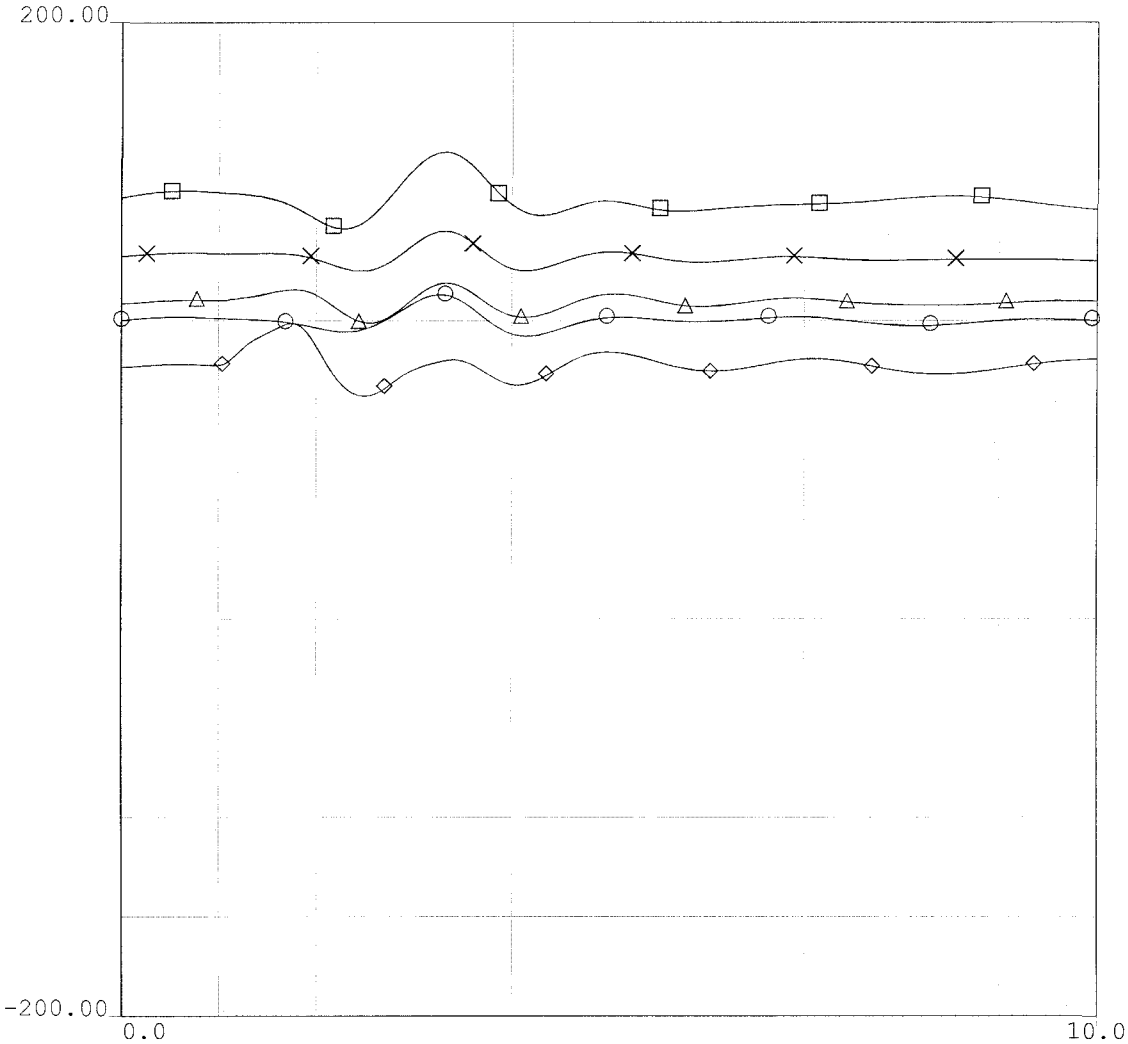
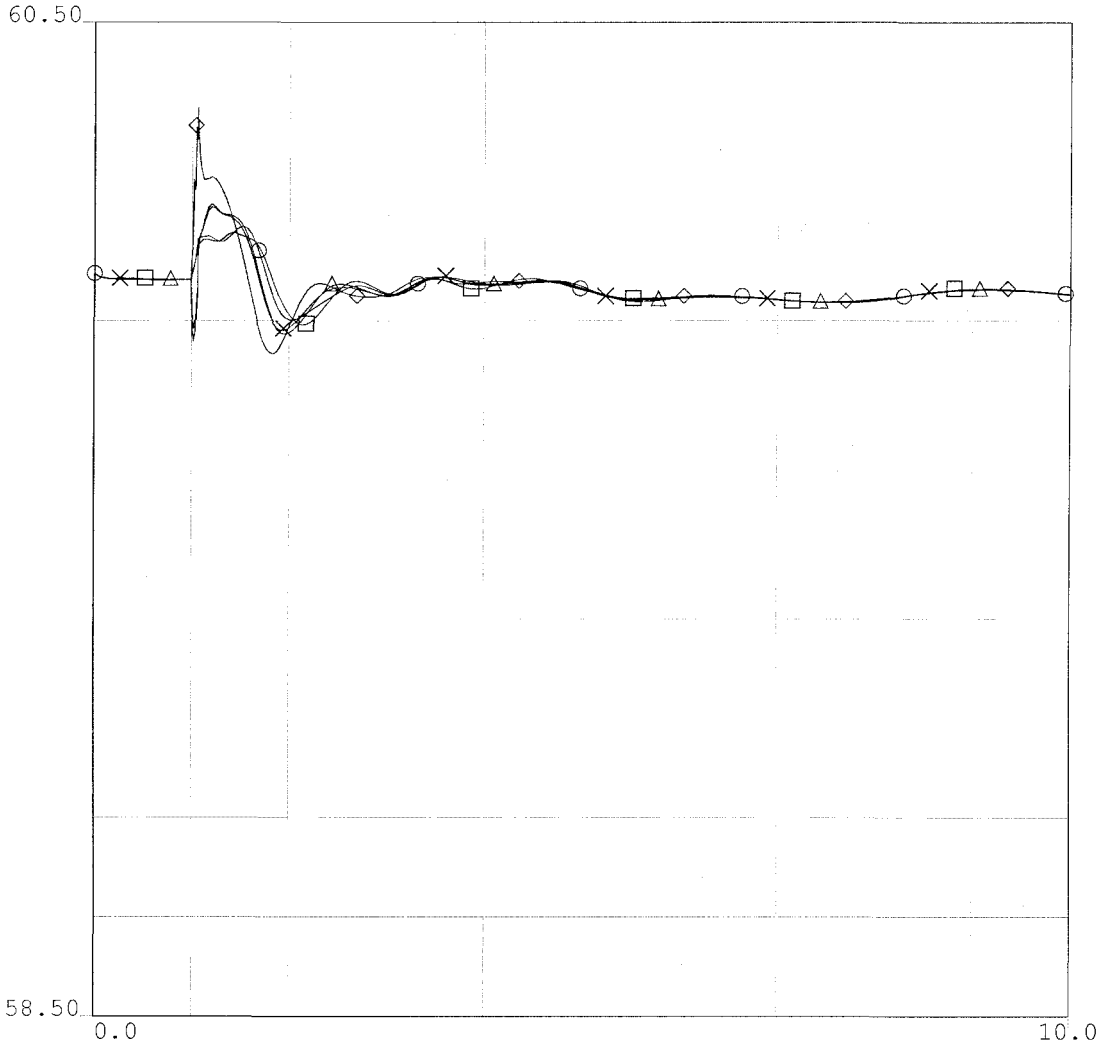
SYSTEM_Rotorangles



-200.0000 ang	73129	MBPP-1	24.0	0	0.0	1	1	200.0000
-200.0000 ang	60086	BRIDGER1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	62050	COLSTP 1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	65500	EHUNTR 3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	10321	SJUAN_G4	22.0	0	0.0	1	1	200.0000

14HS-TS10:THREE PHASE FAULT CLEARING ON ONE PALO VERDE-WESTWING LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

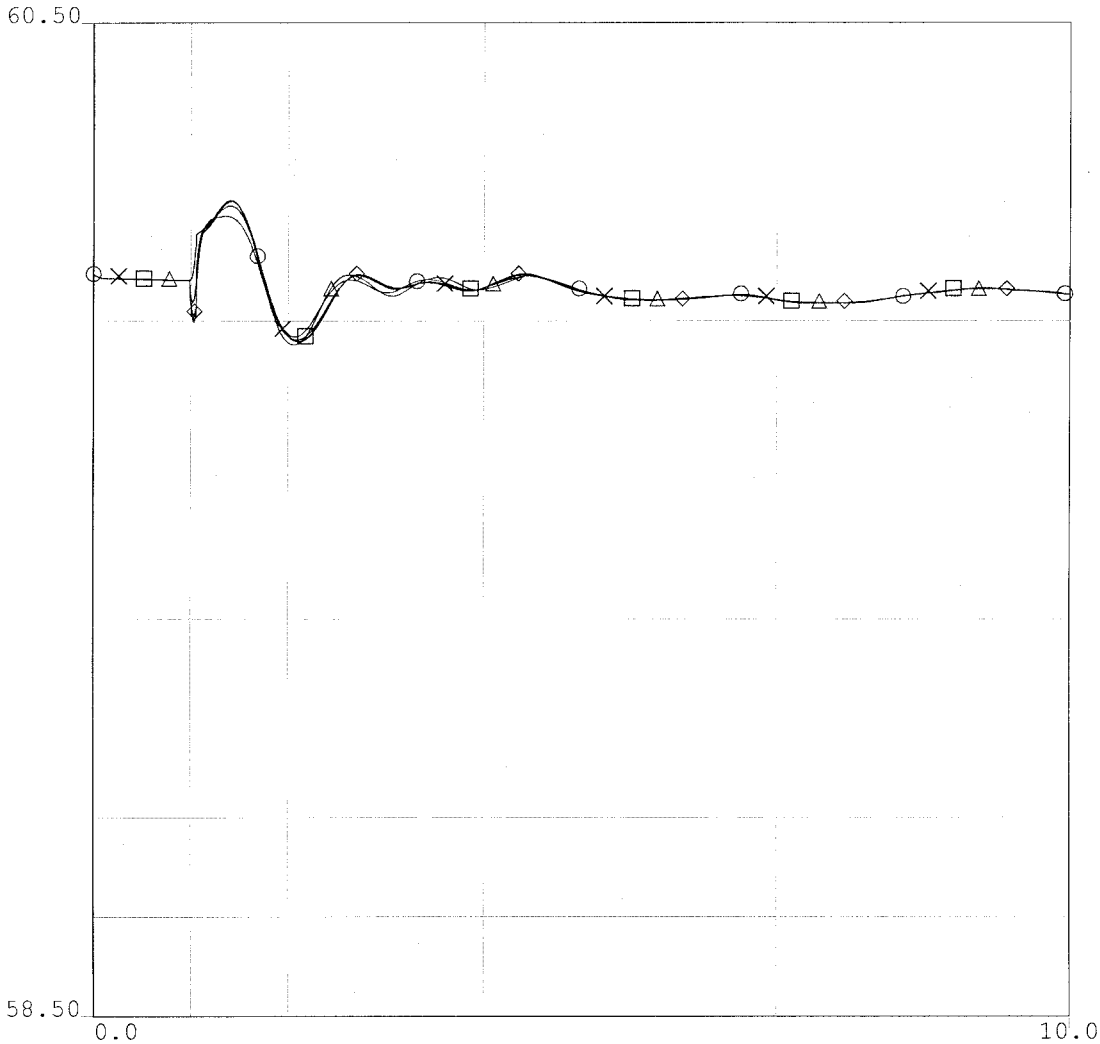
Frequencies:



○	58.5000 fbus	14003	NAVAJO 500.0	0	0.0	1	1	60.5000
⊗	58.5000 fbus	14005	WESTWING 500.0	0	0.0	1	1	60.5000
□	58.5000 fbus	14001	FOURCORN 500.0	0	0.0	1	1	60.5000
△	58.5000 fbus	14016	PNPKAPS 500.0	0	0.0	1	1	60.5000
◇	58.5000 fbus	15021	PALOVRDE 500.0	0	0.0	1	1	60.5000

14HS-TS10:THREE PHASE FAULT CLEARING ON ONE PALO VERDE-WESTWING LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

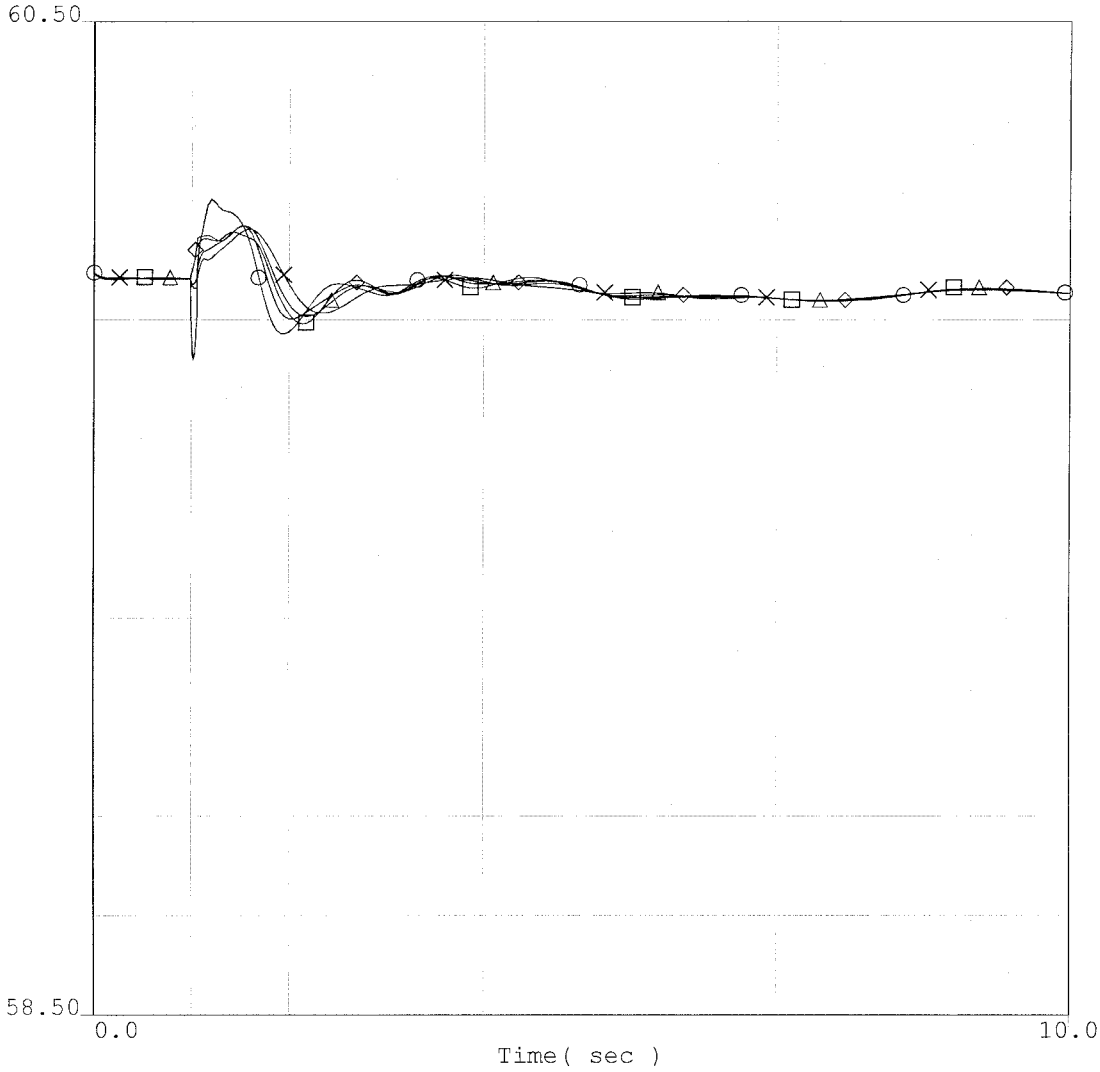
Frequencies:



58.5000 fbus	16000	TORTOLIT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	16105	VAIL 345.0	0	0.0	1	1	60.5000
58.5000 fbus	16103	SOUTH 345.0	0	0.0	1	1	60.5000
58.5000 fbul	15001	CORONADO 500.0	0	0.0	1	1	60.5000
58.5000 fbus	16109	WINCHSTR 345.0	0	0.0	1	1	60.5000

14HS-TS10:THREE PHASE FAULT CLEARING ON ONE PALO VERDE-WESTWING LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

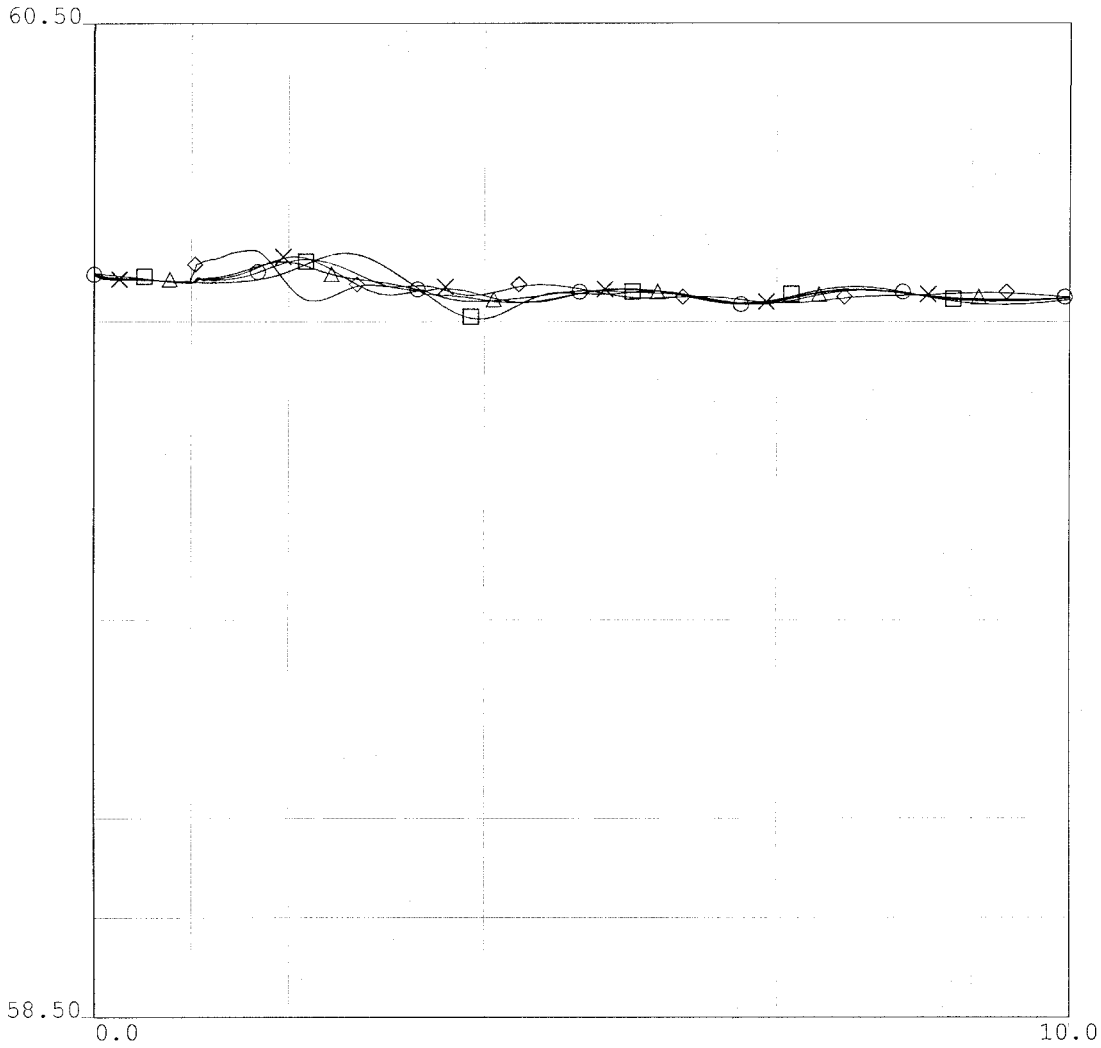
Frequencies:



○	58.5000	fbul	14231	WESTWNGW 230.0	0	0.0	1	1	60.5000
⊠	58.5000	fbus	26003	ADELANTO 500.0	0	0.0	1	1	60.5000
□	58.5000	fbus	14001	FOURCORN 500.0	0	0.0	1	1	60.5000
△	58.5000	fbus	26048	MCCULLGH 500.0	0	0.0	1	1	60.5000
◇	58.5000	fbus	14003	NAVAJO 500.0	0	0.0	1	1	60.5000

14HS-TS10:THREE PHASE FAULT CLEARING ON ONE PALO VERDE-WESTWING LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

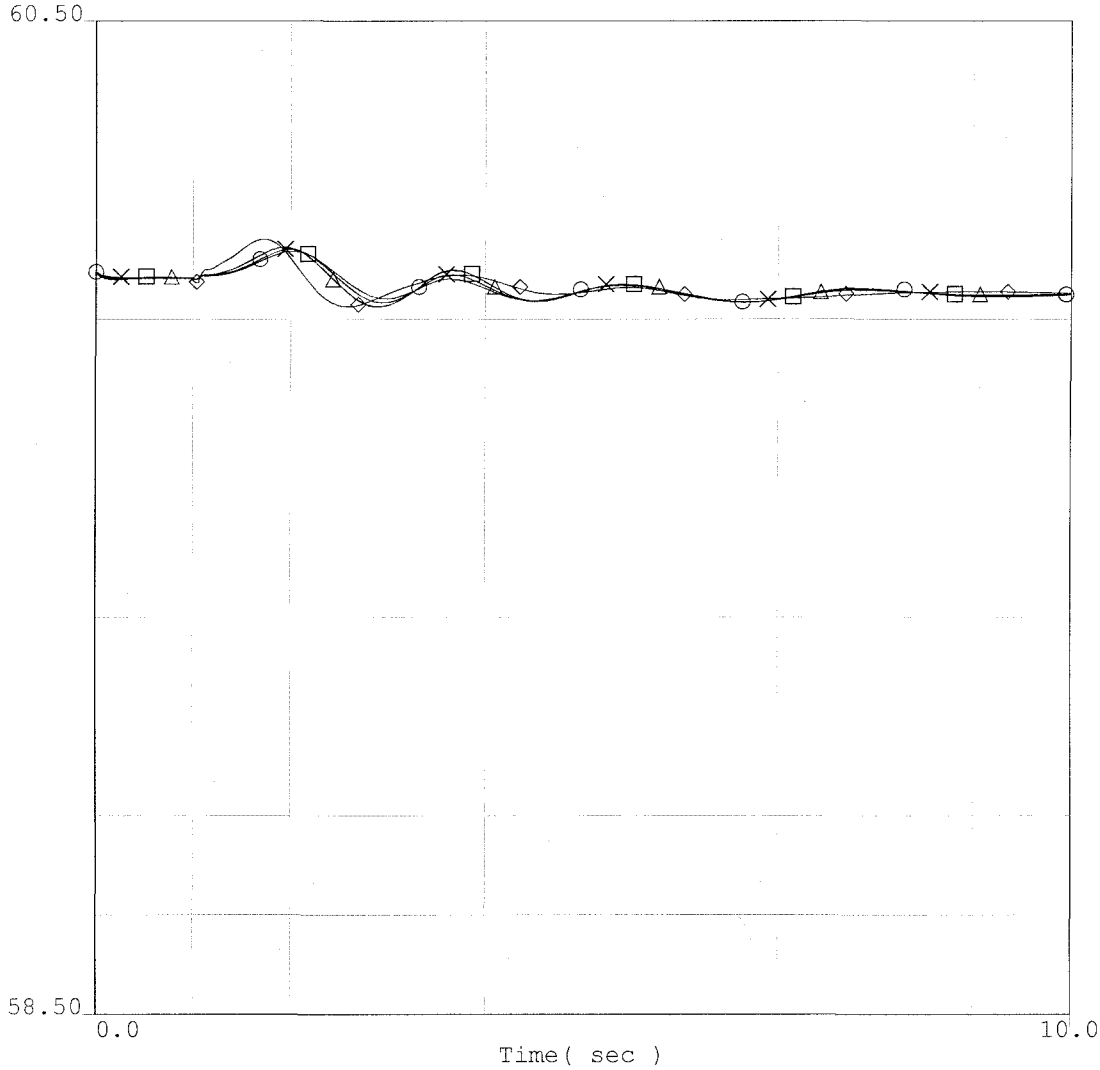
Frequencies:



58.5000 fbus	40489	GRIZZLY 500.0	0	0.0	1	1	60.5000
58.5000 fbus	40687	MALIN 500.0	0	0.0	1	1	60.5000
58.5000 fbus	40459	GARRISON 500.0	0	0.0	1	1	60.5000
58.5000 fbus	60235	MIDPOINT 345.0	0	0.0	1	1	60.5000
58.5000 fbus	66230	PINTO 138.0	0	0.0	1	1	60.5000

14HS-TS10:THREE PHASE FAULT CLEARING ON ONE PALO VERDE-WESTWING LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

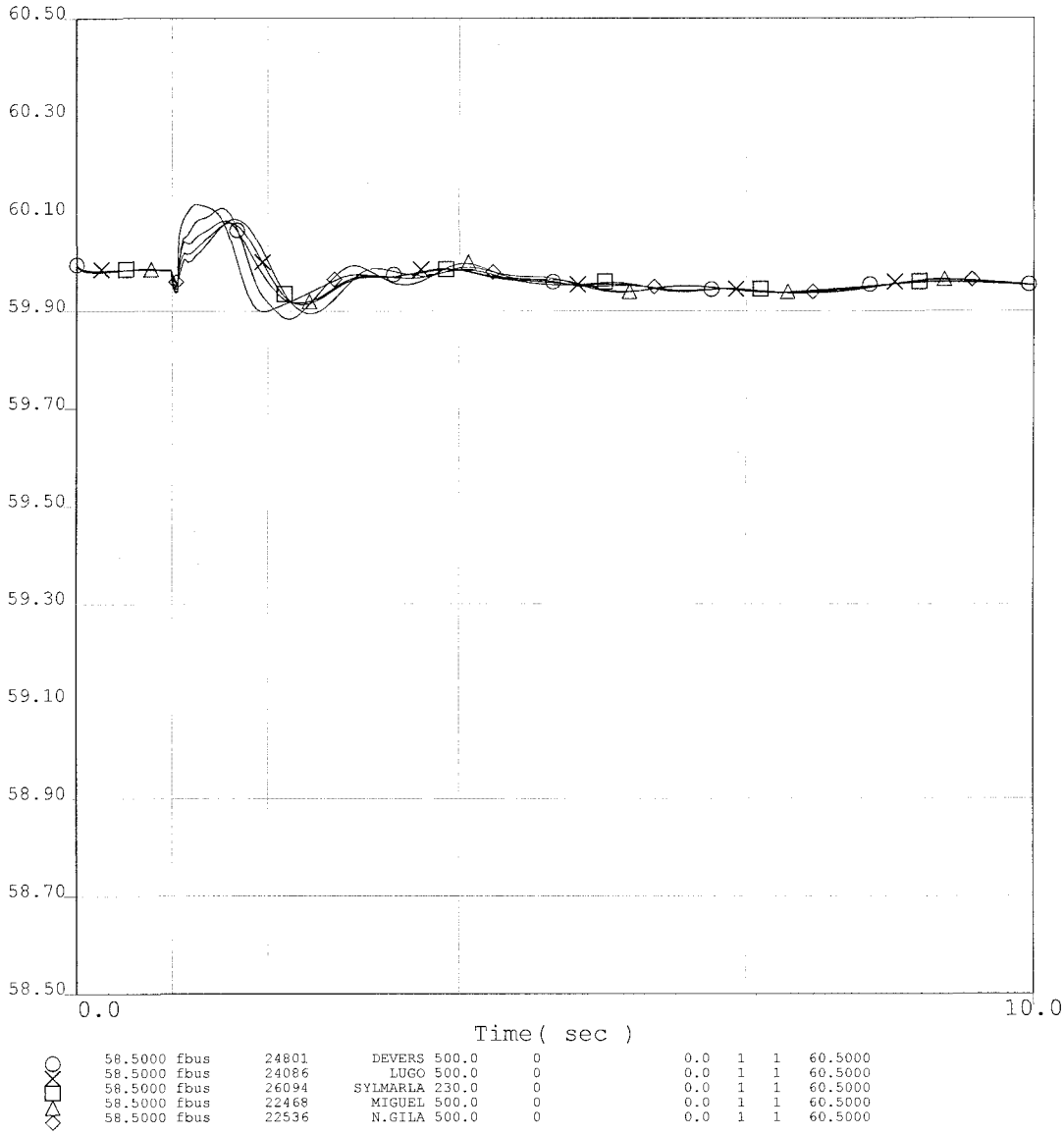
Frequencies:



58.5000 fbus	30005	ROUND MT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30015	TABLE MT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30035	TRACY 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30040	TESLA 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30060	MIDWAY 500.0	0	0.0	1	1	60.5000

14HS-TS10:THREE PHASE FAULT CLEARING ON ONE PALO VERDE-WESTWING LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

Frequencies:



14HS-TS10:THREE PHASE FAULT CLEARING ON ONE PALO VERDE-WESTWING LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

HIGHEST VOLTAGE DIP

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct	@time
14	GILABEND	230	vbul	1.016	0.916	9.9	1.517
14	PALOVRDE	500	vbus	1.059	0.931	12.1	1.517
24	DEVRSVC1	500	vbug	1.06	0.997	5.9	1.517

LOWEST FREQUENCY

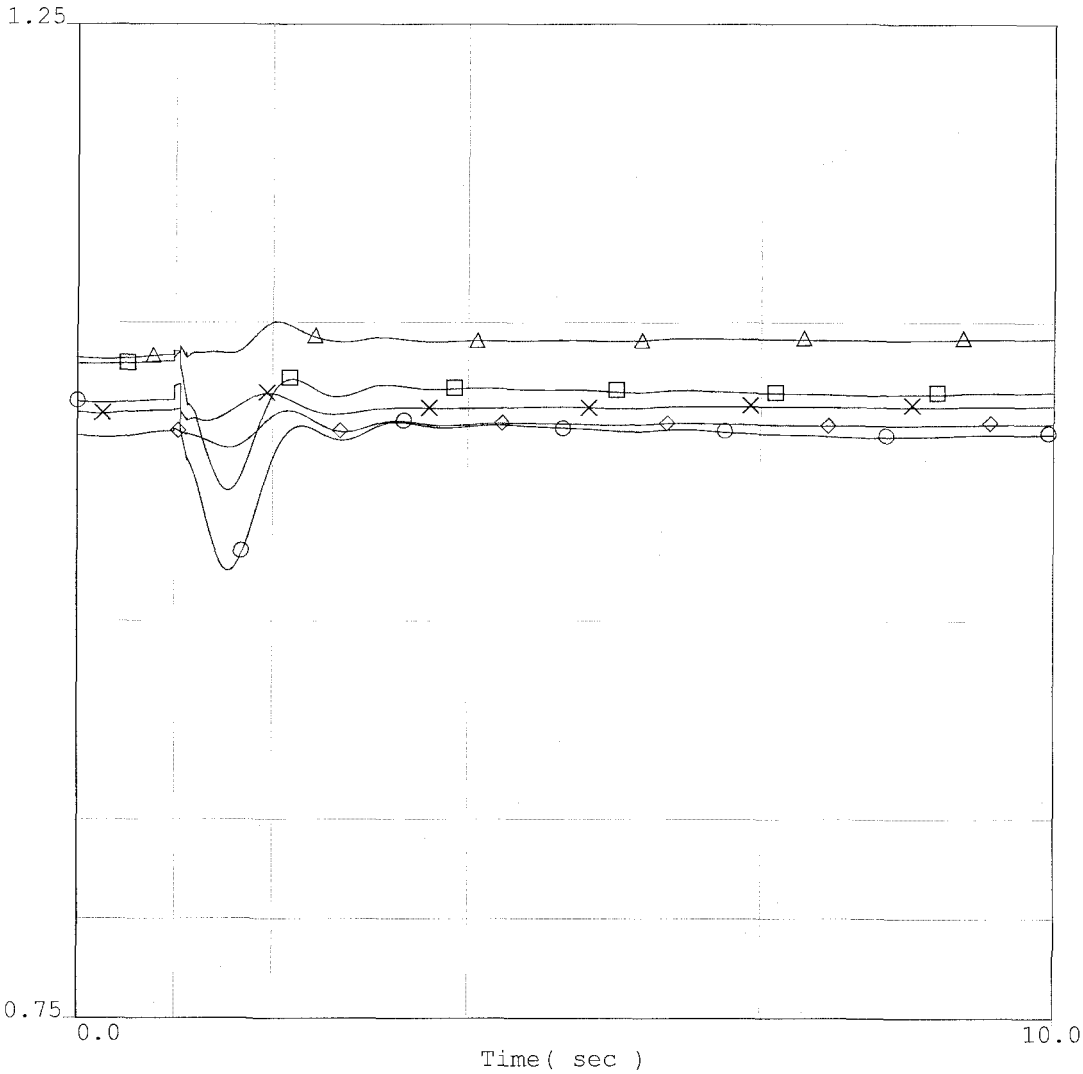
AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
14	WHITETNK	69	fbul	59.492	1.046
14	Q1COL1	34.5	fbus	58.583	1.046
14	GIL-CT1	18	fbug	59.748	1.854

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

There were 0 violations of MORC criteria 1 (25% Voltage Dip) !
There were 0 violations of MORC criteria 2 (20% Voltage Dip for 20 Cycles)!
There were 0 violations of MORC criteria 3 (59.6 HZ for 6 Cycles)!

ARIZONA_voltages:



○	0.7500 vbus	15021	PALOVRDE	500.0	0	0.0	1	1	1.2500
⊠	0.7500 vbus	14001	FOURCORN	500.0	0	0.0	1	1	1.2500
□	0.7500 vbus	15011	KYRENE	500.0	0	0.0	1	1	1.2500
△	0.7500 vbus	14003	NAVAJO	500.0	0	0.0	1	1	1.2500
◇	0.7500 vbus	26003	ADELANTO	500.0	0	0.0	1	1	1.2500

14HS-TS11:SLG ON PV-WWG#1 WITH SUBSEQUENT LOSS OF TWO PALO VERDE-WESTWING
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

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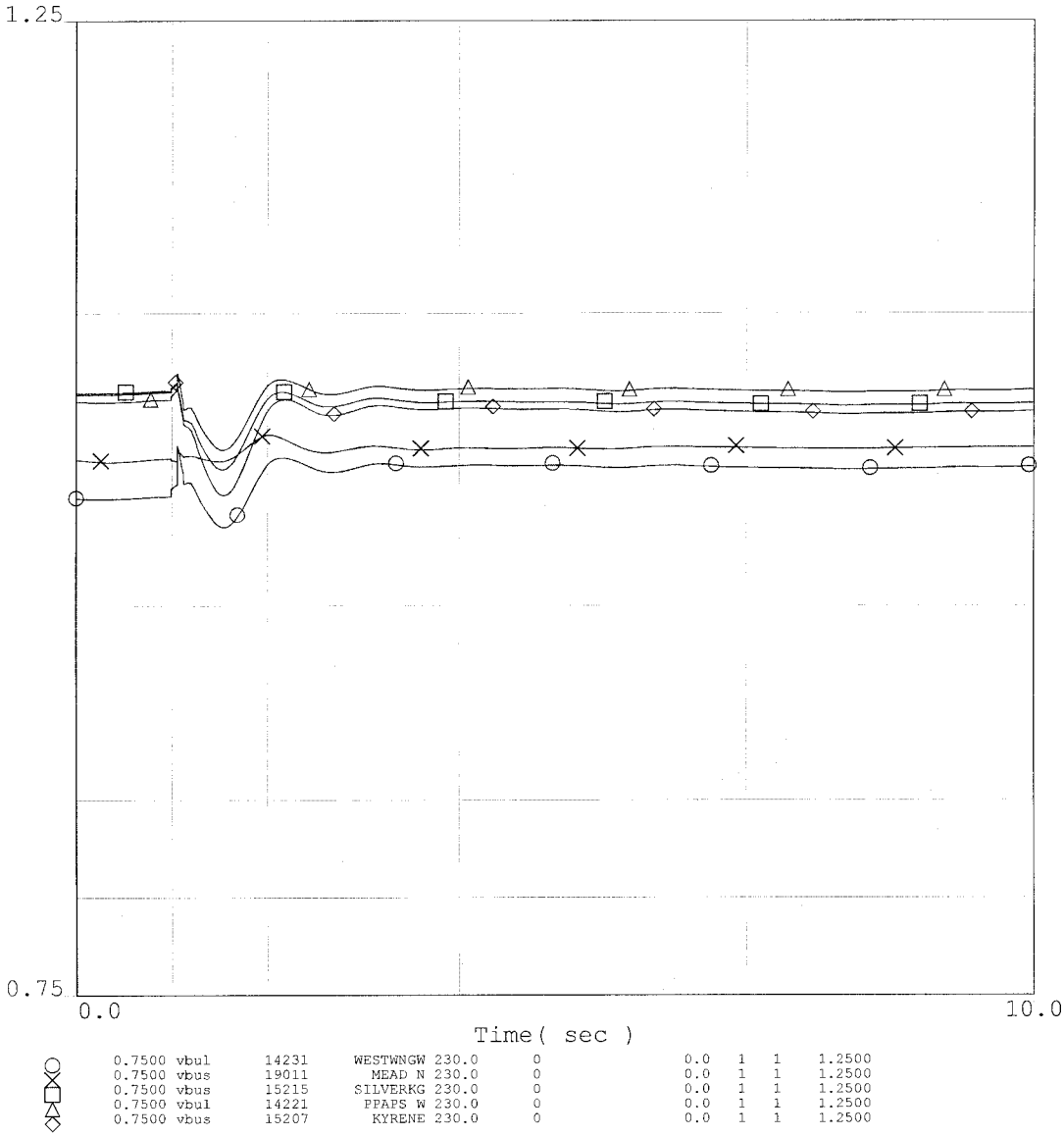
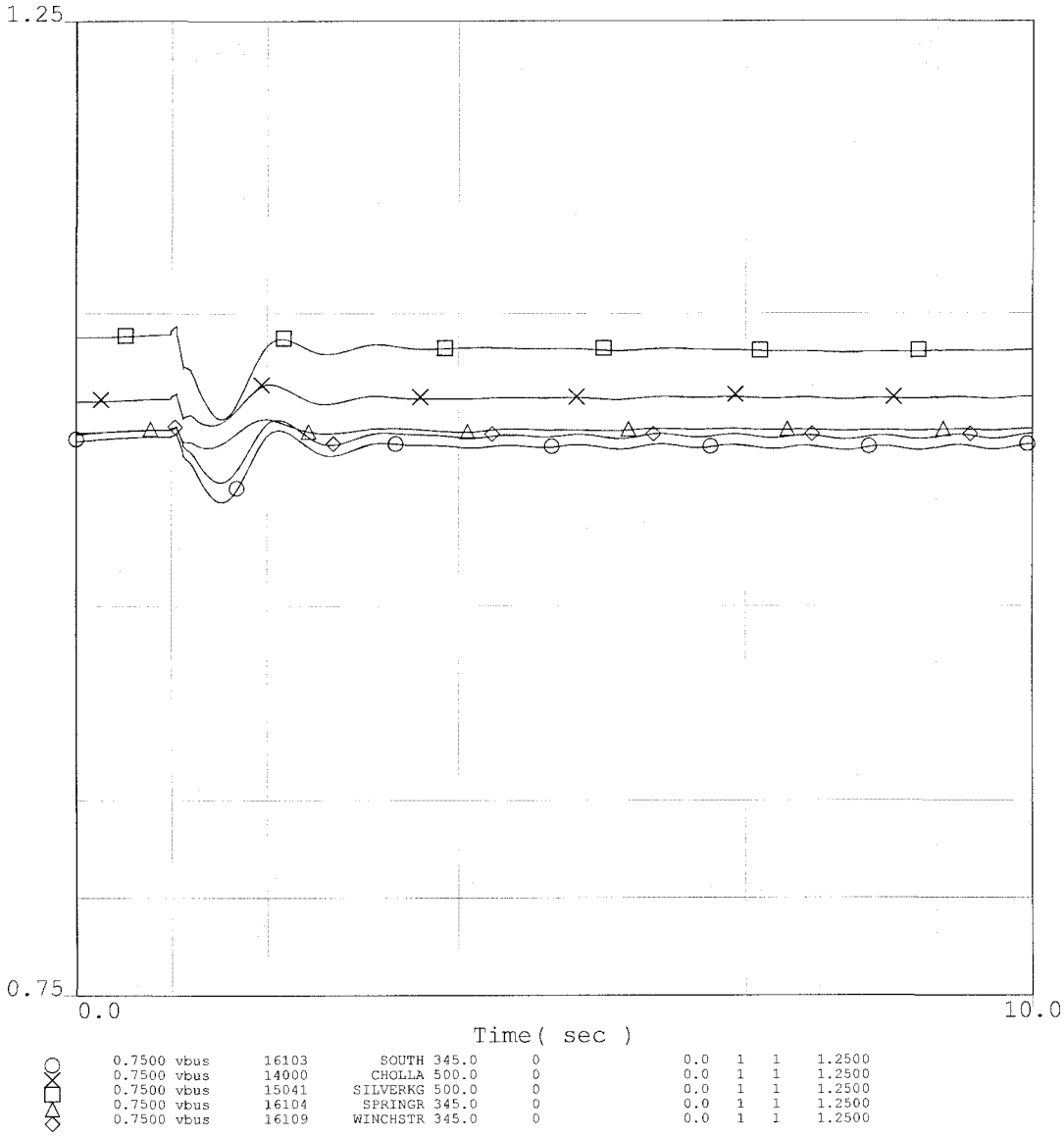
ARIZONA_voltages:



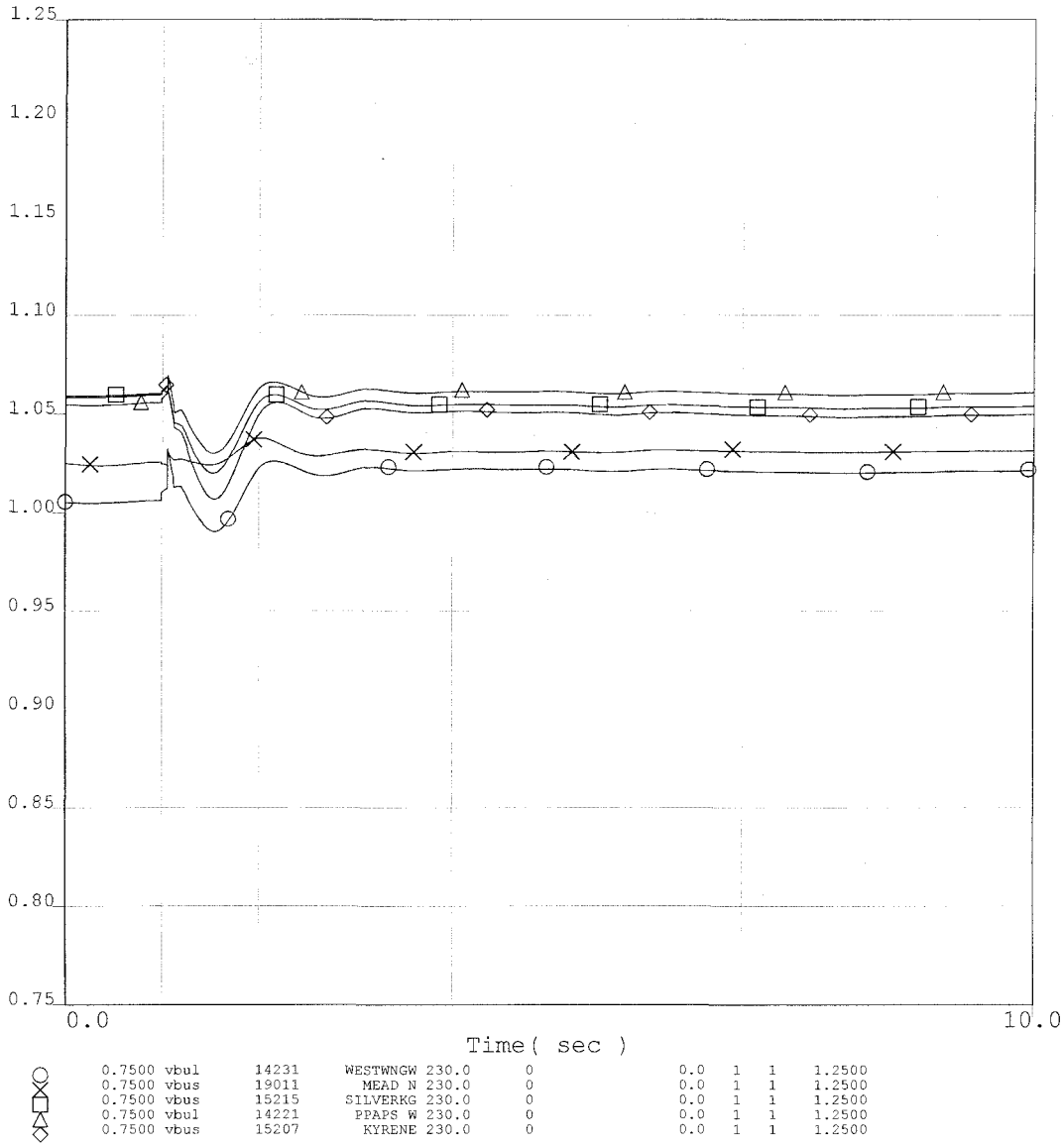
14HS-TS11:SLG ON PV-WWG#1 WITH SUBSEQUENT LOSS OF TWO PALO VERDE-WESTWING
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

ARIZONA_voltages:



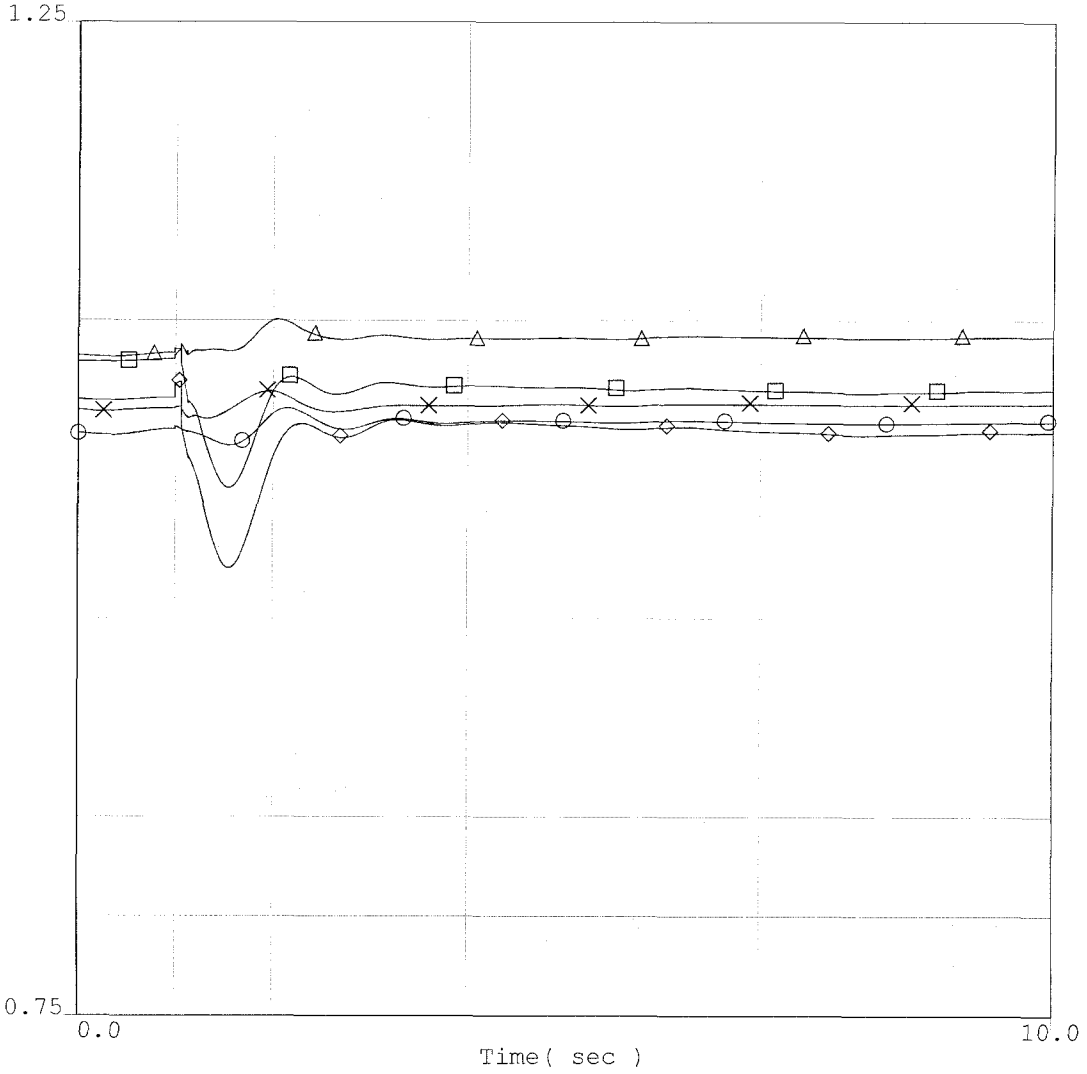
14HS-TS11:SLG ON PV-WWG#1 WITH SUBSEQUENT LOSS OF TWO PALO VERDE-WESTWING
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

ARIZONA_voltages:



14HS-TS11:SLG ON PV-WWG#1 WITH SUBSEQUENT LOSS OF TWO PALO VERDE-WESTWING
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

ARIZONA_voltages:



0.7500 vbus	26003	ADELANTO 500.0	0	0.0	1	1	1.2500
0.7500 vbus	14001	FOURCORN 500.0	0	0.0	1	1	1.2500
0.7500 vbus	15011	KYRENE 500.0	0	0.0	1	1	1.2500
0.7500 vbus	14003	NAVAJO 500.0	0	0.0	1	1	1.2500
0.7500 vbus	15021	PALOVRDE 500.0	0	0.0	1	1	1.2500

14HS-TS11:SLG ON PV-WWG#1 WITH SUBSEQUENT LOSS OF TWO PALO VERDE-WESTWING
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

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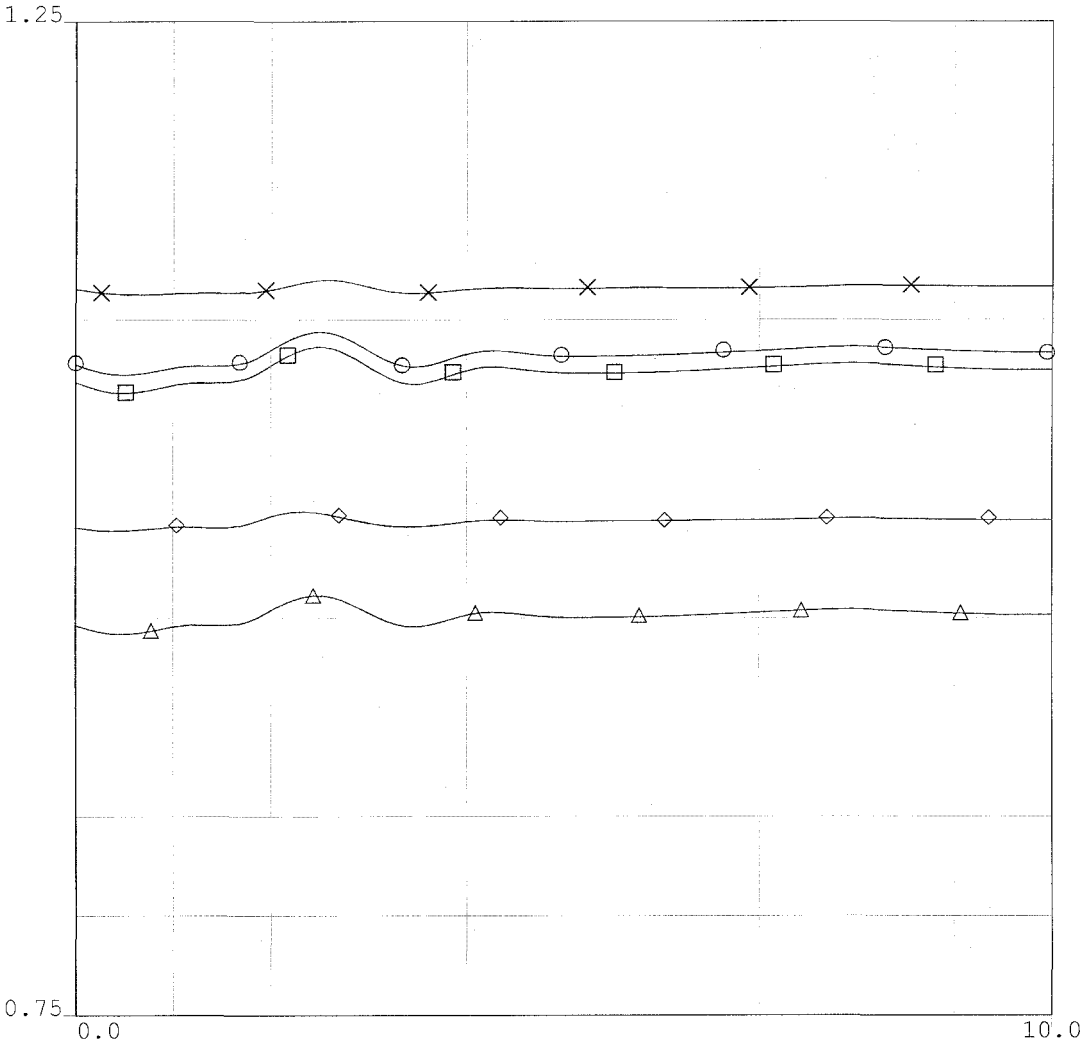
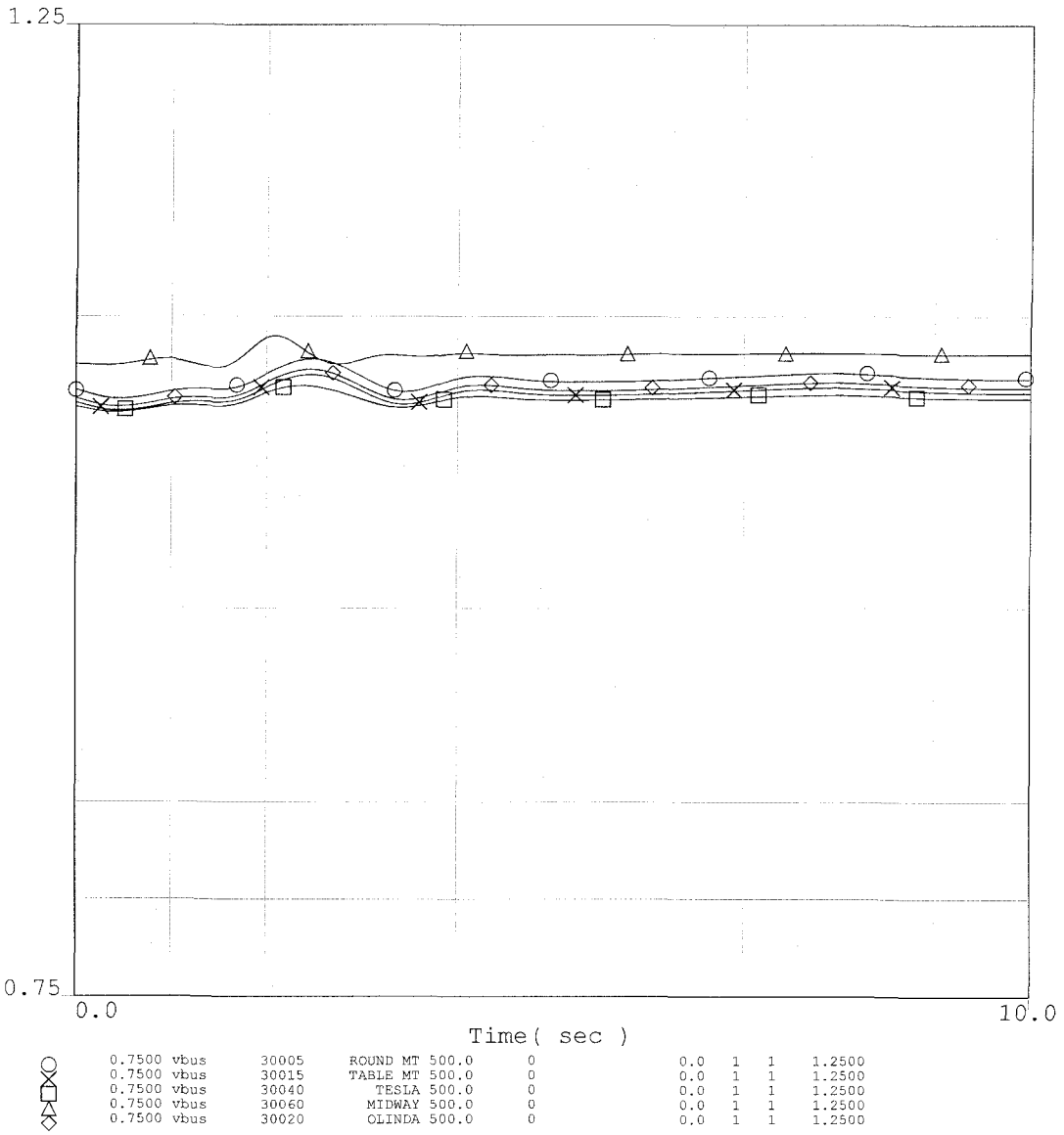
NORTHWEST_voltages:



○	0.7500 vbus	40489	GRIZZLY 500.0	0	0.0	1	1	1.2500
⊠	0.7500 vbus	40459	GARRISON 500.0	0	0.0	1	1	1.2500
□	0.7500 vbus	40687	MALIN 500.0	0	0.0	1	1	1.2500
△	0.7500 vbul	45215	NEWELL 69.0	0	0.0	1	1	1.2500
◇	0.7500 vbus	60235	MIDPOINT 345.0	0	0.0	1	1	1.2500

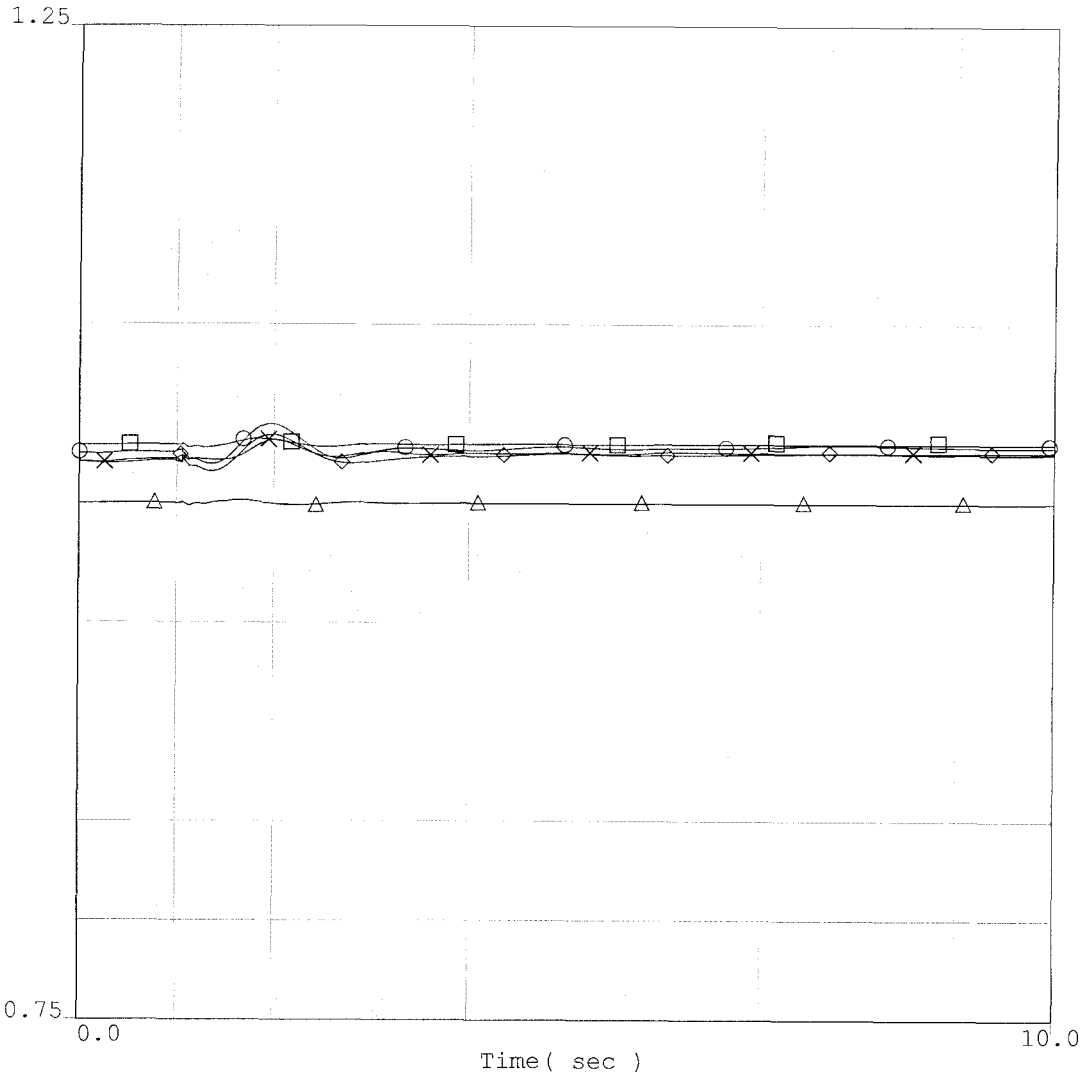
14HS-TS11:SLG ON PV-WWG#1 WITH SUBSEQUENT LOSS OF TWO PALO VERDE-WESTWING
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

CALIFORNIA_voltages:



14HS-TS11:SLG ON PV-WWG#1 WITH SUBSEQUENT LOSS OF TWO PALO VERDE-WESTWING
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

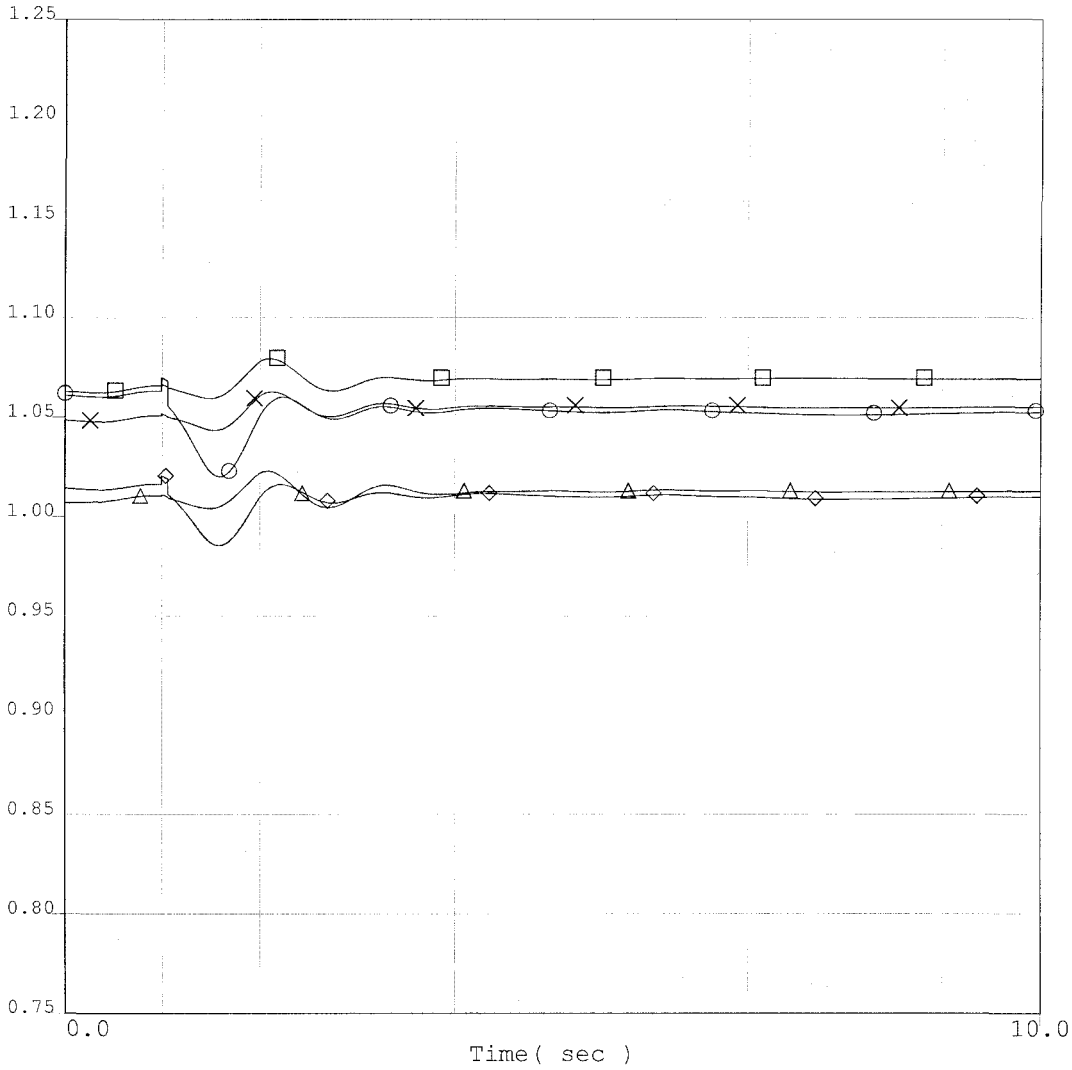
UTAH_voltages:



0.7500	vbus	66230	PINTO 138.0	0	0.0	1	1	1.2500
0.7500	vbus	18019	H ALLEN 230.0	0	0.0	1	1	1.2500
0.7500	vbus	66280	REDBUTTE 345.0	0	0.0	1	1	1.2500
0.7500	vbus	66420	SGSY 138.0	0	0.0	1	1	1.2500
0.7500	vbus	79023	DURANGO 115.0	0	0.0	1	1	1.2500

14HS-TS11:SLG ON PV-WWG#1 WITH SUBSEQUENT LOSS OF TWO PALO VERDE-WESTWING
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

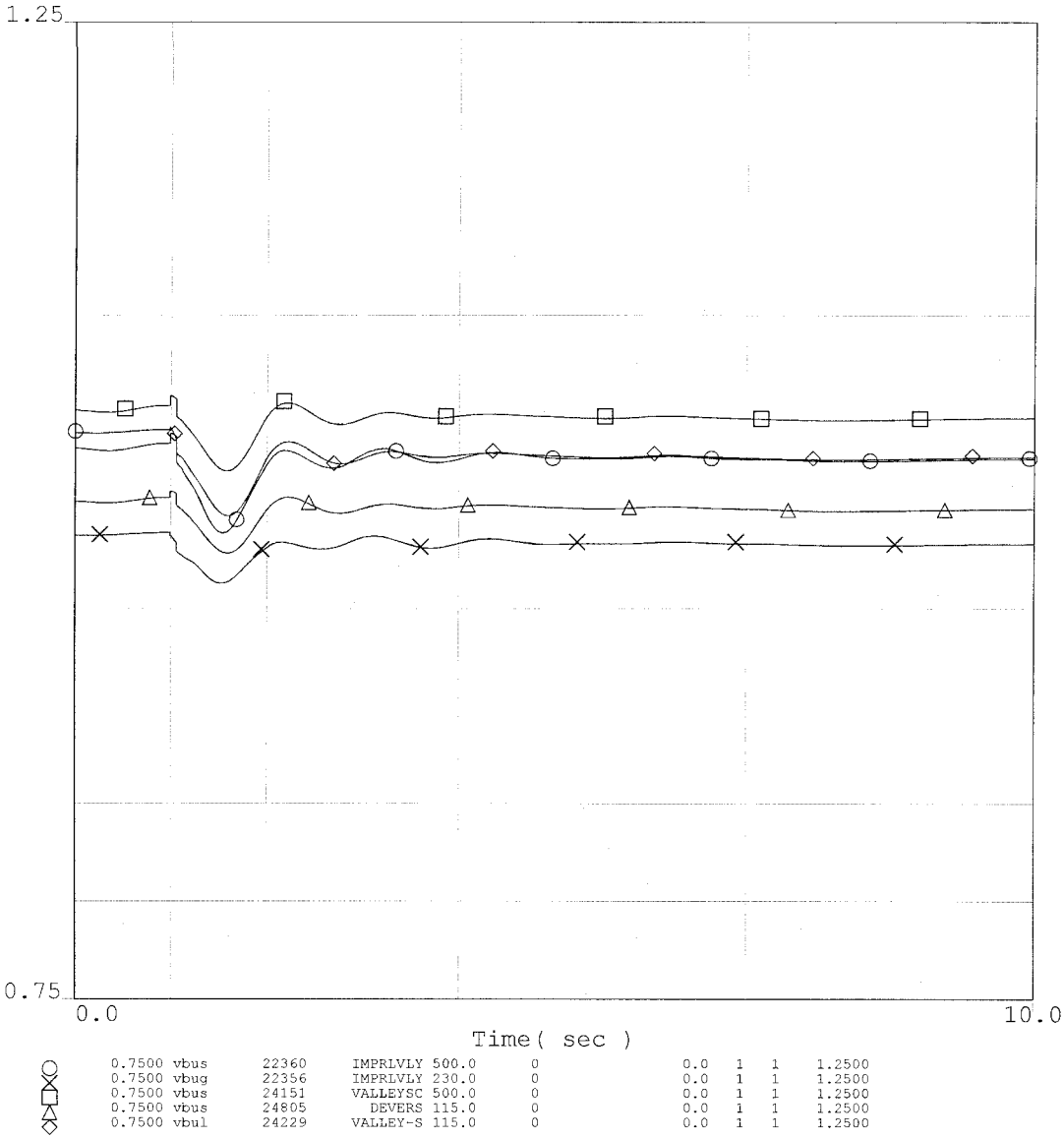
CALIFORNIA_voltages:



0.7500 vbus	24801	DEVERS 500.0	0	0.0	1	1	1.2500
0.7500 vbus	24086	LUGO 500.0	0	0.0	1	1	1.2500
0.7500 vbus	24156	VINCENT 500.0	0	0.0	1	1	1.2500
0.7500 vbus	26094	SYLMARLA 230.0	0	0.0	1	1	1.2500
0.7500 vbus	24804	DEVERS 230.0	0	0.0	1	1	1.2500

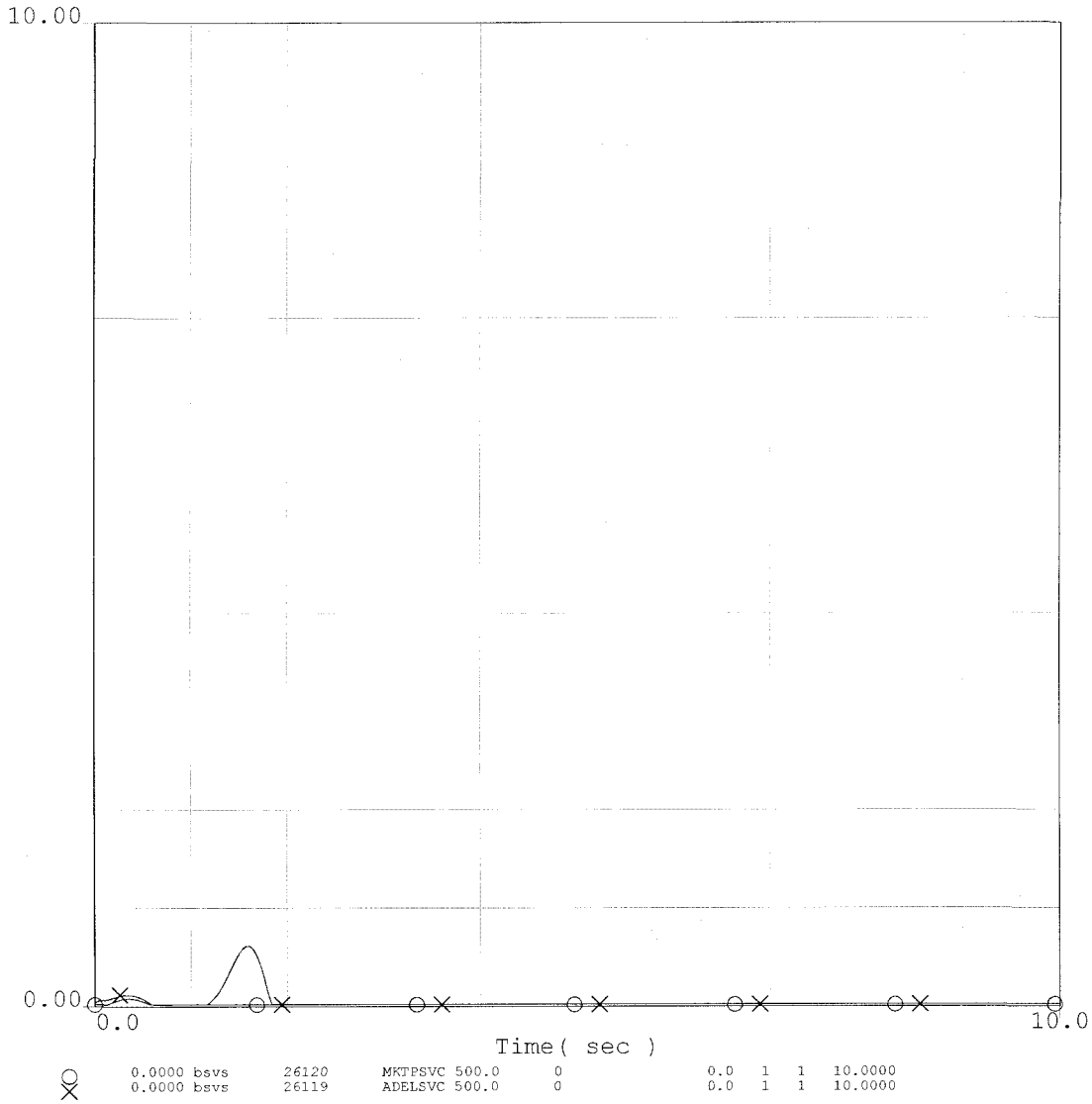
14HS-TS11:SLG ON PV-WWG#1 WITH SUBSEQUENT LOSS OF TWO PALO VERDE-WESTWING
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

CALIFORNIA_voltages:



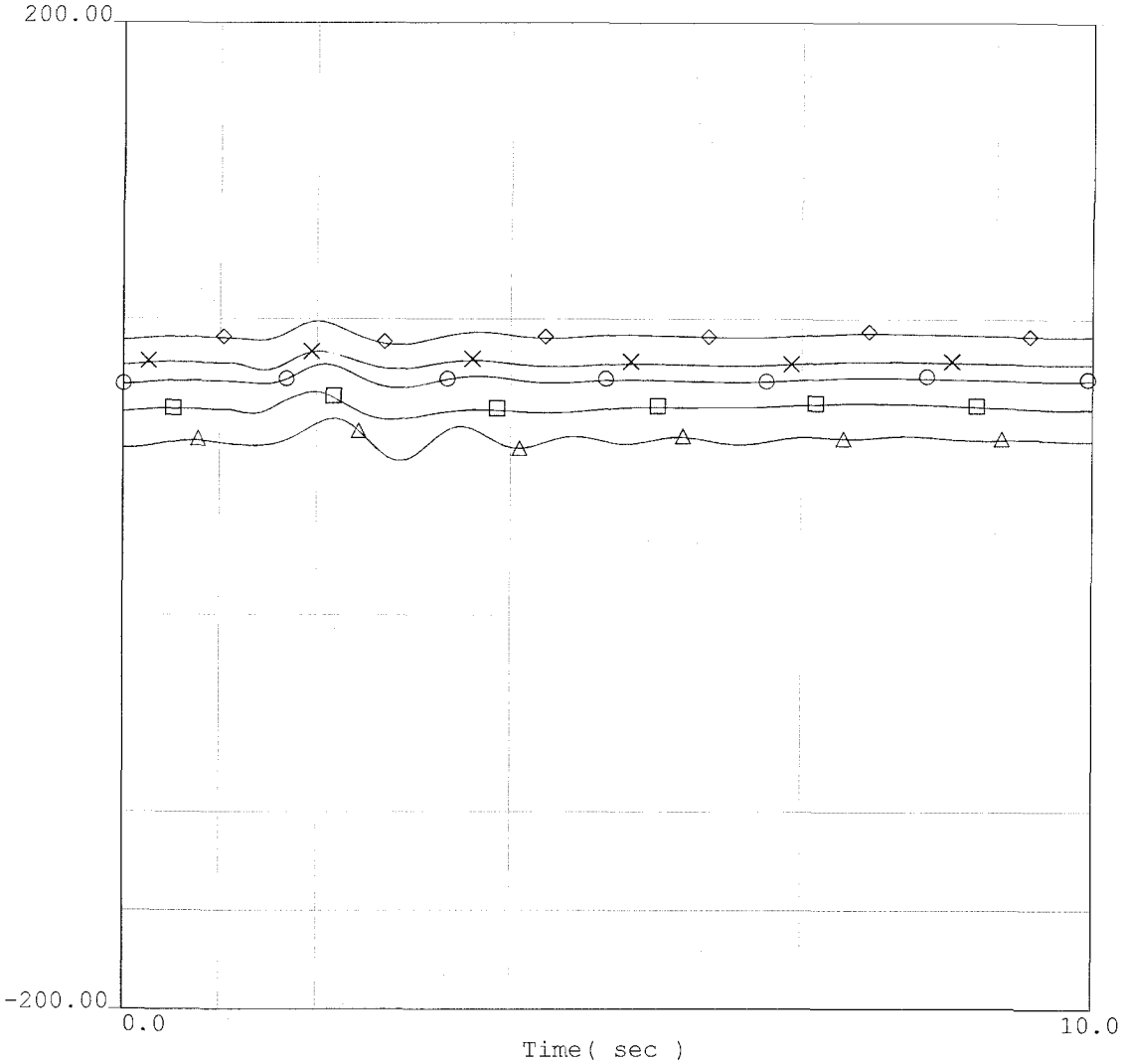
14HS-TS11:SLG ON PV-WWG#1 WITH SUBSEQUENT LOSS OF TWO PALO VERDE-WESTWING
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

SVC_output



14HS-TS11:SLG ON PV-WWG#1 WITH SUBSEQUENT LOSS OF TWO PALO VERDE-WESTWING
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

SYSTEM_Rotorangles



-200.0000 ang	16500	SPR GEN1	19.0	0	0.0	1	1	200.0000
-200.0000 ang	10321	SJUAN_G4	22.0	0	0.0	1	1	200.0000
-200.0000 ang	14942	SAGUARO2	15.5	0	0.0	1	1	200.0000
-200.0000 ang	17024	APACHCT1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	16518	SPR GEN3	21.0	0	0.0	1	1	200.0000

14HS-TS11:SLG ON PV-WWG#1 WITH SUBSEQUENT LOSS OF TWO PALO VERDE-WESTWING
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

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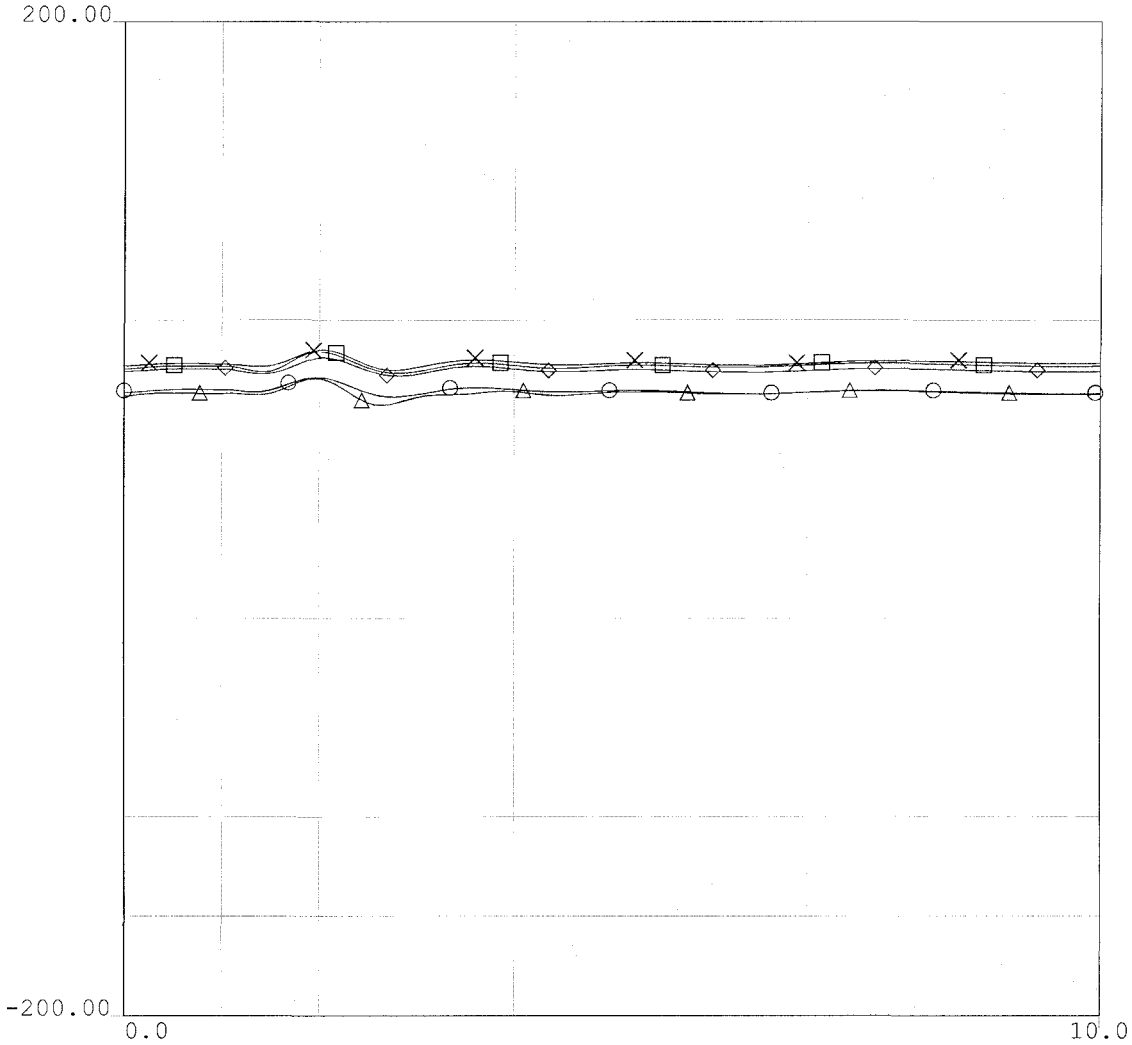
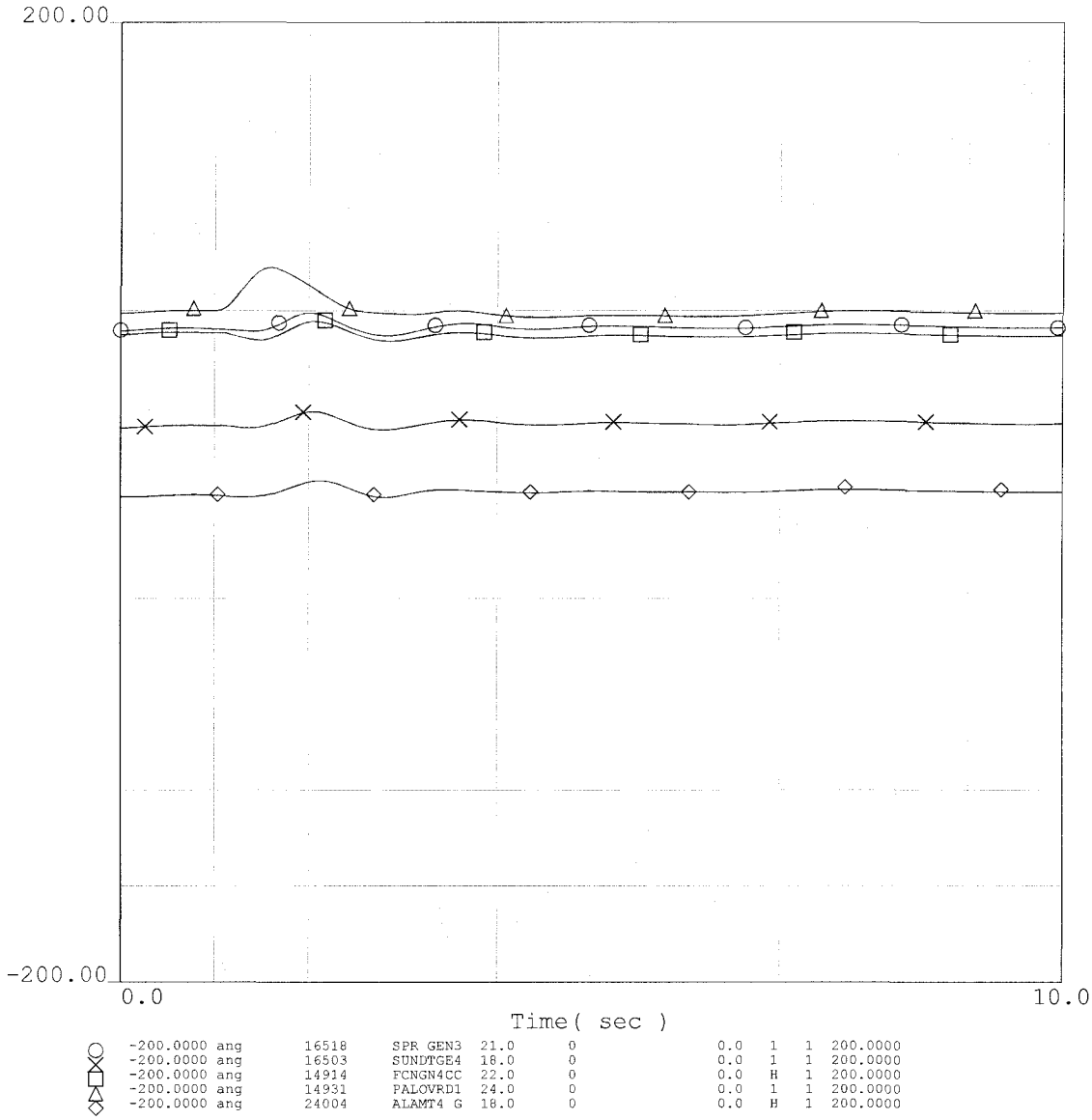
SYSTEM_Rotorangles



-200.0000 ang	15140	DBG-CT1	18.0	0	0.0	1	1	200.0000
-200.0000 ang	14945	SAG. CT3	13.8	0	0.0	1	1	200.0000
-200.0000 ang	14902	CHOLLA3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	15921	SANTAN 1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	14903	CHOLLA4	22.0	0	0.0	1	1	200.0000

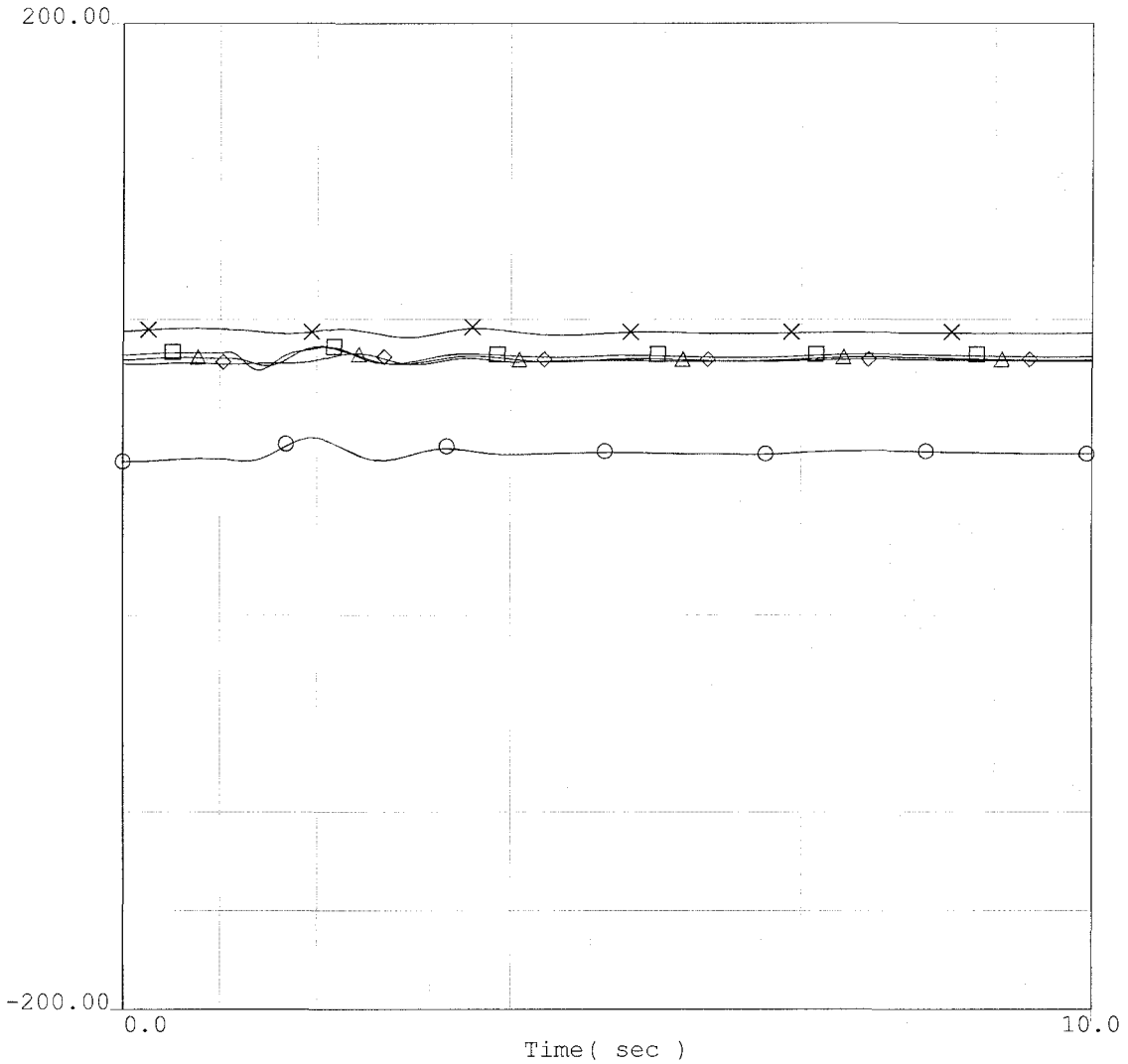
14HS-TS11:SLG ON PV-WWG#1 WITH SUBSEQUENT LOSS OF TWO PALO VERDE-WESTWING
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

SYSTEM_Rotorangles



14HS-TS11:SLG ON PV-WWG#1 WITH SUBSEQUENT LOSS OF TWO PALO VERDE-WESTWING
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

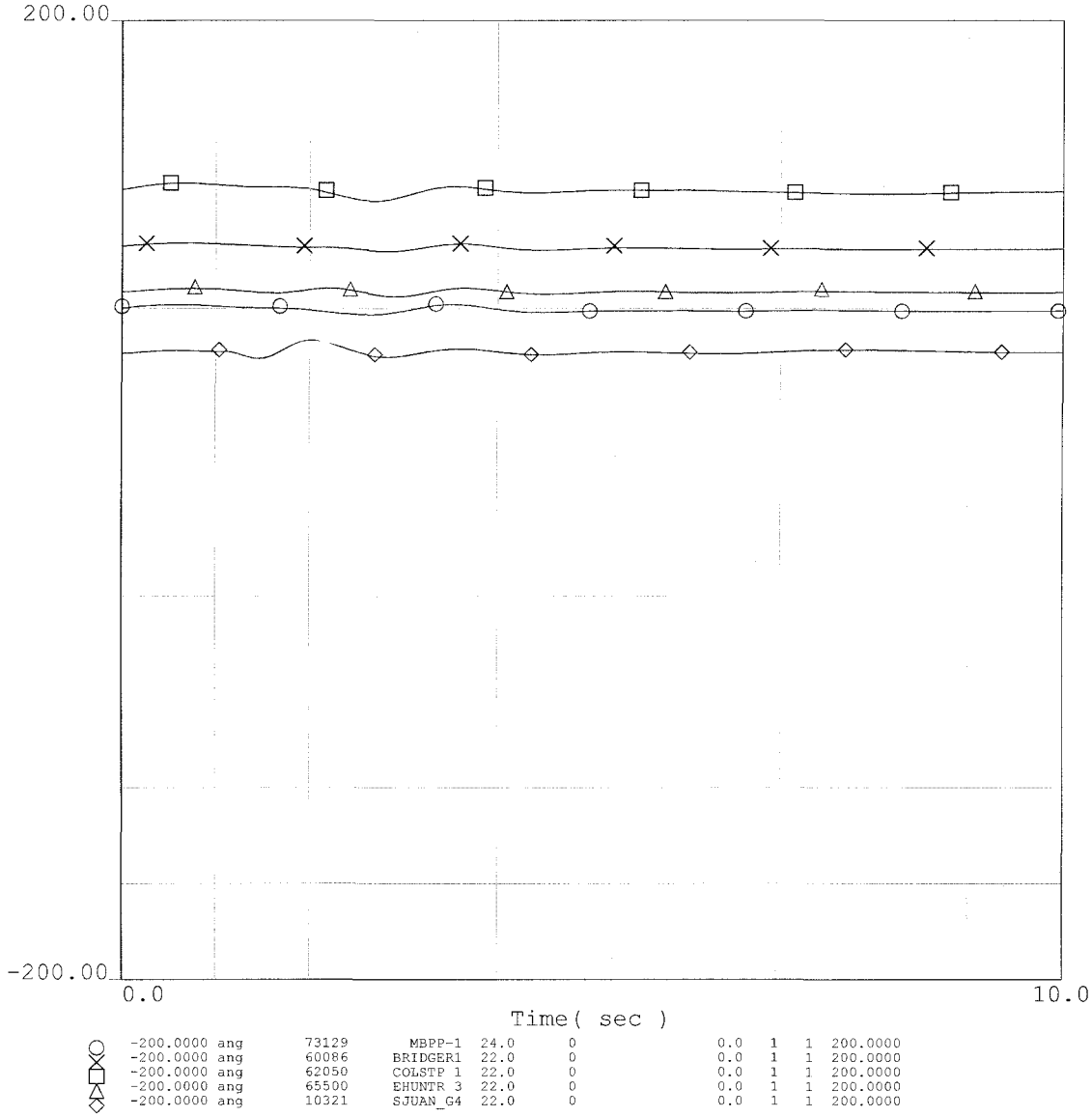
SYSTEM_Rotorangles



-200.0000 ang	24129	S.ONOFR2	22.0	0	0.0	1	1	200.0000
-200.0000 ang	26039	INTERM1G	26.0	0	0.0	1	1	200.0000
-200.0000 ang	15981	NAVAJO 1	26.0	0	0.0	1	1	200.0000
-200.0000 ang	10318	SJUAN_G1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	36411	DIABLO 1	25.0	0	0.0	1	1	200.0000

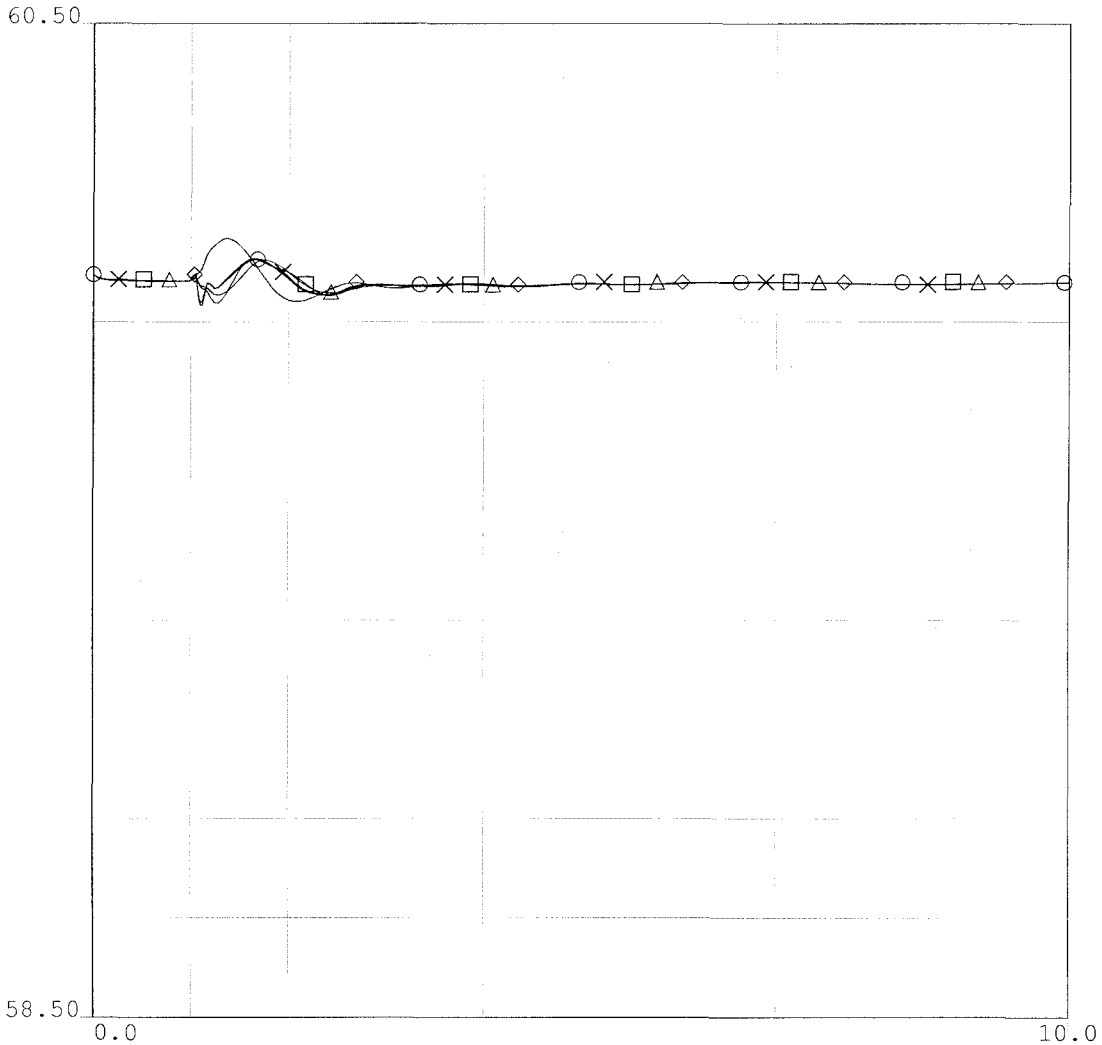
14HS-TS11:SLG ON PV-WWG#1 WITH SUBSEQUENT LOSS OF TWO PALO VERDE-WESTWING
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

SYSTEM_Rotorangles



14HS-TS11:SLG ON PV-WWG#1 WITH SUBSEQUENT LOSS OF TWO PALO VERDE-WESTWING
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

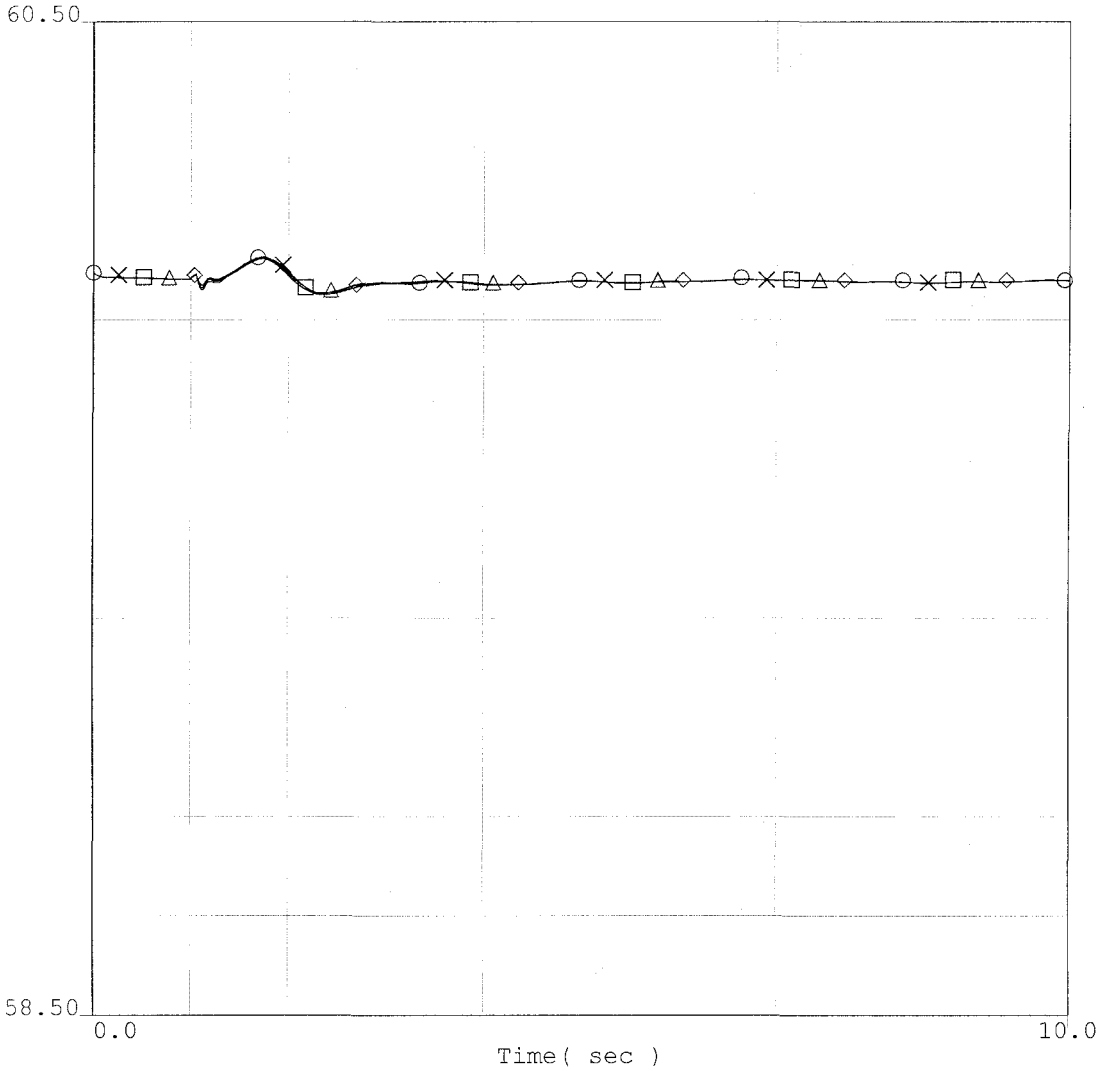
Frequencies:



58.5000 fbus	14003	NAVAJO 500.0	0	0.0	1	1	60.5000
58.5000 fbus	14005	WESTWING 500.0	0	0.0	1	1	60.5000
58.5000 fbus	14001	FOURCORN 500.0	0	0.0	1	1	60.5000
58.5000 fbus	14016	PNPKAPS 500.0	0	0.0	1	1	60.5000
58.5000 fbus	15021	PALOVRDE 500.0	0	0.0	1	1	60.5000

14HS-TS11:SLG ON PV-WWG#1 WITH SUBSEQUENT LOSS OF TWO PALO VERDE-WESTWING
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

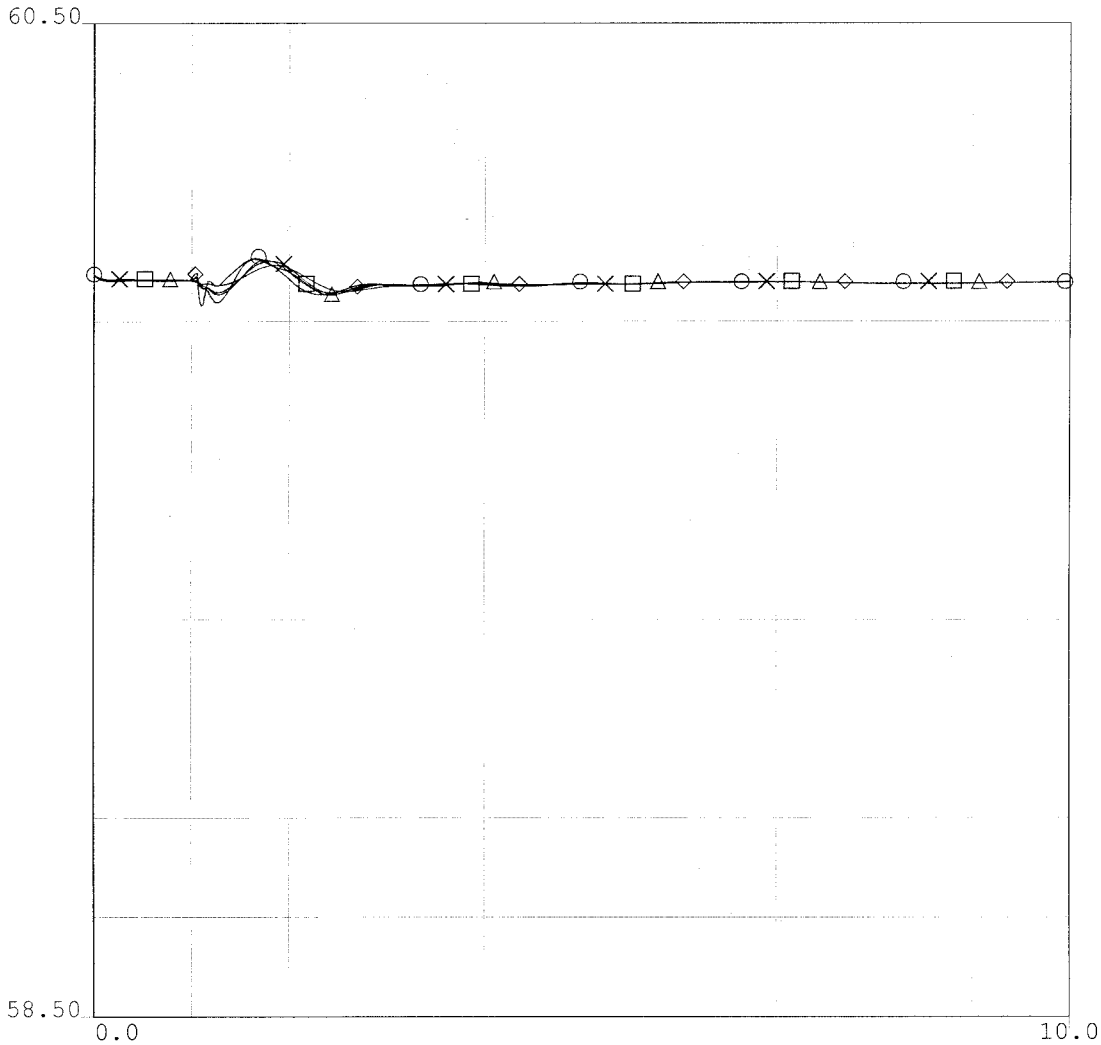
Frequencies:



58.5000	fbus	16000	TORTOLIT 500.0	0	0.0	1	1	60.5000
58.5000	fbus	16105	VAIL 345.0	0	0.0	1	1	60.5000
58.5000	fbus	16103	SOUTH 345.0	0	0.0	1	1	60.5000
58.5000	fbul	15001	CORONADO 500.0	0	0.0	1	1	60.5000
58.5000	fbus	16109	WINCHSTR 345.0	0	0.0	1	1	60.5000

14HS-TS11:SLG ON PV-WWG#1 WITH SUBSEQUENT LOSS OF TWO PALO VERDE-WESTWING
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

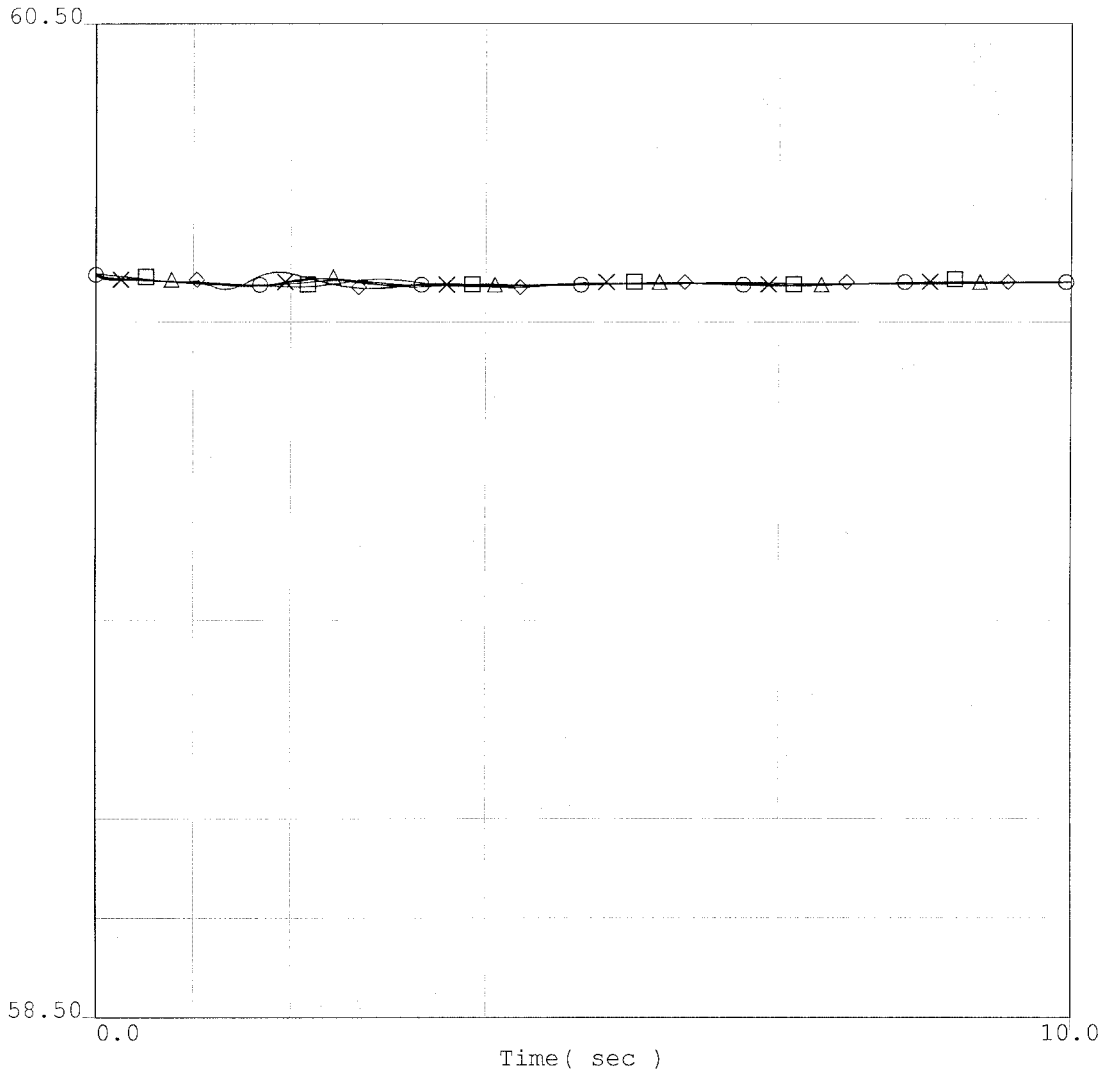
Frequencies:



58.5000 fbul	14231	WESTWNGW 230.0	0	0.0	1	1	60.5000
58.5000 fbus	26003	ADELANTO 500.0	0	0.0	1	1	60.5000
58.5000 fbus	14001	FOURCORN 500.0	0	0.0	1	1	60.5000
58.5000 fbus	26048	MCCULLGH 500.0	0	0.0	1	1	60.5000
58.5000 fbus	14003	NAVAJO 500.0	0	0.0	1	1	60.5000

14HS-TS11:SLG ON PV-WWG#1 WITH SUBSEQUENT LOSS OF TWO PALO VERDE-WESTWING
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

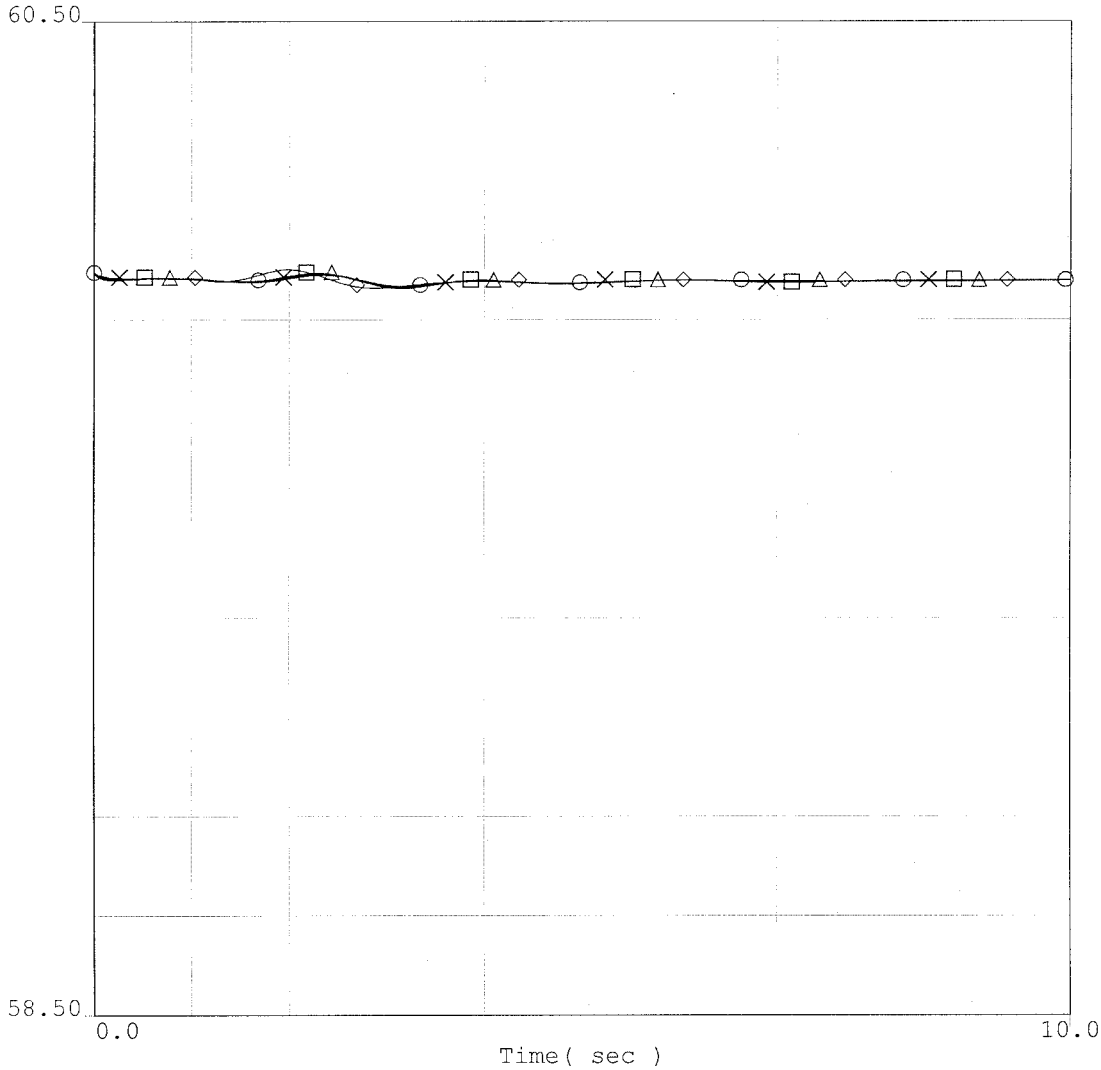
Frequencies:



○	58.5000	fbus	40489	GRIZZLY 500.0	0	0.0	1	1	60.5000
⊠	58.5000	fbus	40687	MALIN 500.0	0	0.0	1	1	60.5000
□	58.5000	fbus	40459	GARRISON 500.0	0	0.0	1	1	60.5000
△	58.5000	fbus	60235	MIDPOINT 345.0	0	0.0	1	1	60.5000
◇	58.5000	fbus	66230	PINTO 138.0	0	0.0	1	1	60.5000

14HS-TS11:SLG ON PV-WWG#1 WITH SUBSEQUENT LOSS OF TWO PALO VERDE-WESTWING
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

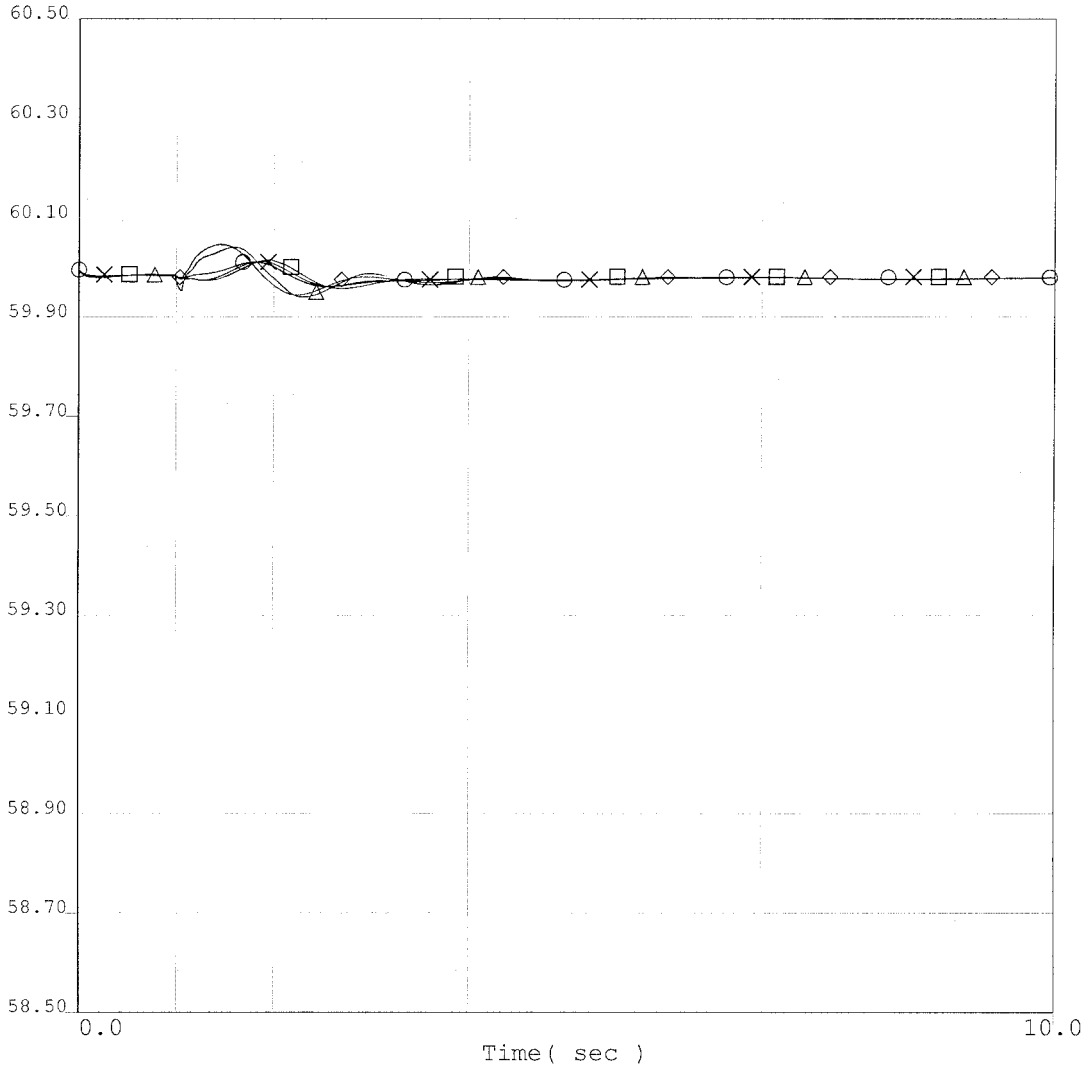
Frequencies:



○	58.5000 fbus	30005	ROUND MT 500.0	0	0.0	1	1	60.5000
⊠	58.5000 fbus	30015	TABLE MT 500.0	0	0.0	1	1	60.5000
□	58.5000 fbus	30035	TRACY 500.0	0	0.0	1	1	60.5000
△	58.5000 fbus	30040	TESLA 500.0	0	0.0	1	1	60.5000
◇	58.5000 fbus	30060	MIDWAY 500.0	0	0.0	1	1	60.5000

14HS-TS11:SLG ON PV-WWG#1 WITH SUBSEQUENT LOSS OF TWO PALO VERDE-WESTWING
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

Frequencies:



○	58.5000 fbus	24801	DEVERS 500.0	0	0.0	1	1	60.5000
⊗	58.5000 fbus	24086	LUGO 500.0	0	0.0	1	1	60.5000
□	58.5000 fbus	26094	SYLMARLA 230.0	0	0.0	1	1	60.5000
△	58.5000 fbus	22468	MIGUEL 500.0	0	0.0	1	1	60.5000
◇	58.5000 fbus	22536	N.GILA 500.0	0	0.0	1	1	60.5000

14HS-TS11:SLG ON PV-WWG#1 WITH SUBSEQUENT LOSS OF TWO PALO VERDE-WESTWING
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

HIGHEST VOLTAGE DIP

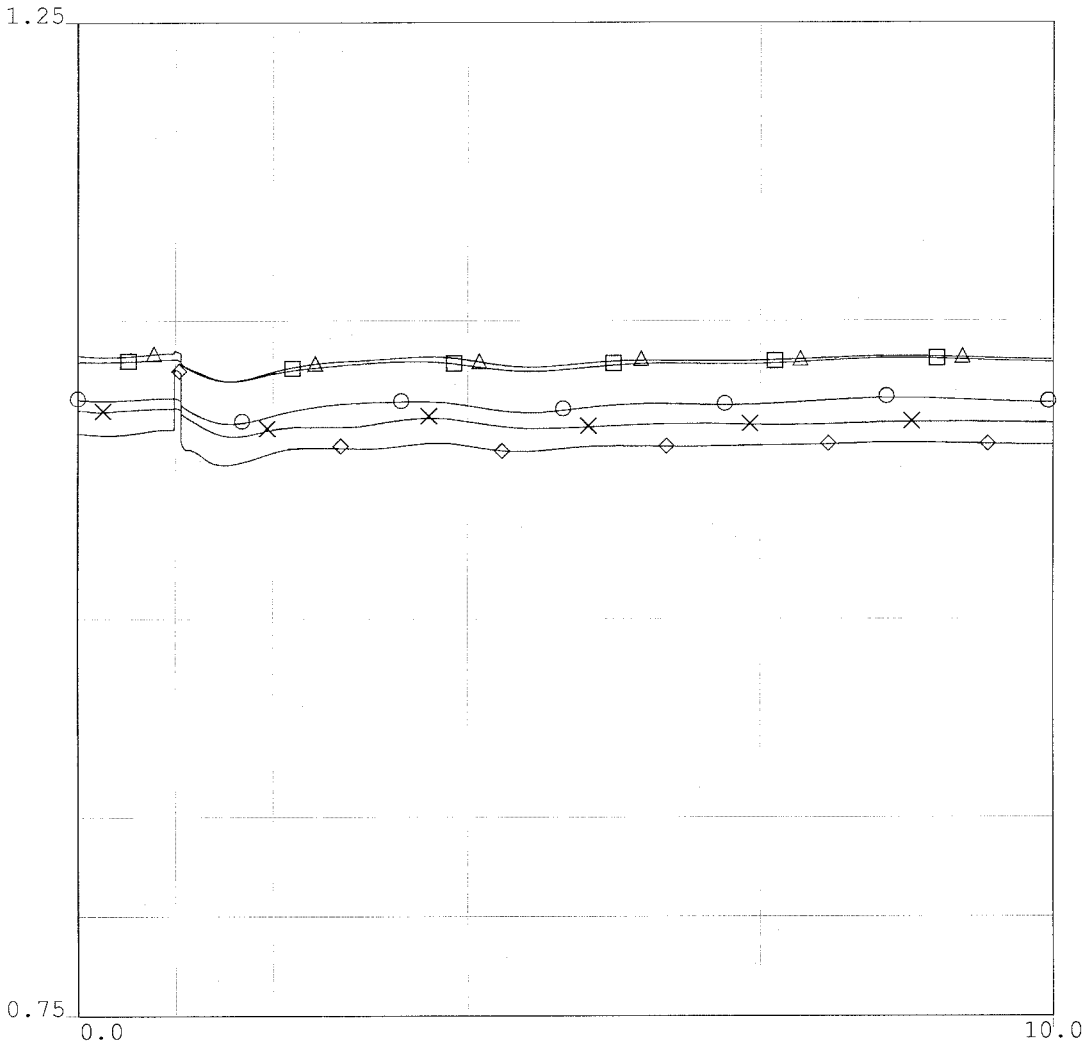
AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct	@time
14	GILABEND	230	vbul	1.016	0.945	7.1	1.592
14	RUDD	500	vbus	1.059	0.967	8.8	1.554
24	DEVRSVC1	500	vbug	1.06	1.02	4	1.592

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
14	BAGDAD	115	fbul	59.884	1.125
24	RUSH	115	fbus	59.914	3.129
24	BSPHYD26	2.2	fbug	59.874	3.242

There were 0 violations of MORC criteria 1 (25% Voltage Dip) !
There were 0 violations of MORC criteria 2 (20% Voltage Dip for 20 Cycles)!
There were 0 violations of MORC criteria 3 (59.6 HZ for 6 Cycles)!

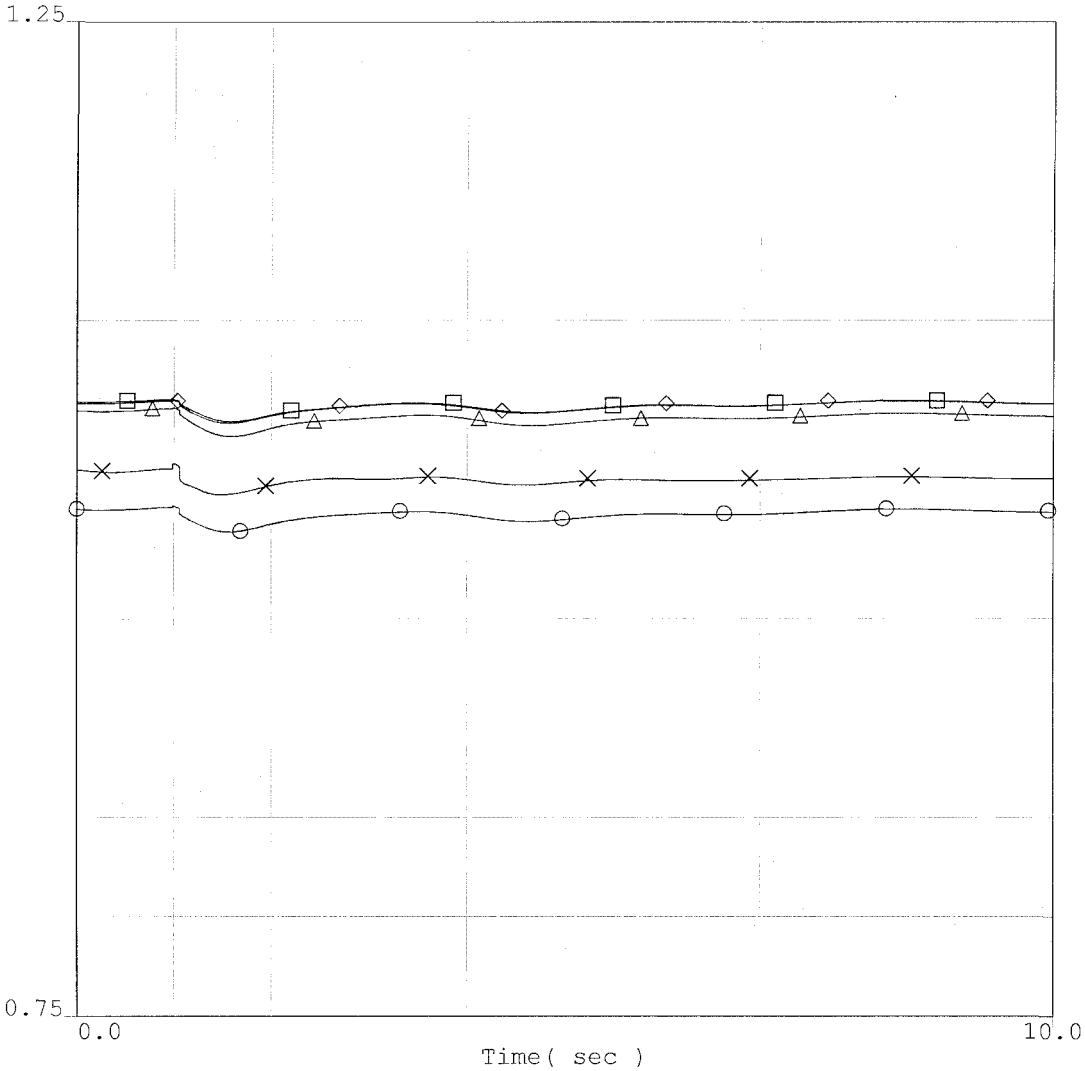
ARIZONA_voltages:



○	0.7500 vbus	15021	PALOVRDE	500.0	0	0.0	1	1	1.2500
⊗	0.7500 vbus	14001	FOURCORN	500.0	0	0.0	1	1	1.2500
□	0.7500 vbus	15011	KYRENE	500.0	0	0.0	1	1	1.2500
△	0.7500 vbus	14003	NAVAJO	500.0	0	0.0	1	1	1.2500
◇	0.7500 vbus	26003	ADELANTO	500.0	0	0.0	1	1	1.2500

14HS-TS12:IPP BIPOLAR DC PERMANENT BLOCK
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

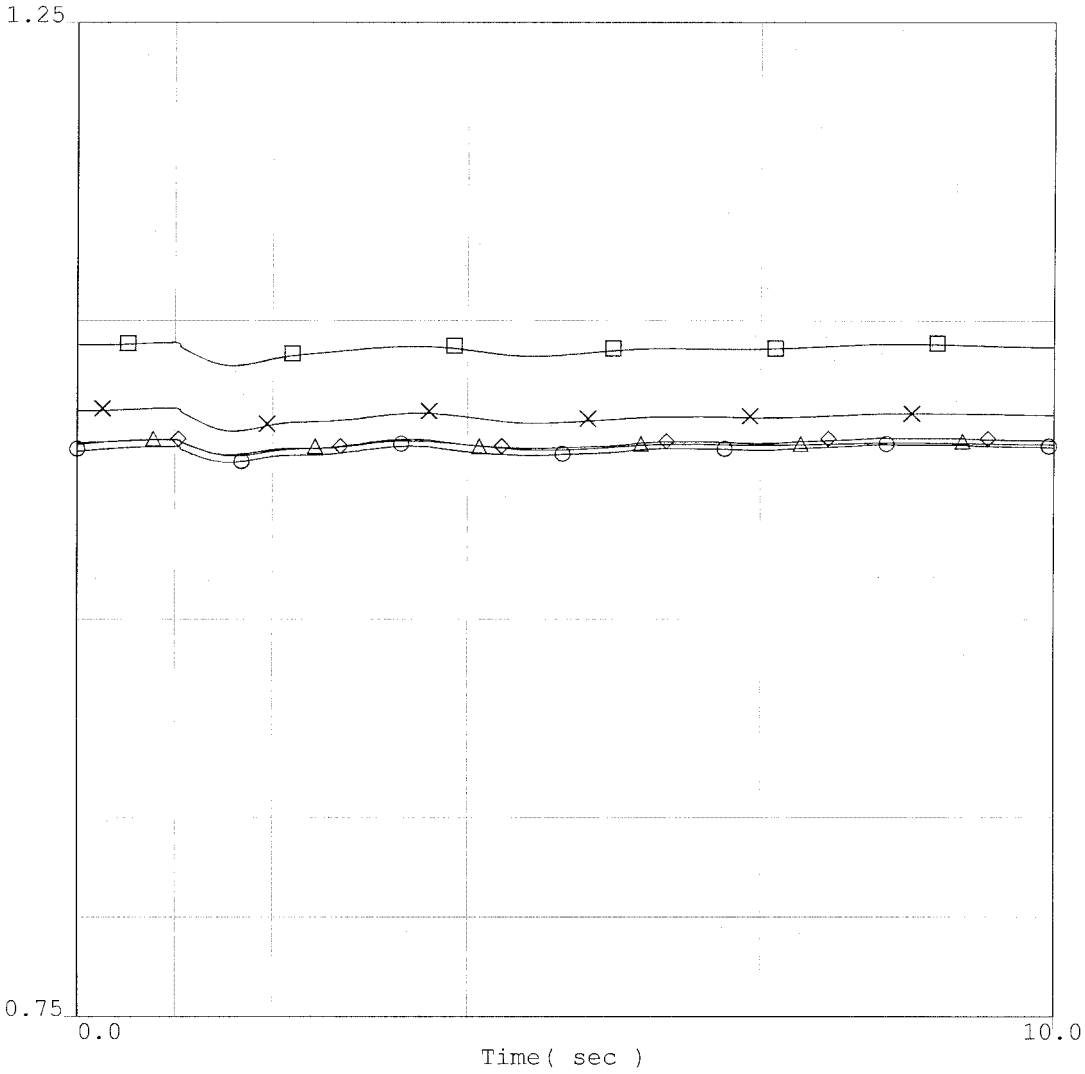
ARIZONA_voltages:



○	0.7500 vbul	14231	WESTWNGW	230.0	0	0.0	1	1	1.2500
⊗	0.7500 vbus	19011	MEAD N	230.0	0	0.0	1	1	1.2500
□	0.7500 vbus	15215	SILVERKG	230.0	0	0.0	1	1	1.2500
△	0.7500 vbul	14221	PPAPS W	230.0	0	0.0	1	1	1.2500
◇	0.7500 vbus	15207	KYRENE	230.0	0	0.0	1	1	1.2500

14HS-TS12:IPP BIPOLAR DC PERMANENT BLOCK
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

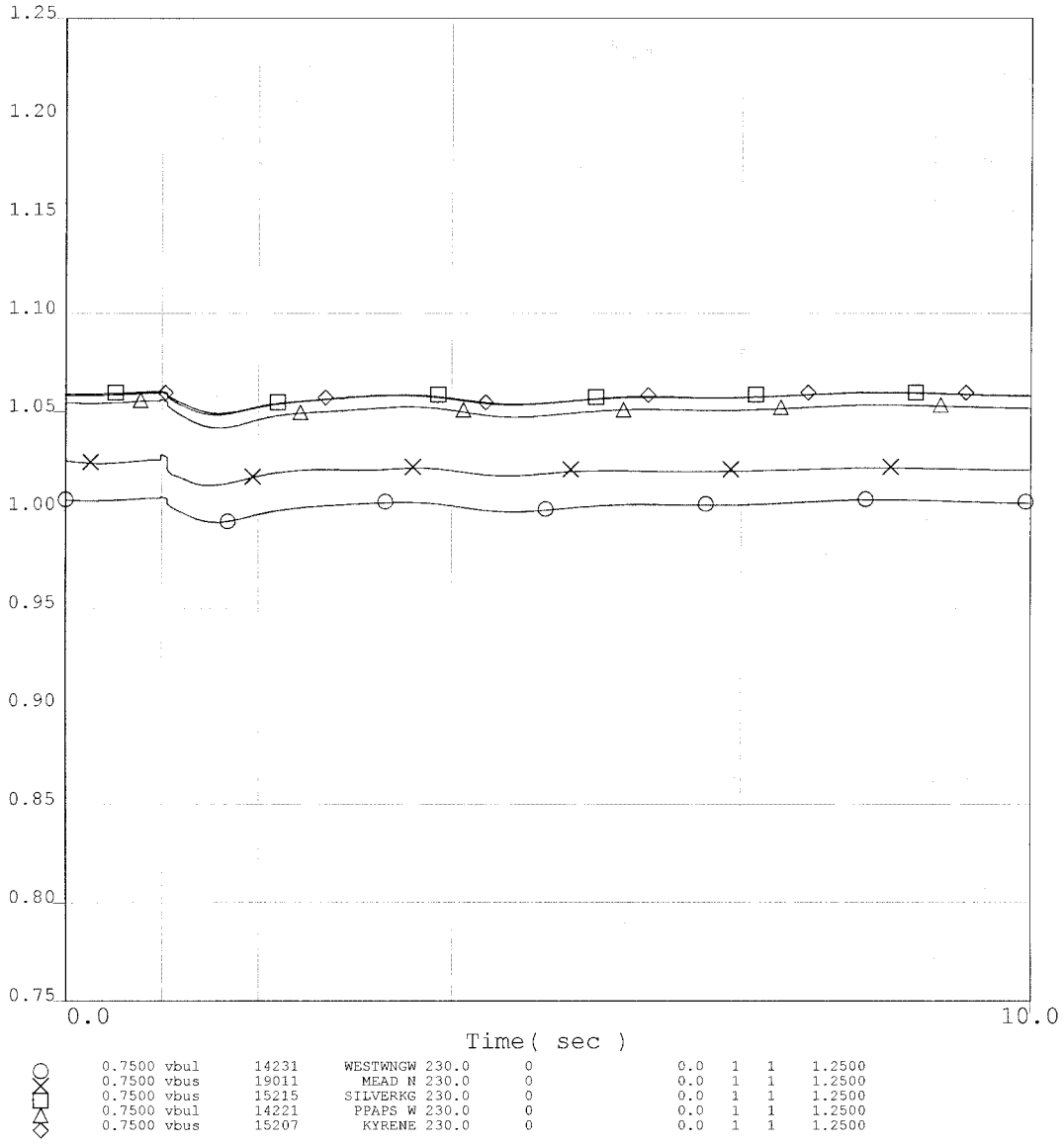
ARIZONA_voltages:



0.7500 vbus	16103	SOUTH 345.0	0	0.0	1	1	1.2500
0.7500 vbus	14000	CHOLLA 500.0	0	0.0	1	1	1.2500
0.7500 vbus	15041	SILVERKG 500.0	0	0.0	1	1	1.2500
0.7500 vbus	16104	SPRINGR 345.0	0	0.0	1	1	1.2500
0.7500 vbus	16109	WINCHSTR 345.0	0	0.0	1	1	1.2500

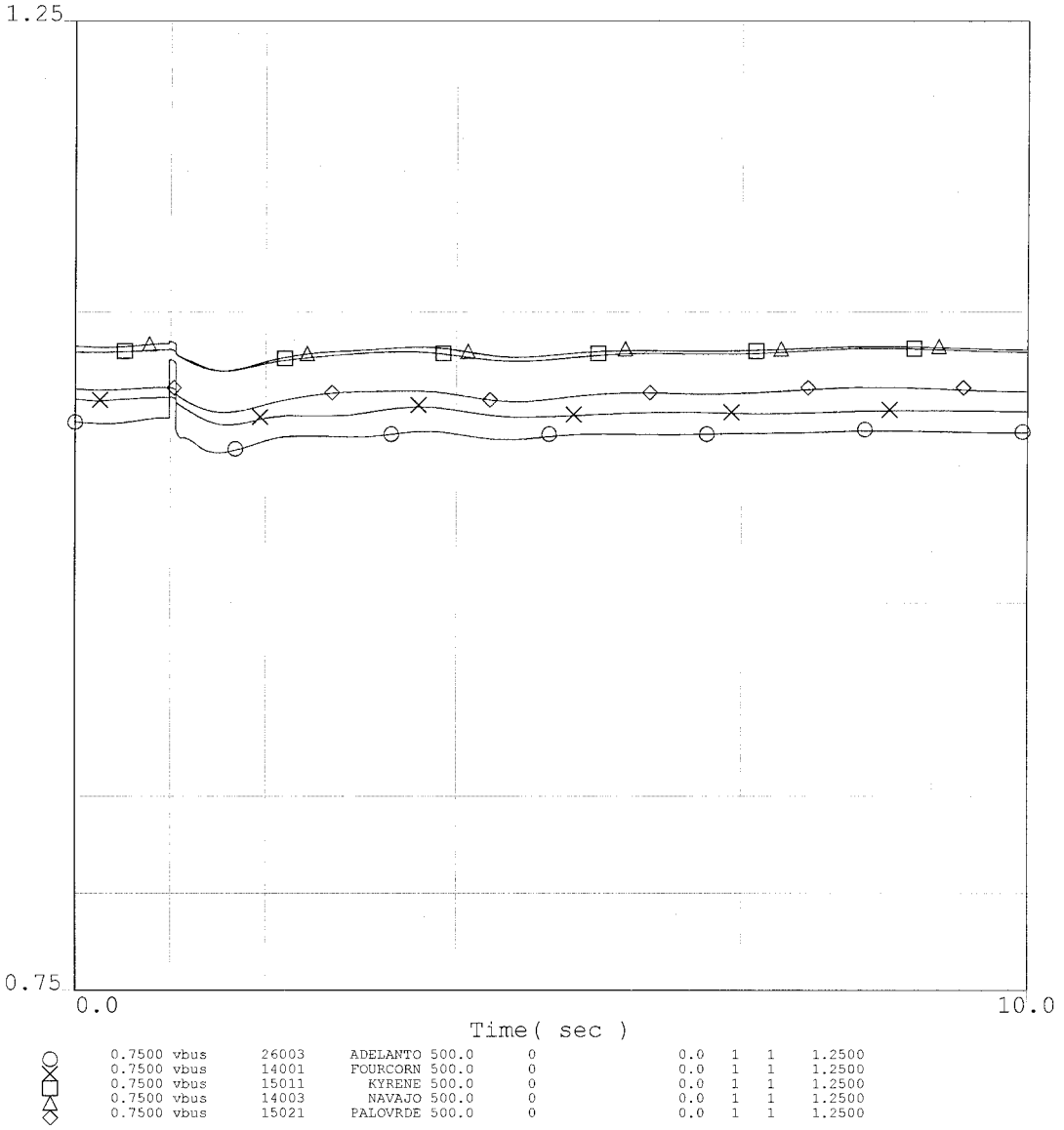
14HS-TS12:IPP BIPOLAR DC PERMANENT BLOCK
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

ARIZONA_voltages:



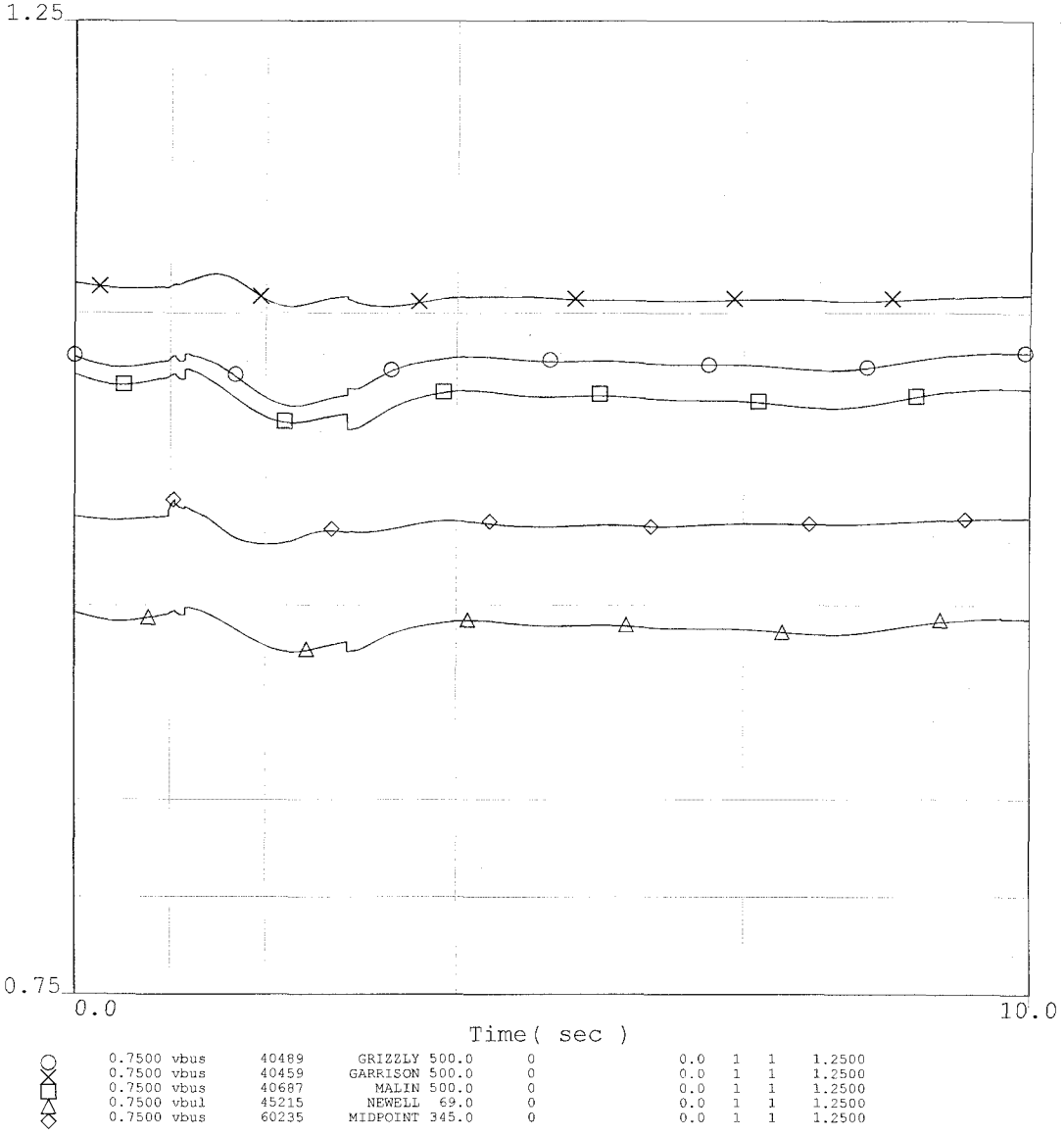
14HS-TS12:IPP BIPOLAR DC PERMANENT BLOCK
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

ARIZONA_voltages:



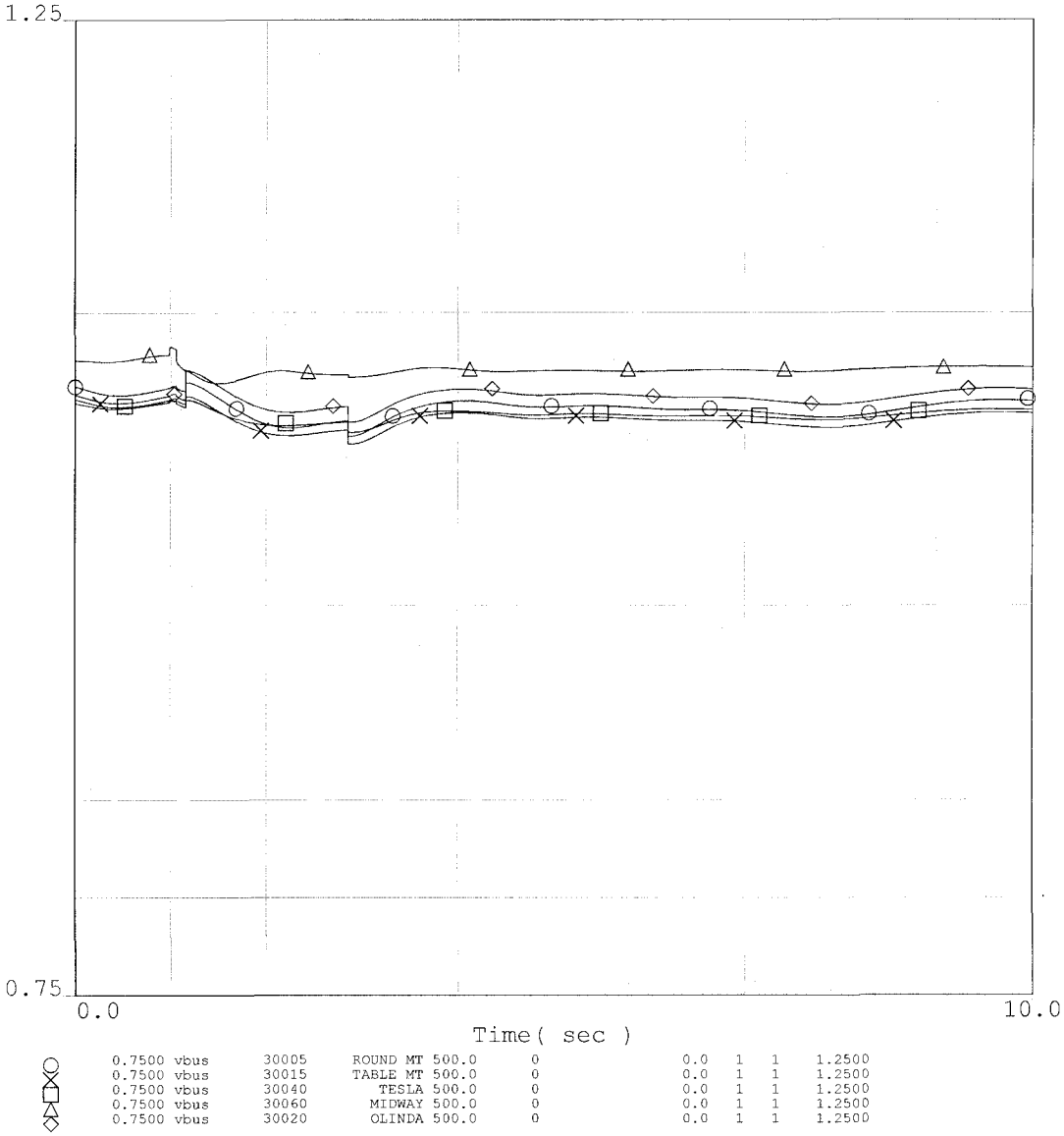
14HS-TS12:IPP BIPOLAR DC PERMANENT BLOCK
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

NORTHWEST_voltages:



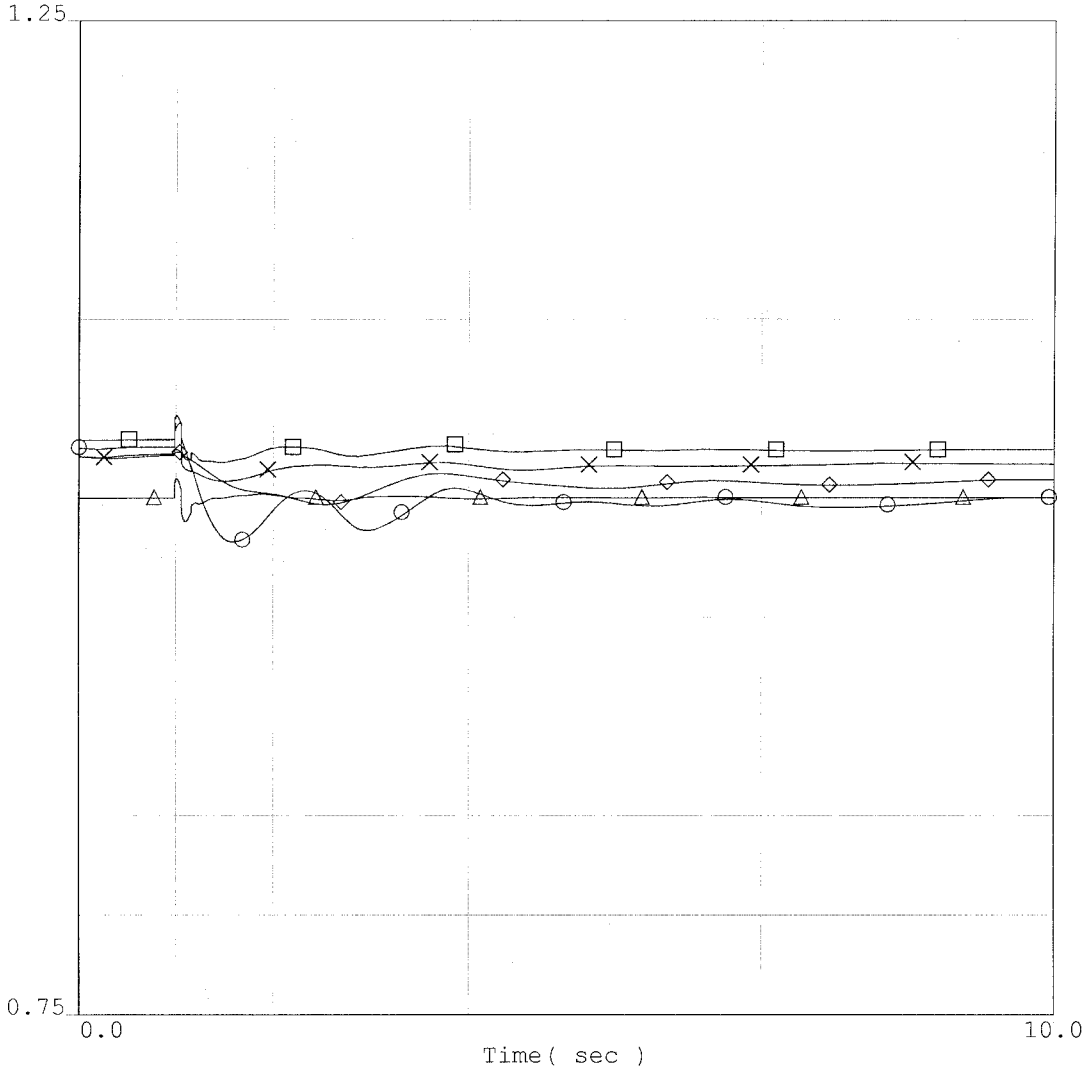
14HS-TS12:IPP BIPOLAR DC PERMANENT BLOCK
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

CALIFORNIA_voltages:



14HS-TS12:IPP BIPOLAR DC PERMANENT BLOCK
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

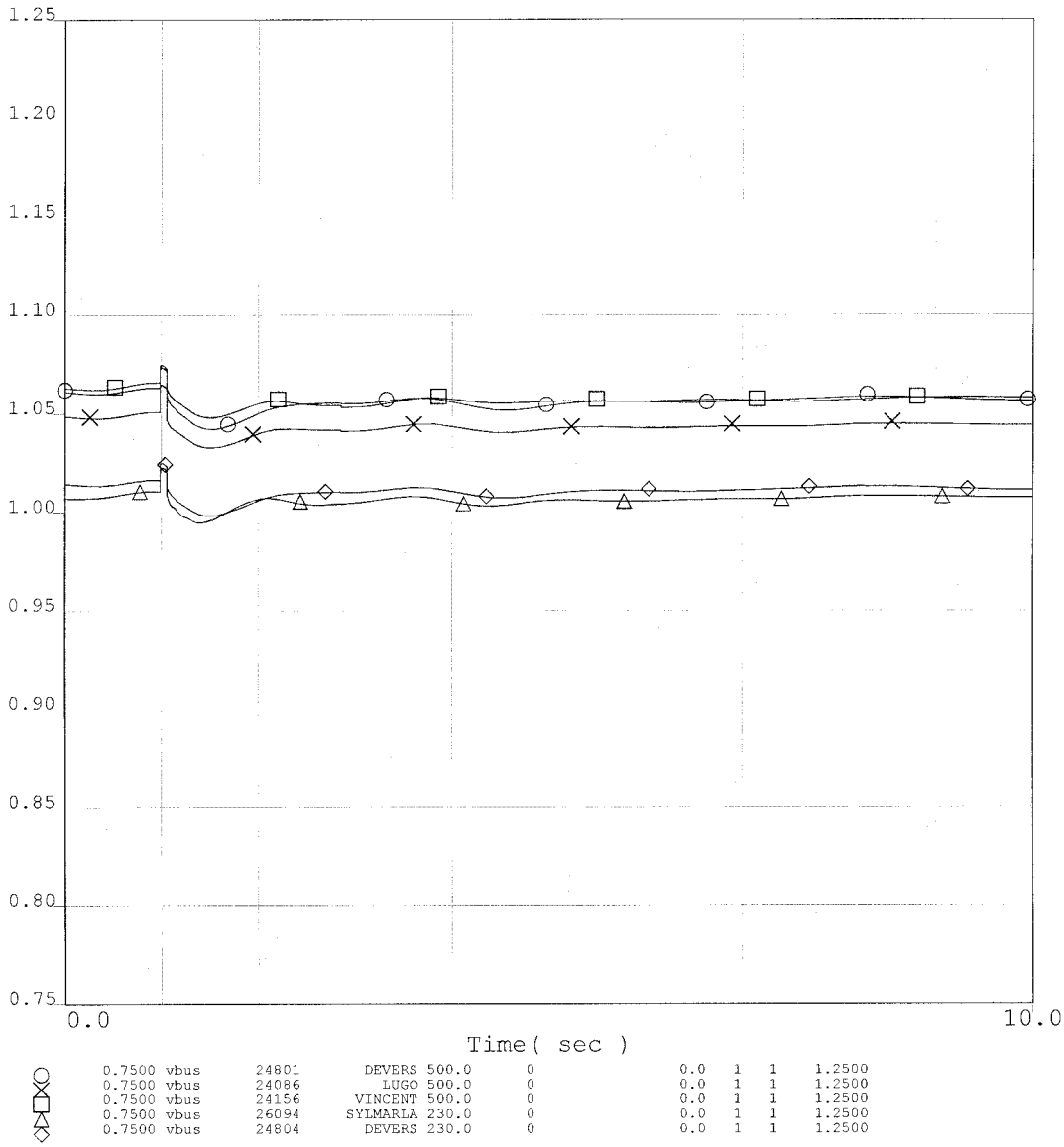
UTAH_voltages:



0.7500 vbus	66230	PINTO 138.0	0	0.0	1	1	1.2500
0.7500 vbus	18019	H ALLEN 230.0	0	0.0	1	1	1.2500
0.7500 vbus	66280	REDBUTTE 345.0	0	0.0	1	1	1.2500
0.7500 vbus	66420	SGSY 138.0	0	0.0	1	1	1.2500
0.7500 vbus	79023	DURANGO 115.0	0	0.0	1	1	1.2500

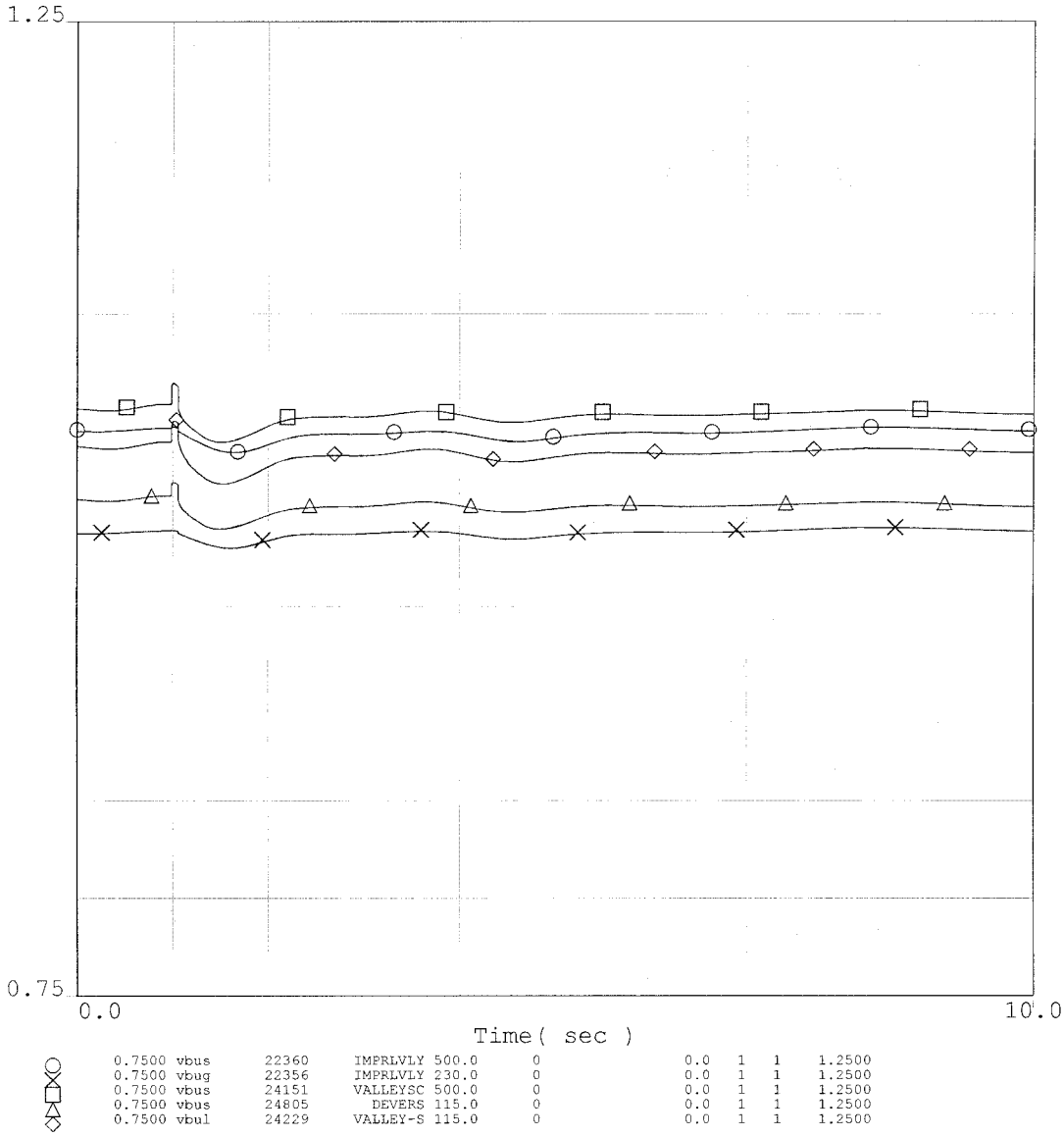
14HS-TS12:IPP BIPOLAR DC PERMANENT BLOCK
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

CALIFORNIA_voltages:



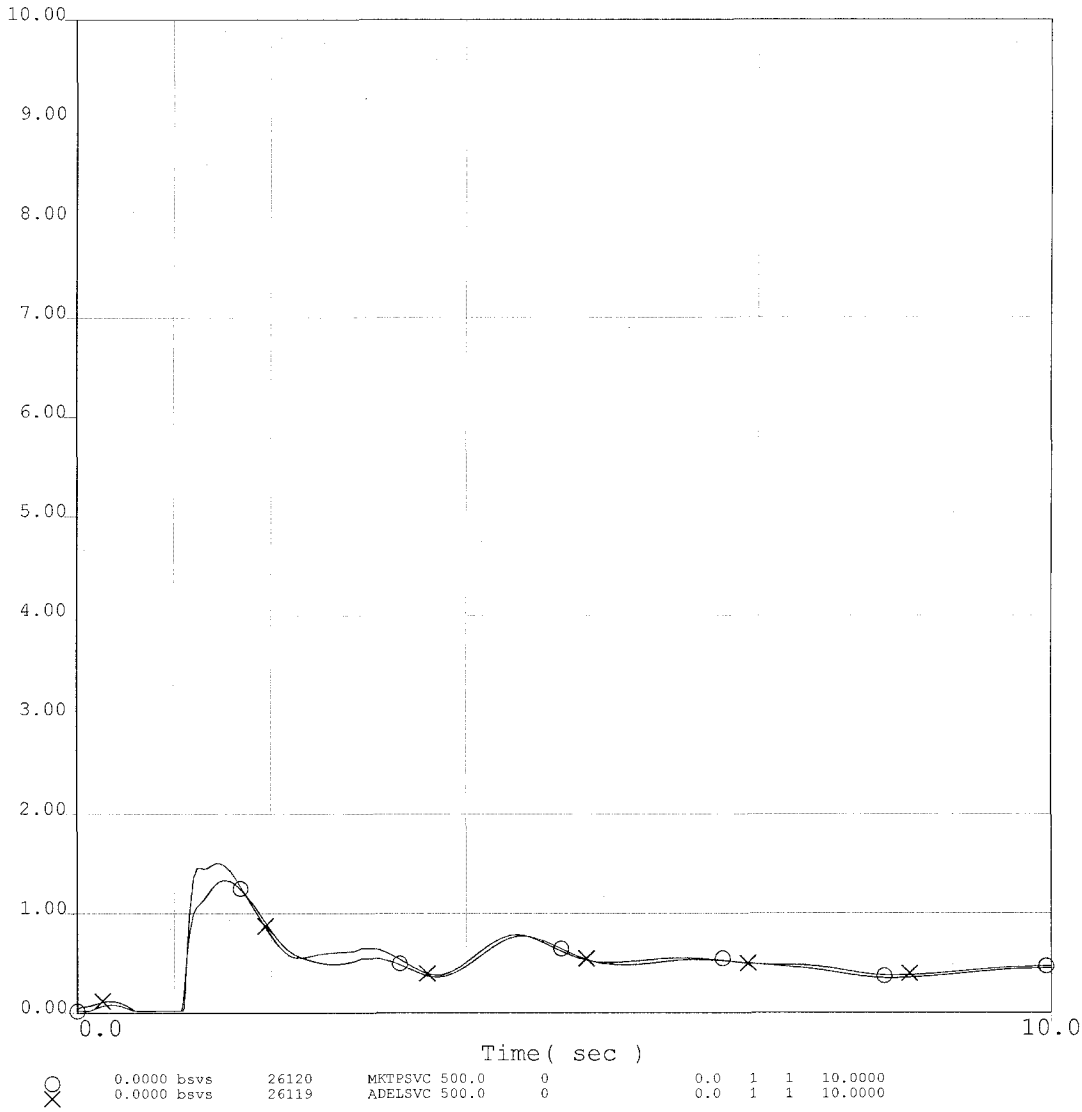
14HS-TS12:IPP BIPOLAR DC PERMANENT BLOCK
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

CALIFORNIA_voltages:



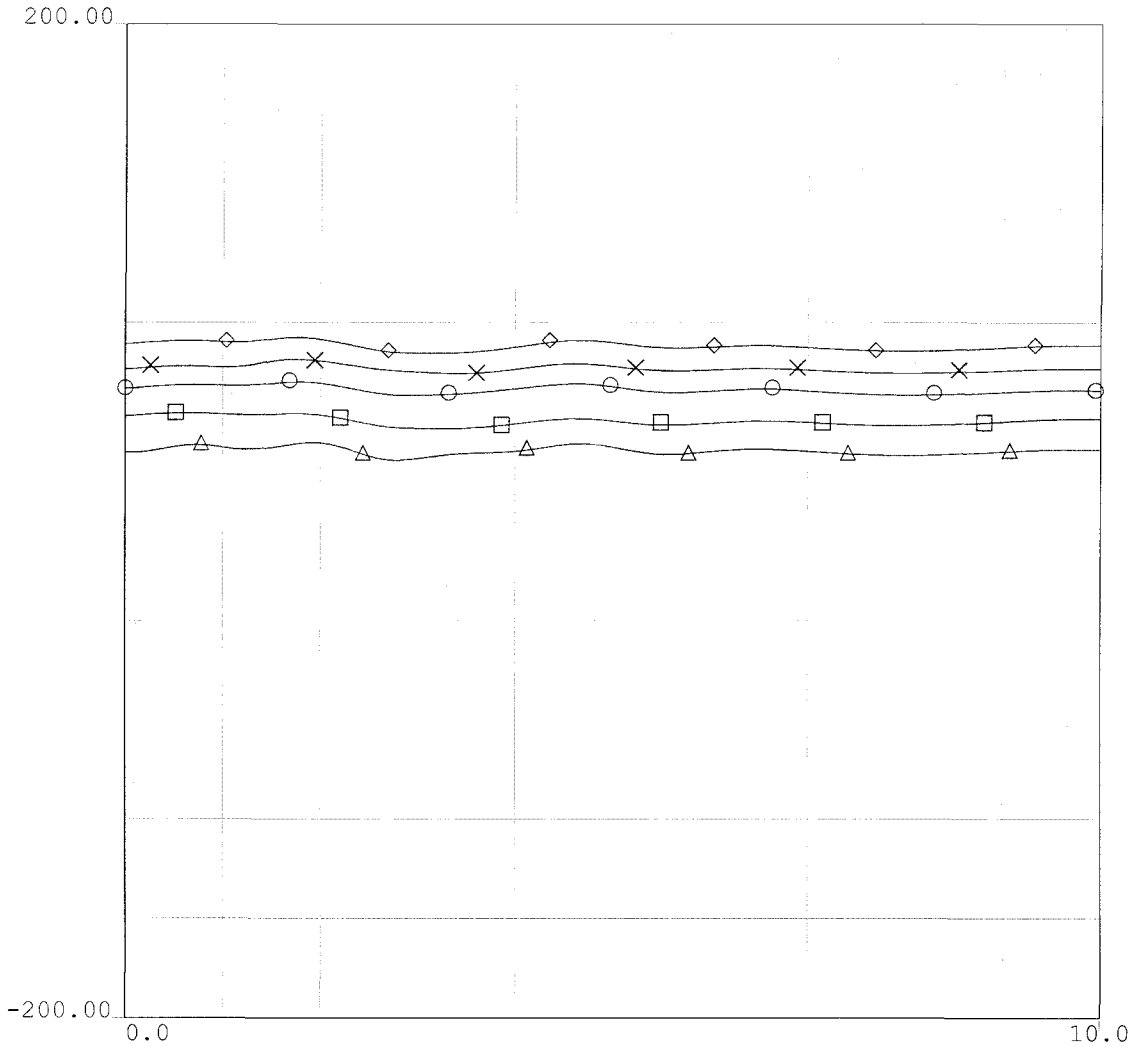
14HS-TS12:IPP BIPOLAR DC PERMANENT BLOCK
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

SVC_output



14HS-TS12:IPP BIPOLAR DC PERMANENT BLOCK
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

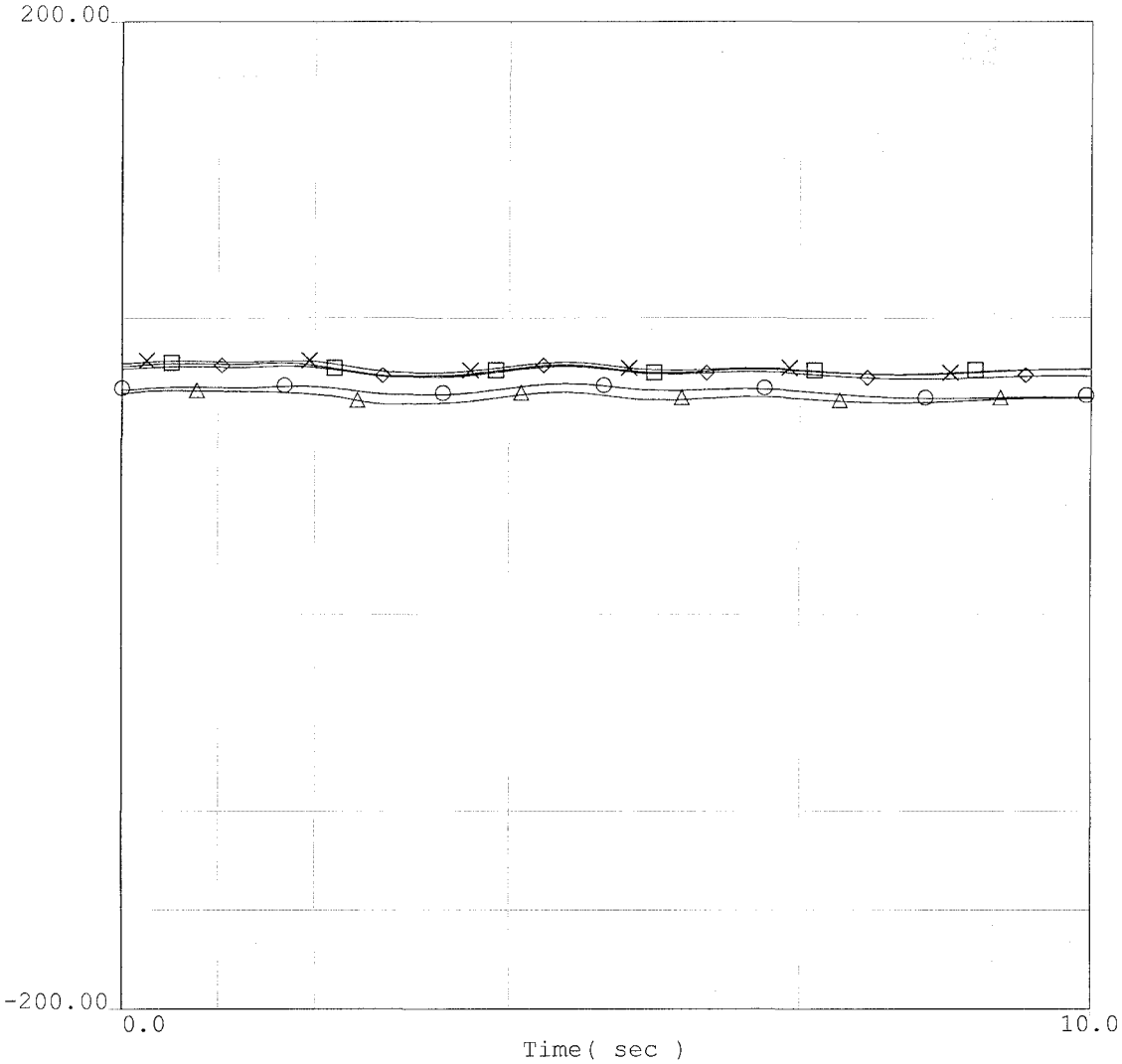
SYSTEM_Rotorangles



-200.0000 ang	16500	SPR GEN1	19.0	0	0.0	1	1	200.0000
-200.0000 ang	10321	SJUAN_G4	22.0	0	0.0	1	1	200.0000
-200.0000 ang	14942	SAGUARO2	15.5	0	0.0	1	1	200.0000
-200.0000 ang	17024	APACHCT1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	16518	SPR GEN3	21.0	0	0.0	1	1	200.0000

14HS-TS12:IPP BIPOLAR DC PERMANENT BLOCK
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

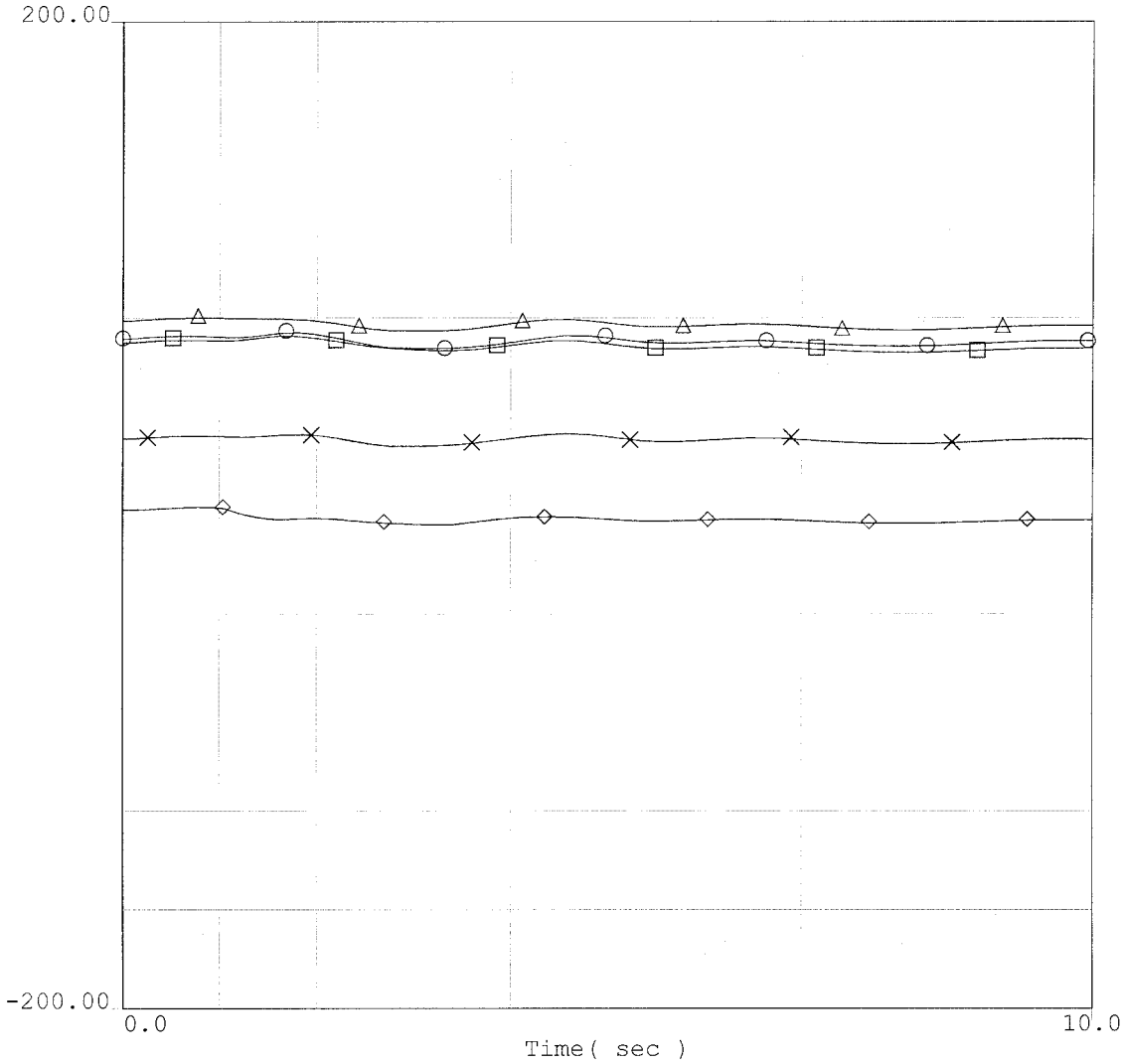
SYSTEM_Rotorangles



-200.0000 ang	15140	DBG-CT1	18.0	0	0.0	1	1	200.0000
-200.0000 ang	14945	SAG. CT3	13.8	0	0.0	1	1	200.0000
-200.0000 ang	14902	CHOLLA3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	15921	SANTAN 1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	14903	CHOLLA4	22.0	0	0.0	1	1	200.0000

14HS-TS12:IPP BIPOLAR DC PERMANENT BLOCK
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

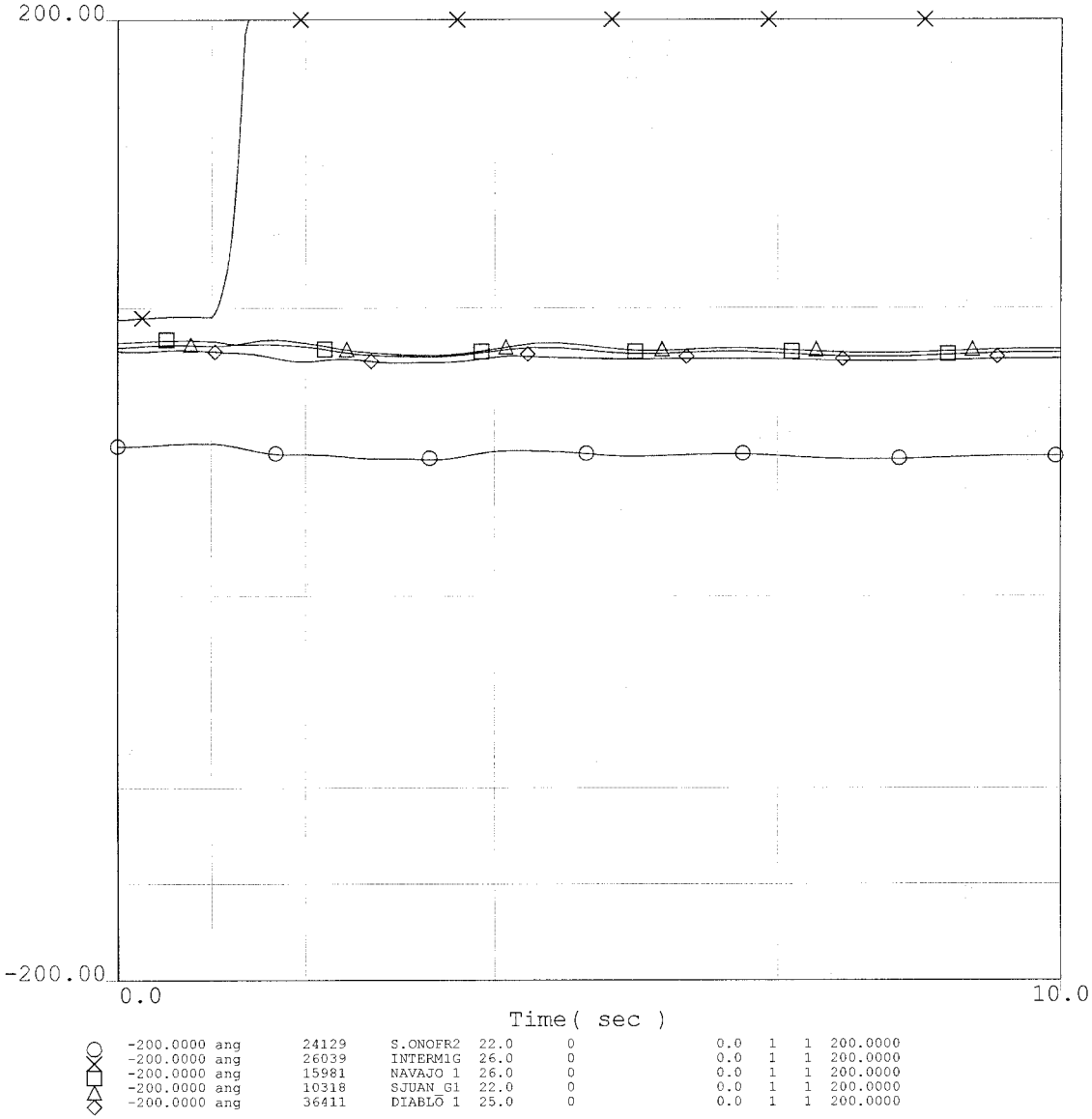
SYSTEM_Rotorangles



-200.0000 ang	16518	SPR GEN3	21.0	0	0.0	1	1	200.0000
-200.0000 ang	16503	SUNDTGE4	18.0	0	0.0	1	1	200.0000
-200.0000 ang	14914	FCNGN4CC	22.0	0	0.0	H	1	200.0000
-200.0000 ang	14931	PALOVRD1	24.0	0	0.0	1	1	200.0000
-200.0000 ang	24004	ALAMT4 G	18.0	0	0.0	H	1	200.0000

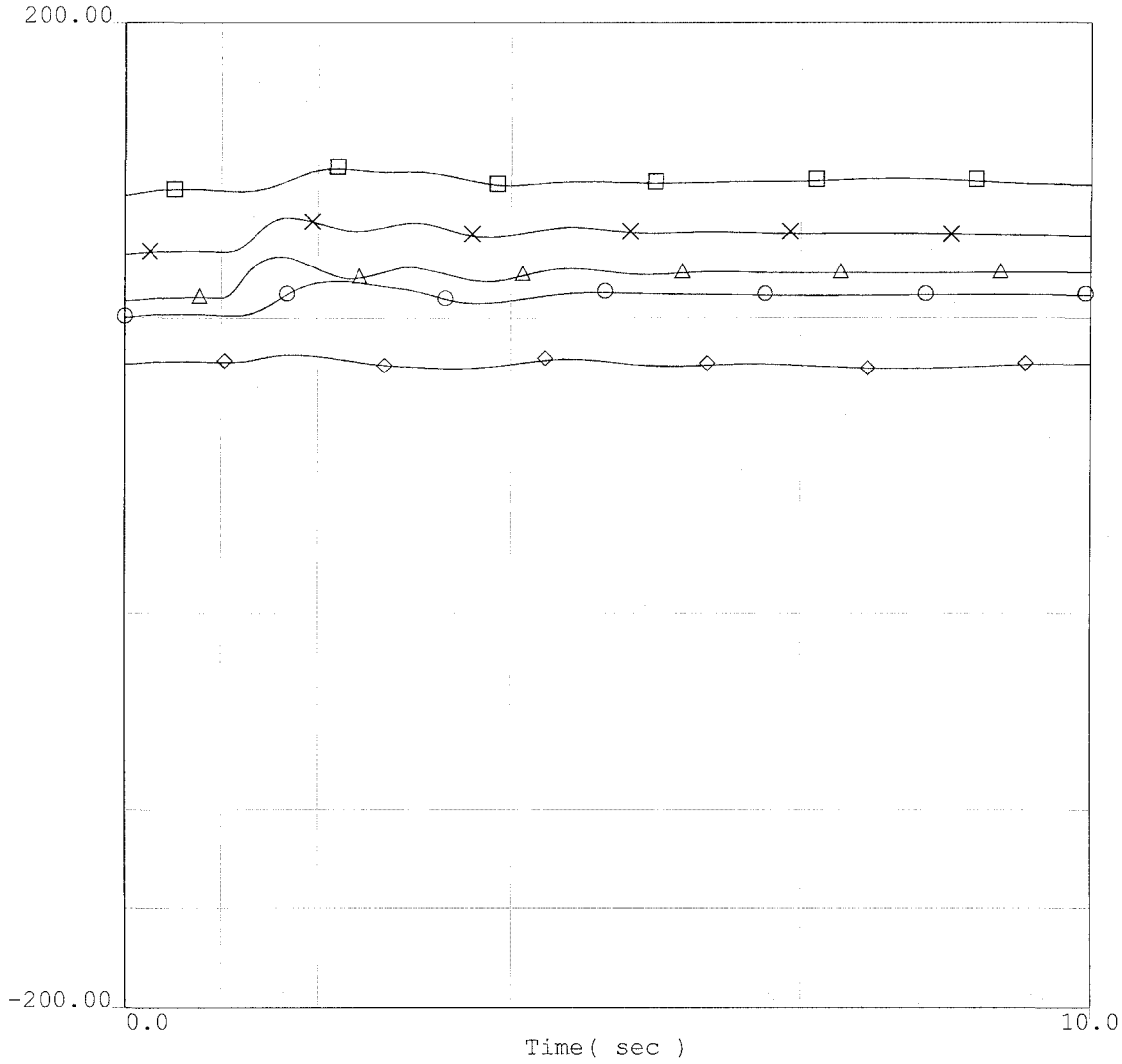
14HS-TS12:IPP BIPOLAR DC PERMANENT BLOCK
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

SYSTEM_Rotorangles



14HS-TS12:IPP BIPOLAR DC PERMANENT BLOCK
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

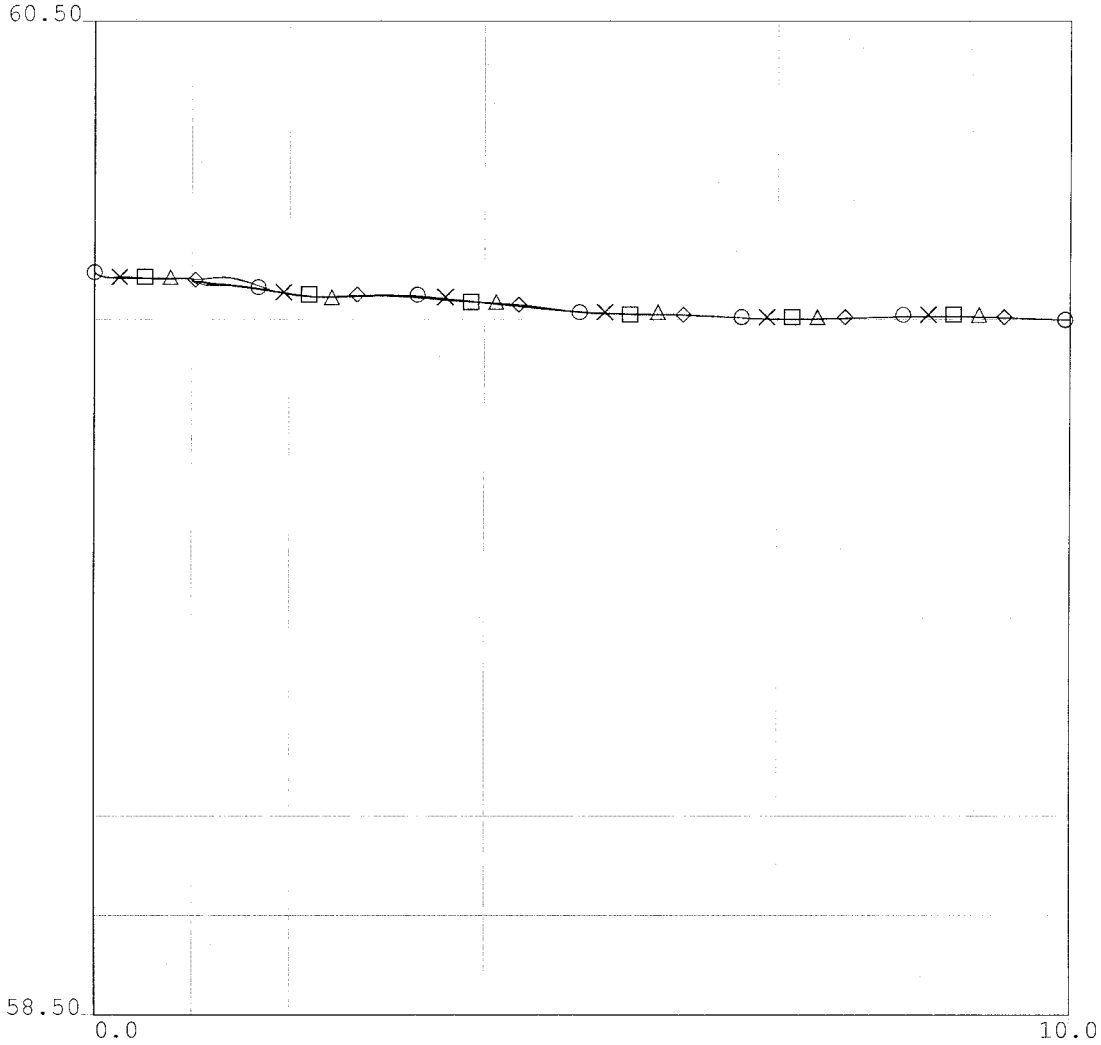
SYSTEM_Rotorangles



-200.0000 ang	73129	MBPP-1	24.0	0	0.0	1	1	200.0000
-200.0000 ang	60086	BRIDGER1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	62050	COLSTP 1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	65500	EHUNTR 3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	10321	SJUAN_G4	22.0	0	0.0	1	1	200.0000

14HS-TS12:IPP BIPOLAR DC PERMANENT BLOCK
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

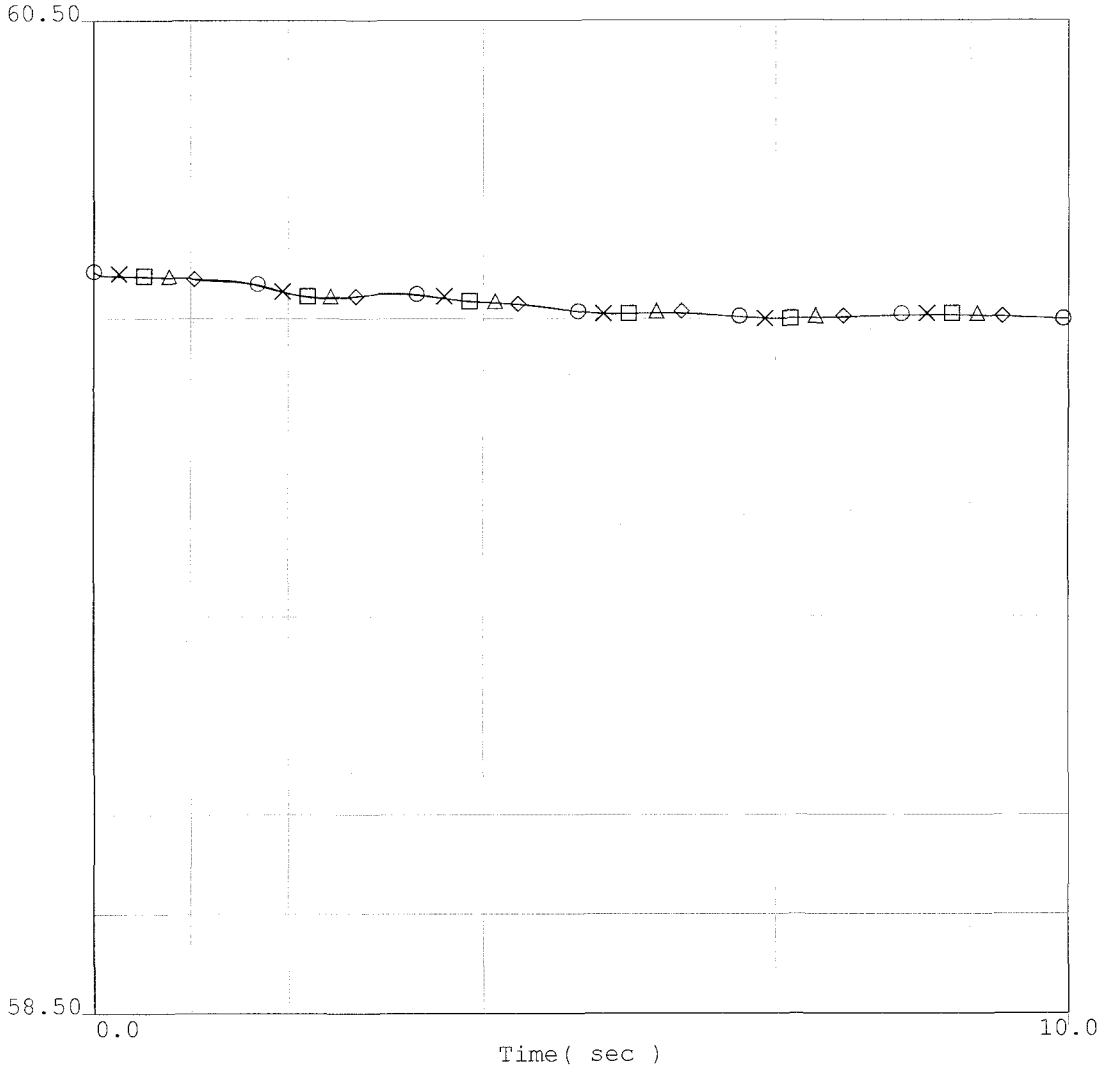
Frequencies:



58.5000 fbus	14003	NAVAJO 500.0	0	0.0	1	1	60.5000
58.5000 fbus	14005	WESTWING 500.0	0	0.0	1	1	60.5000
58.5000 fbus	14001	FOURCORN 500.0	0	0.0	1	1	60.5000
58.5000 fbus	14016	PNPKAPS 500.0	0	0.0	1	1	60.5000
58.5000 fbus	15021	PALOVRDE 500.0	0	0.0	1	1	60.5000

14HS-TS12:IPP BIPOLAR DC PERMANENT BLOCK
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

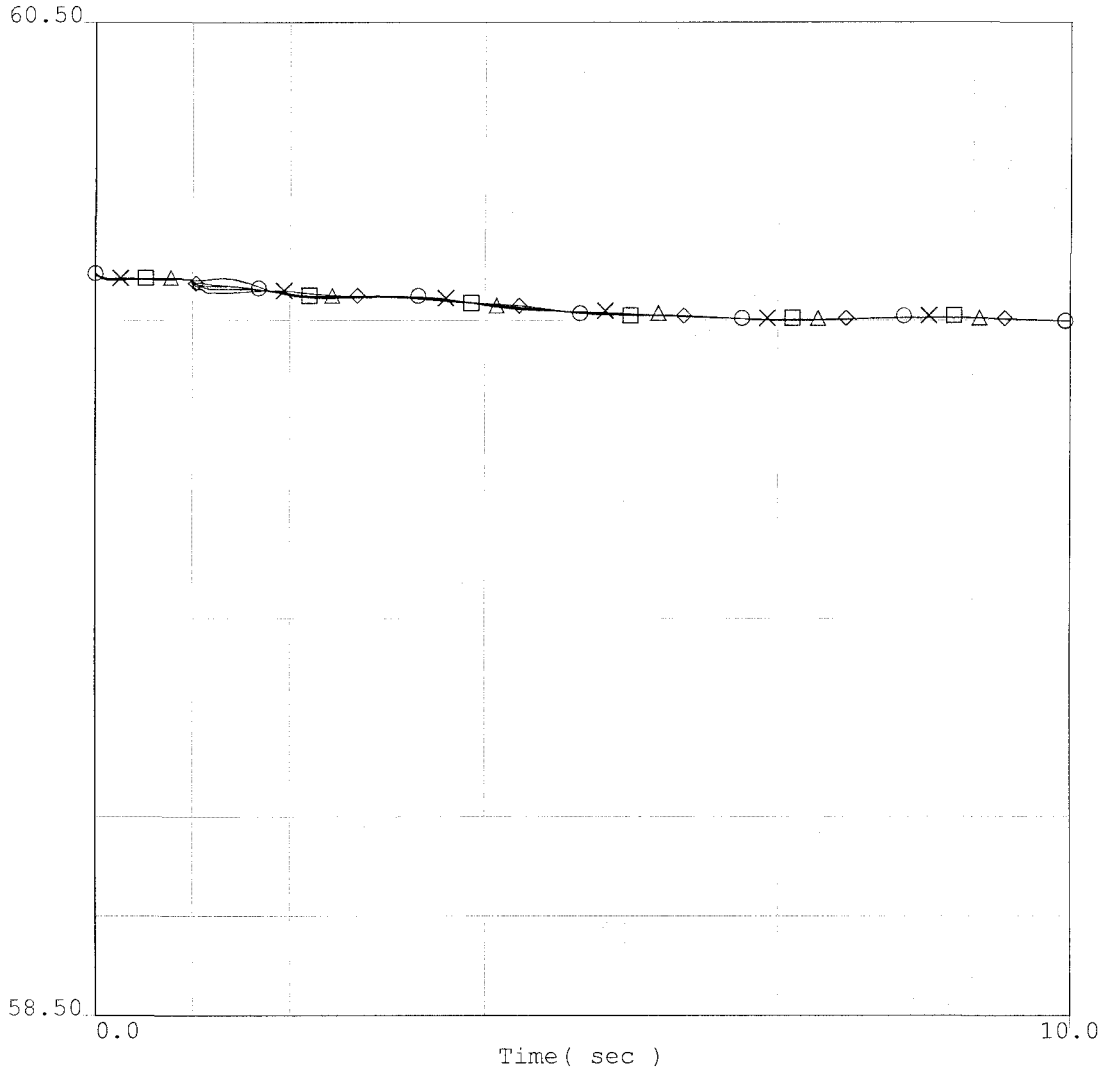
Frequencies:



58.5000 fbus	16000	TORTOLIT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	16105	VAIL 345.0	0	0.0	1	1	60.5000
58.5000 fbus	16103	SOUTH 345.0	0	0.0	1	1	60.5000
58.5000 fbul	15001	CORONADO 500.0	0	0.0	1	1	60.5000
58.5000 fbus	16109	WINCHSTR 345.0	0	0.0	1	1	60.5000

14HS-TS12:IPP BIPOLAR DC PERMANENT BLOCK
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

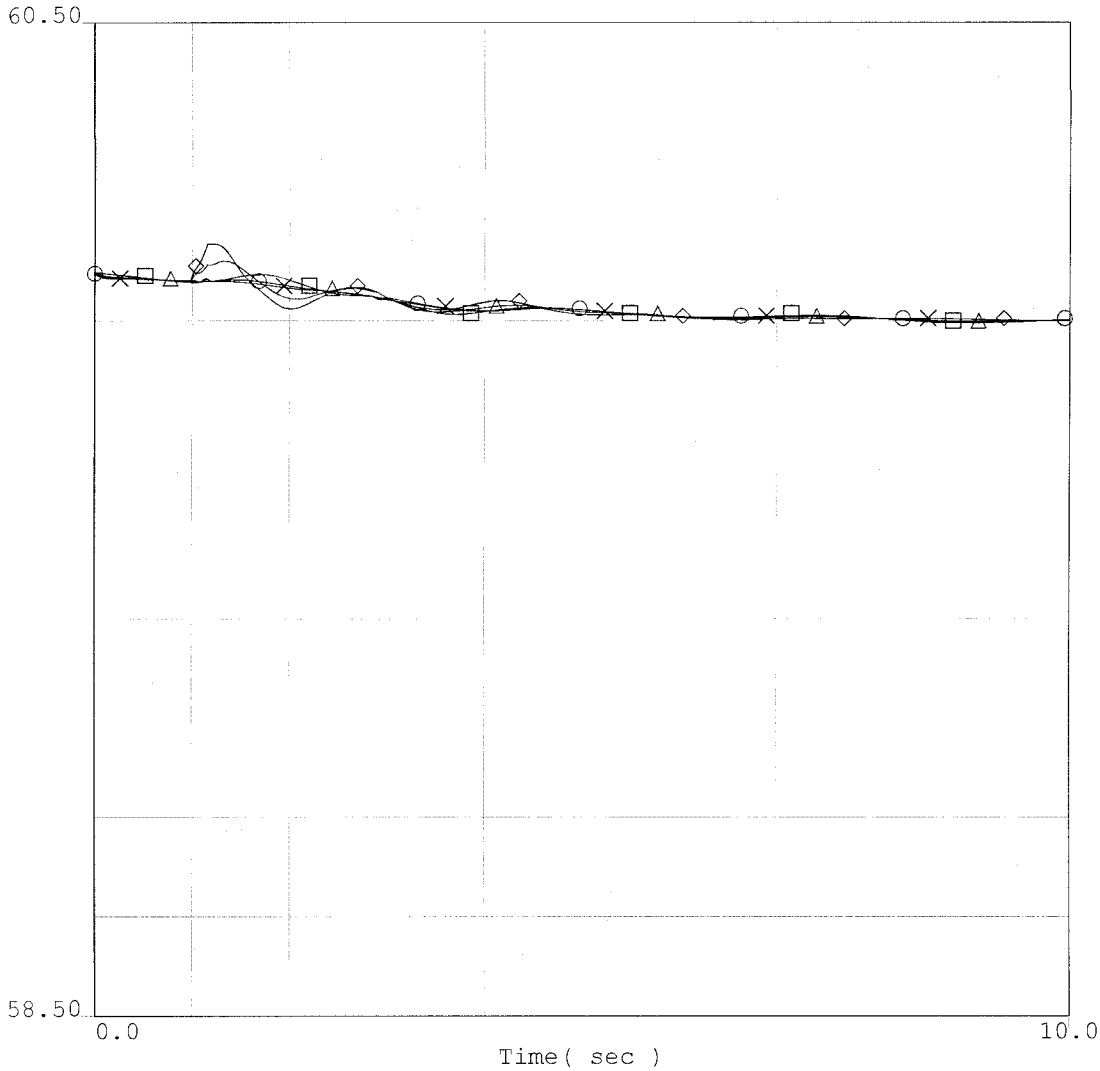
Frequencies:



58.5000	fbul	14231	WESTWNGW 230.0	0	0.0	1	1	60.5000
58.5000	fbus	26003	ADELANTO 500.0	0	0.0	1	1	60.5000
58.5000	fbus	14001	FOURCORN 500.0	0	0.0	1	1	60.5000
58.5000	fbus	26048	MCCULLGH 500.0	0	0.0	1	1	60.5000
58.5000	fbus	14003	NAVAJO 500.0	0	0.0	1	1	60.5000

14HS-TS12:IPP BIPOLAR DC PERMANENT BLOCK
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

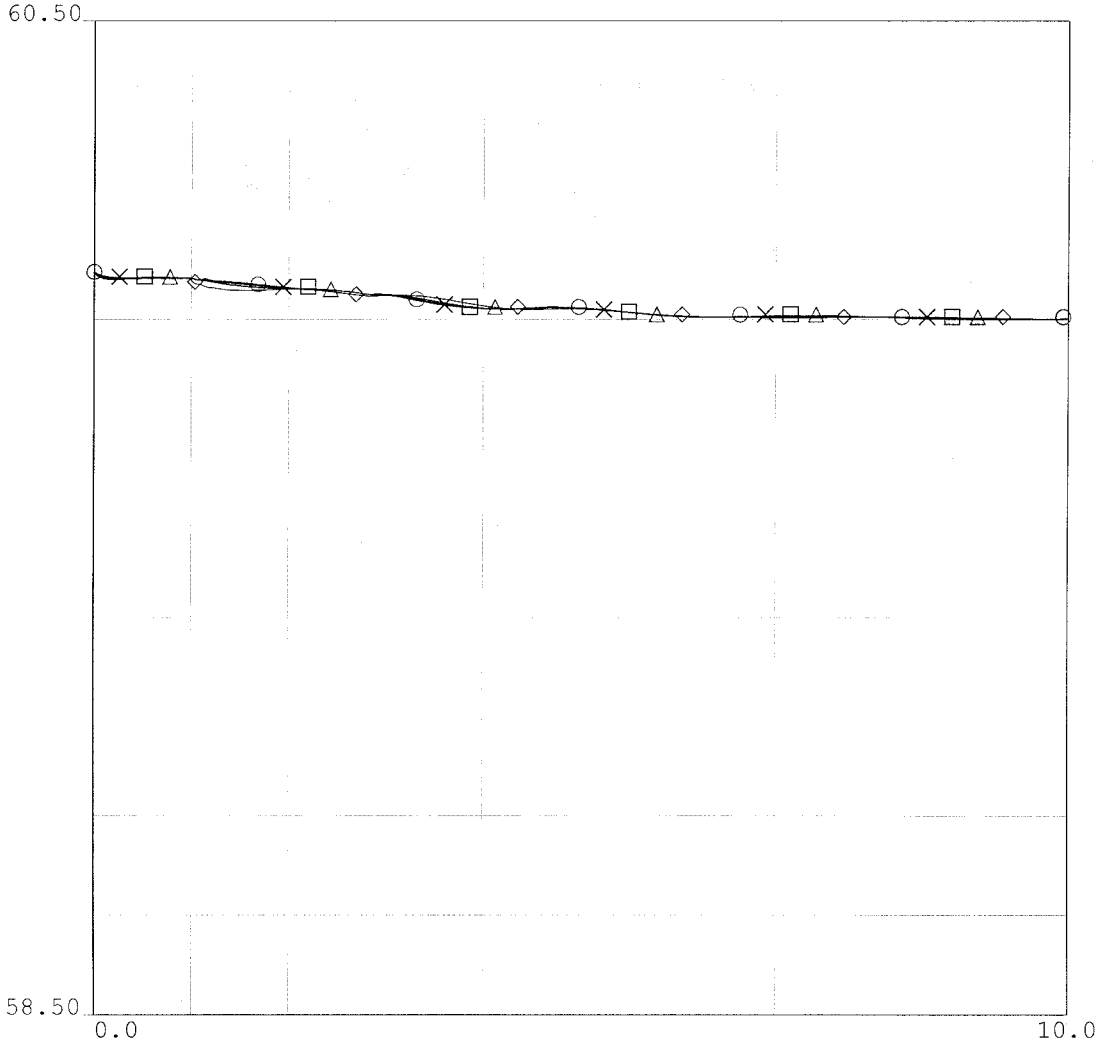
Frequencies:



58.5000	fbus	40489	GRIZZLY 500.0	0	0.0	1	1	60.5000
58.5000	fbus	40687	MALIN 500.0	0	0.0	1	1	60.5000
58.5000	fbus	40459	GARRISON 500.0	0	0.0	1	1	60.5000
58.5000	fbus	60235	MIDPOINT 345.0	0	0.0	1	1	60.5000
58.5000	fbus	66230	PINTO 138.0	0	0.0	1	1	60.5000

14HS-TS12:IPP BIPOLAR DC PERMANENT BLOCK
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

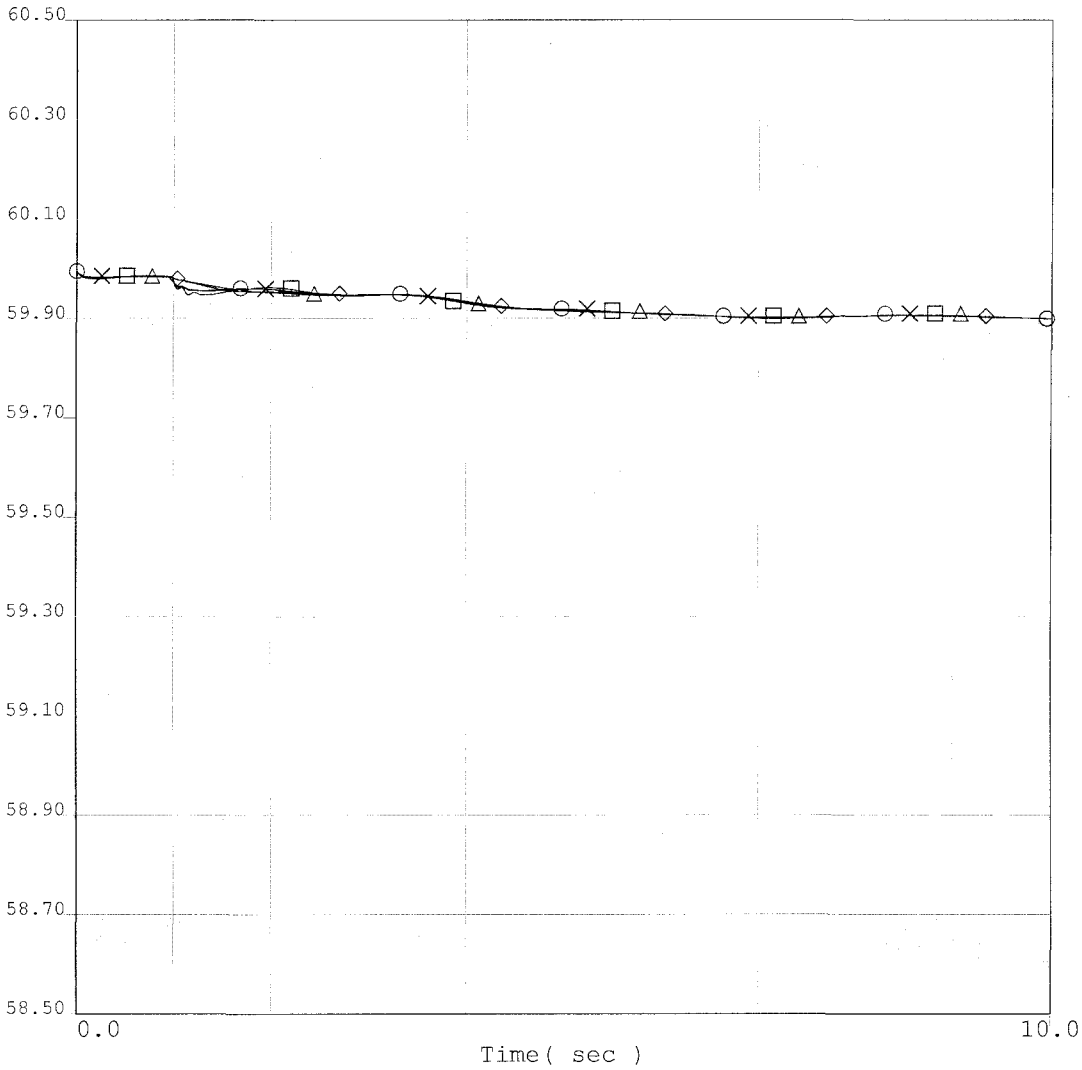
Frequencies:



58.5000 fbus	30005	ROUND MT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30015	TABLE MT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30035	TRACY 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30040	TESLA 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30060	MIDWAY 500.0	0	0.0	1	1	60.5000

14HS-TS12:IPP BIPOLAR DC PERMANENT BLOCK
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

Frequencies:



58.5000 fbus	24801	DEVERS 500.0	0	0.0	1	1	60.5000
58.5000 fbus	24086	LUGO 500.0	0	0.0	1	1	60.5000
58.5000 fbus	26094	SYLMARLA 230.0	0	0.0	1	1	60.5000
58.5000 fbus	22468	MIGUEL 500.0	0	0.0	1	1	60.5000
58.5000 fbus	22536	N.GILA 500.0	0	0.0	1	1	60.5000

14HS-TS12:IPP BIPOLAR DC PERMANENT BLOCK
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

HIGHEST VOLTAGE DIP

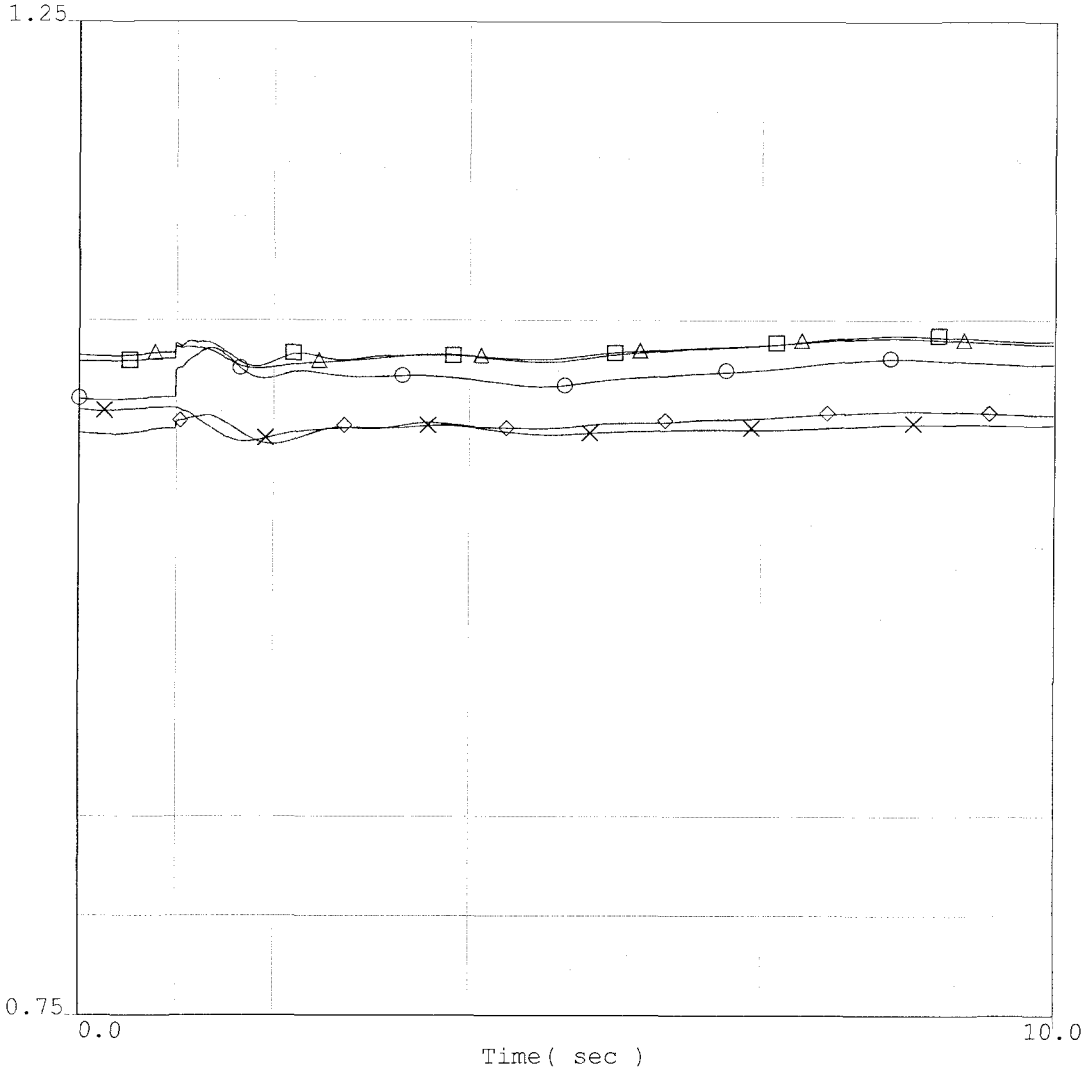
AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct	@time
64	GONDER1	69	vbul	1.01	0.935	7.5	1.775
64	GONDER1	230	vbus	0.999	0.926	7.3	1.775
40	COID TAP	69	vbug	1.017	0.987	3	2.3

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
54	LONGLK10	25	fbul	59.874	4.775
26	INTERMT	345	fbus	59.874	2
26	INTERM2G	26	fbug	59.848	2

There were 0 violations of MORC criteria 1 (25% Voltage Dip) !
There were 0 violations of MORC criteria 2 (20% Voltage Dip for 20 Cycles)!
There were 0 violations of MORC criteria 3 (59.6 HZ for 6 Cycles)!

ARIZONA_voltages:



○	0.7500 vbus	15021	PALOVRDE	500.0	0	0.0	1	1	1.2500
⊗	0.7500 vbus	14001	FOURCORN	500.0	0	0.0	1	1	1.2500
□	0.7500 vbus	15011	KYRENE	500.0	0	0.0	1	1	1.2500
△	0.7500 vbus	14003	NAVAJO	500.0	0	0.0	1	1	1.2500
◇	0.7500 vbus	26003	ADELANTO	500.0	0	0.0	1	1	1.2500

2014HS-TS12:PALO VERDE TWO GENERATORS OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

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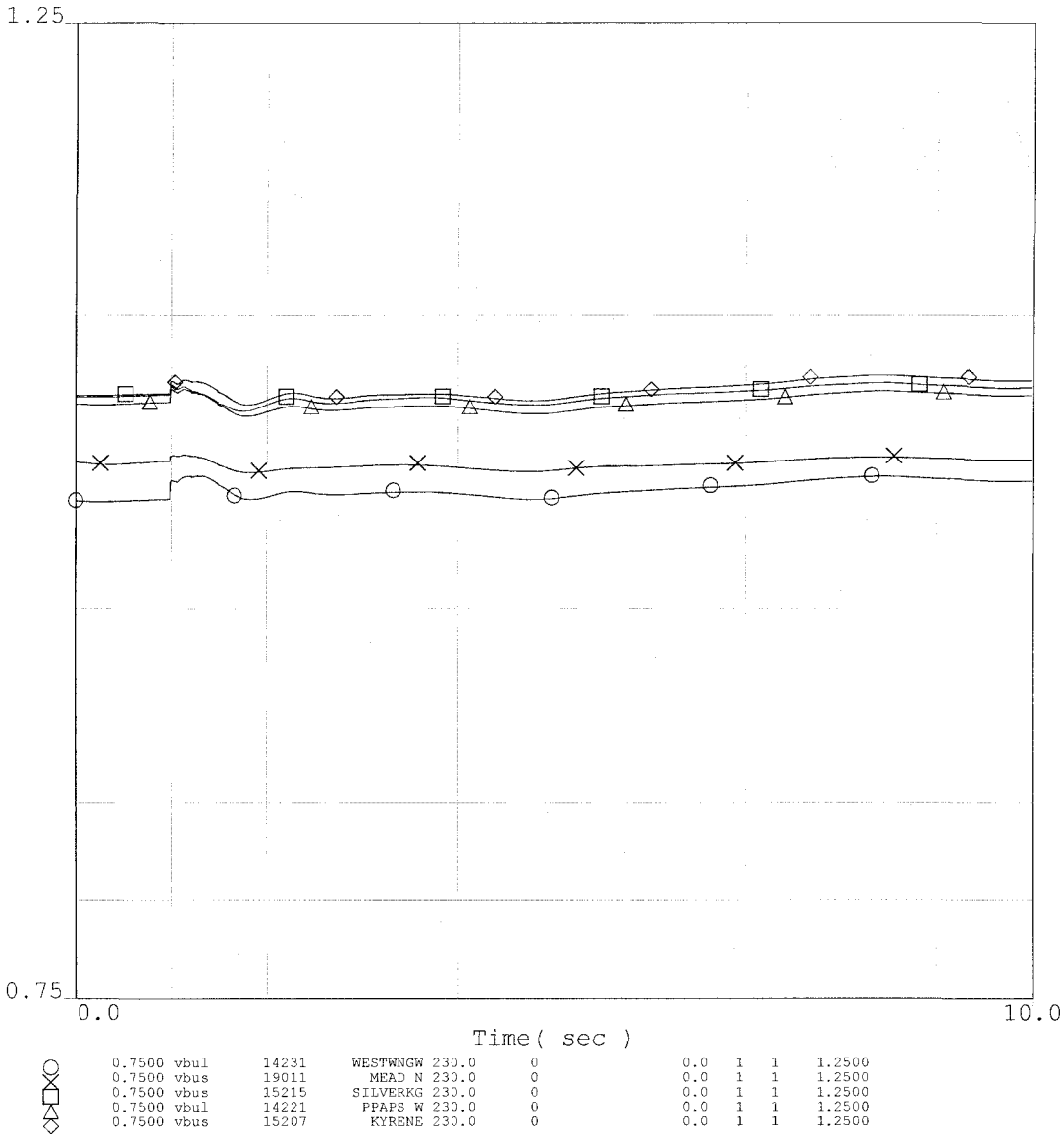
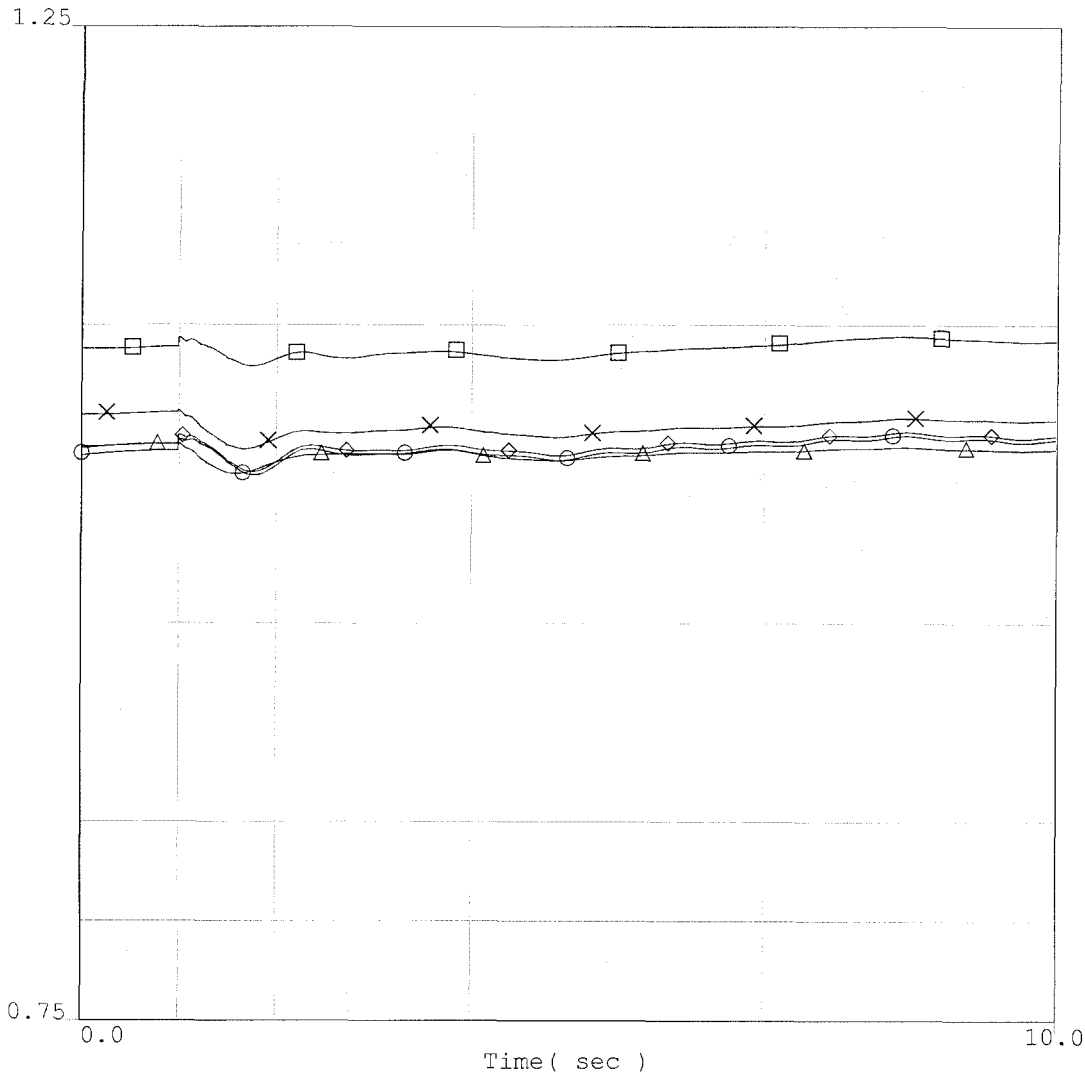
ARIZONA_voltages:



2014HS-TS12:PALO VERDE TWO GENERATORS OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

ARIZONA_voltages:



0.7500 vbus	16103	SOUTH 345.0	0	0.0	1	1	1.2500
0.7500 vbus	14000	CHOLLA 500.0	0	0.0	1	1	1.2500
0.7500 vbus	15041	SILVERKG 500.0	0	0.0	1	1	1.2500
0.7500 vbus	16104	SPRINGR 345.0	0	0.0	1	1	1.2500
0.7500 vbus	16109	WINCHSTR 345.0	0	0.0	1	1	1.2500

2014HS-TS12:PALO VERDE TWO GENERATORS OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

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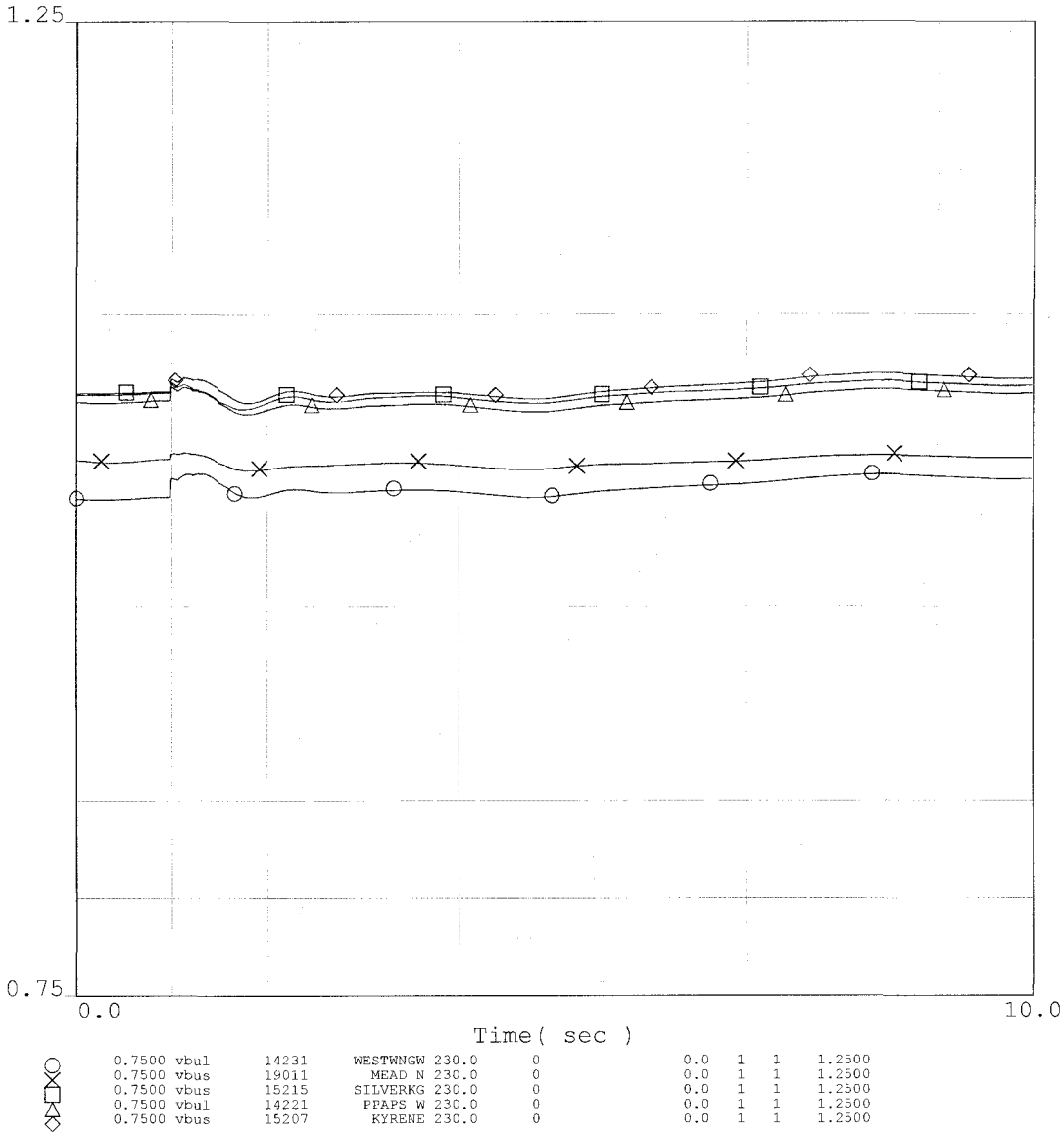
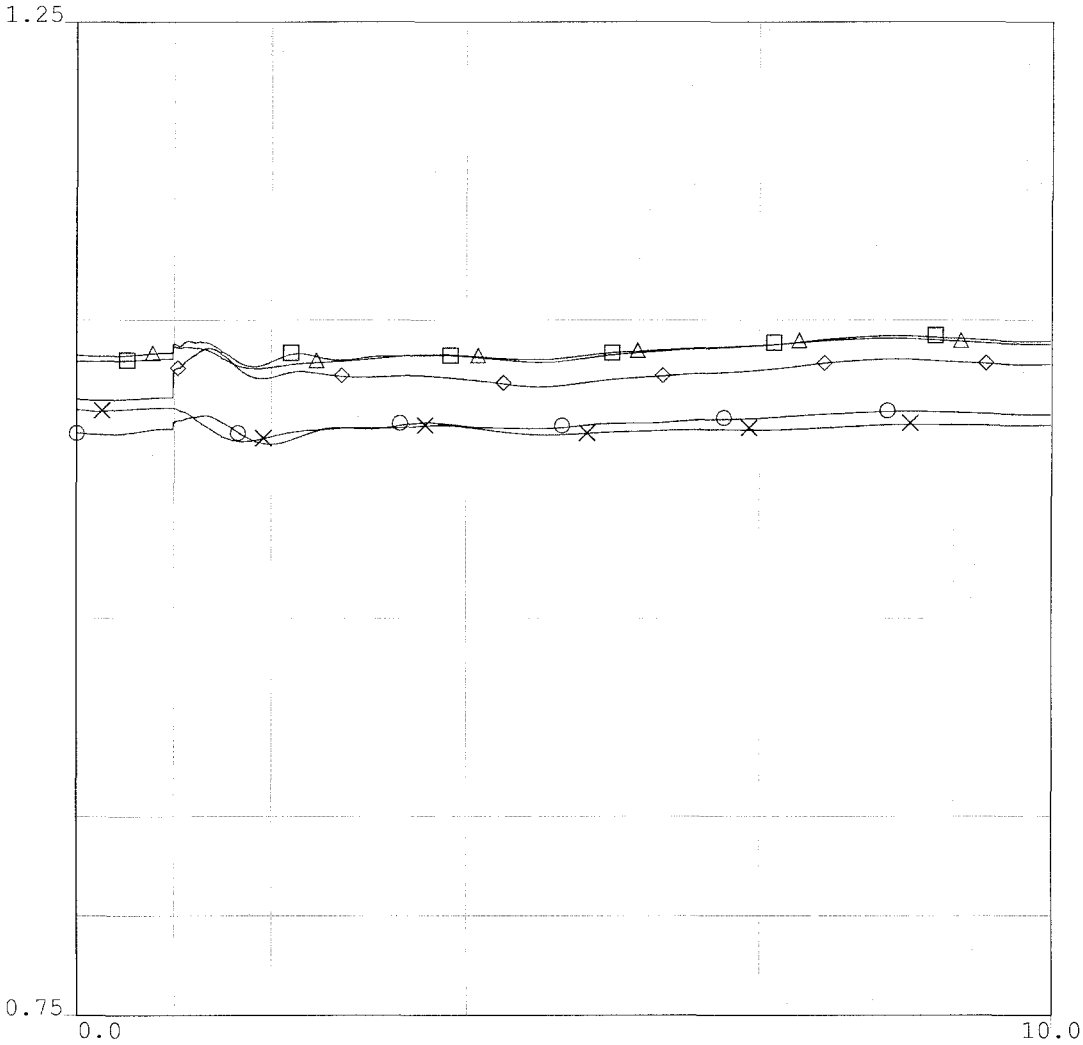
ARIZONA_voltages:



2014HS-TS12:PALO VERDE TWO GENERATORS OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

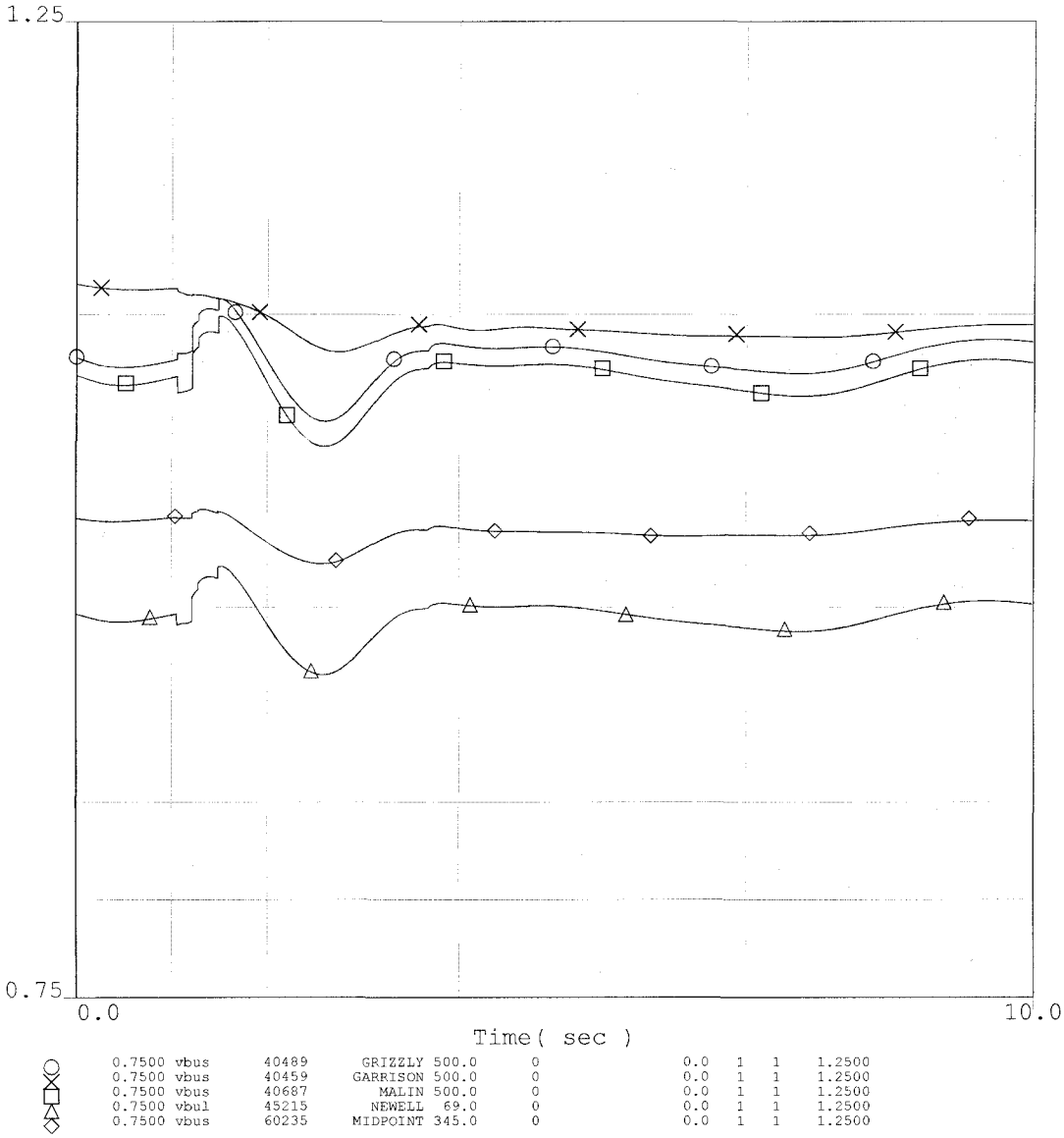
ARIZONA_voltages:



○	0.7500 vbus	26003	ADELANTO 500.0	0	0.0	1	1	1.2500
⊠	0.7500 vbus	14001	FOURCORN 500.0	0	0.0	1	1	1.2500
□	0.7500 vbus	15011	KYRENE 500.0	0	0.0	1	1	1.2500
△	0.7500 vbus	14003	NAVAJO 500.0	0	0.0	1	1	1.2500
◇	0.7500 vbus	15021	PALOVRDE 500.0	0	0.0	1	1	1.2500

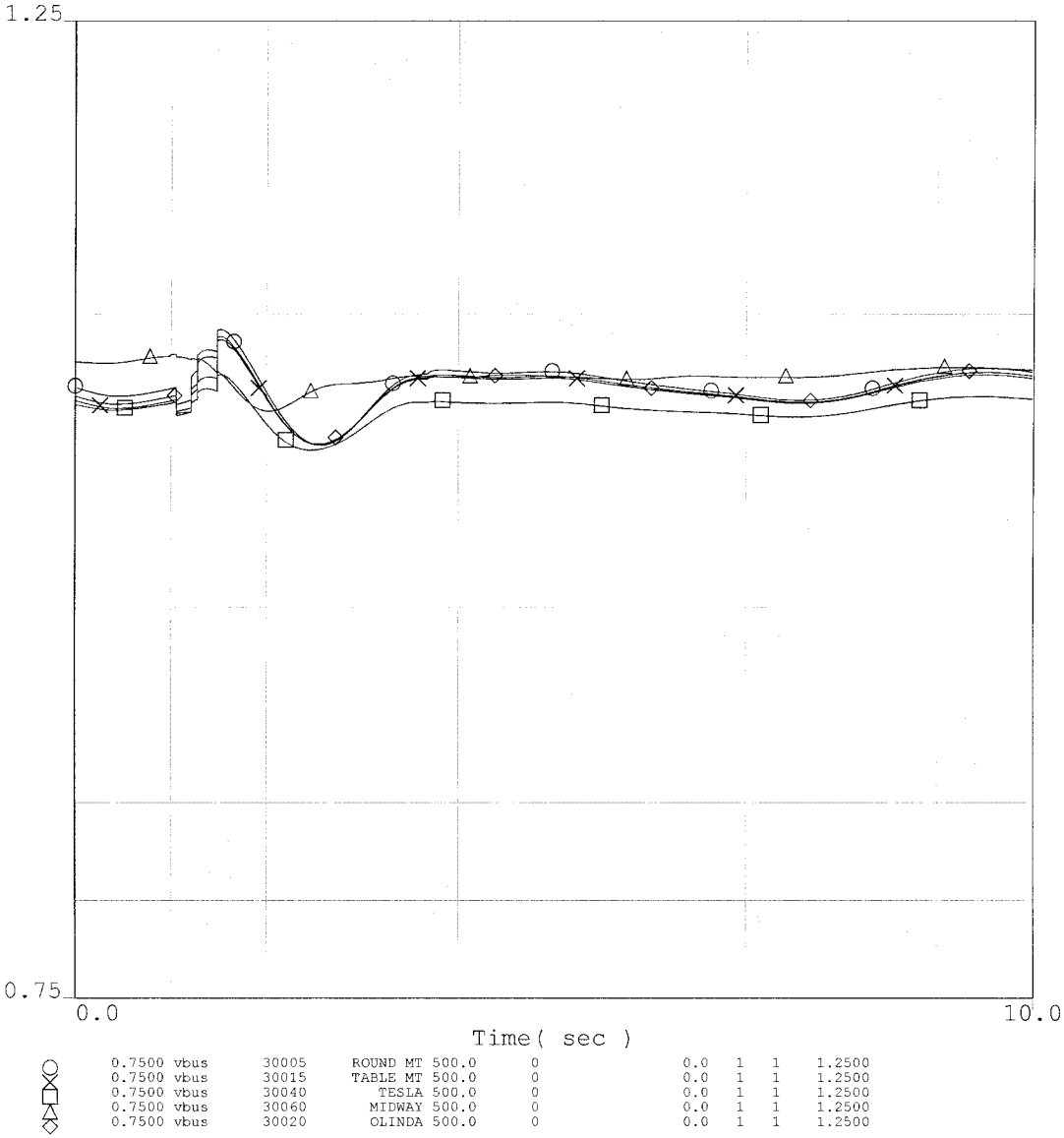
2014HS-TS12:PALO VERDE TWO GENERATORS OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

NORTHWEST_voltages:



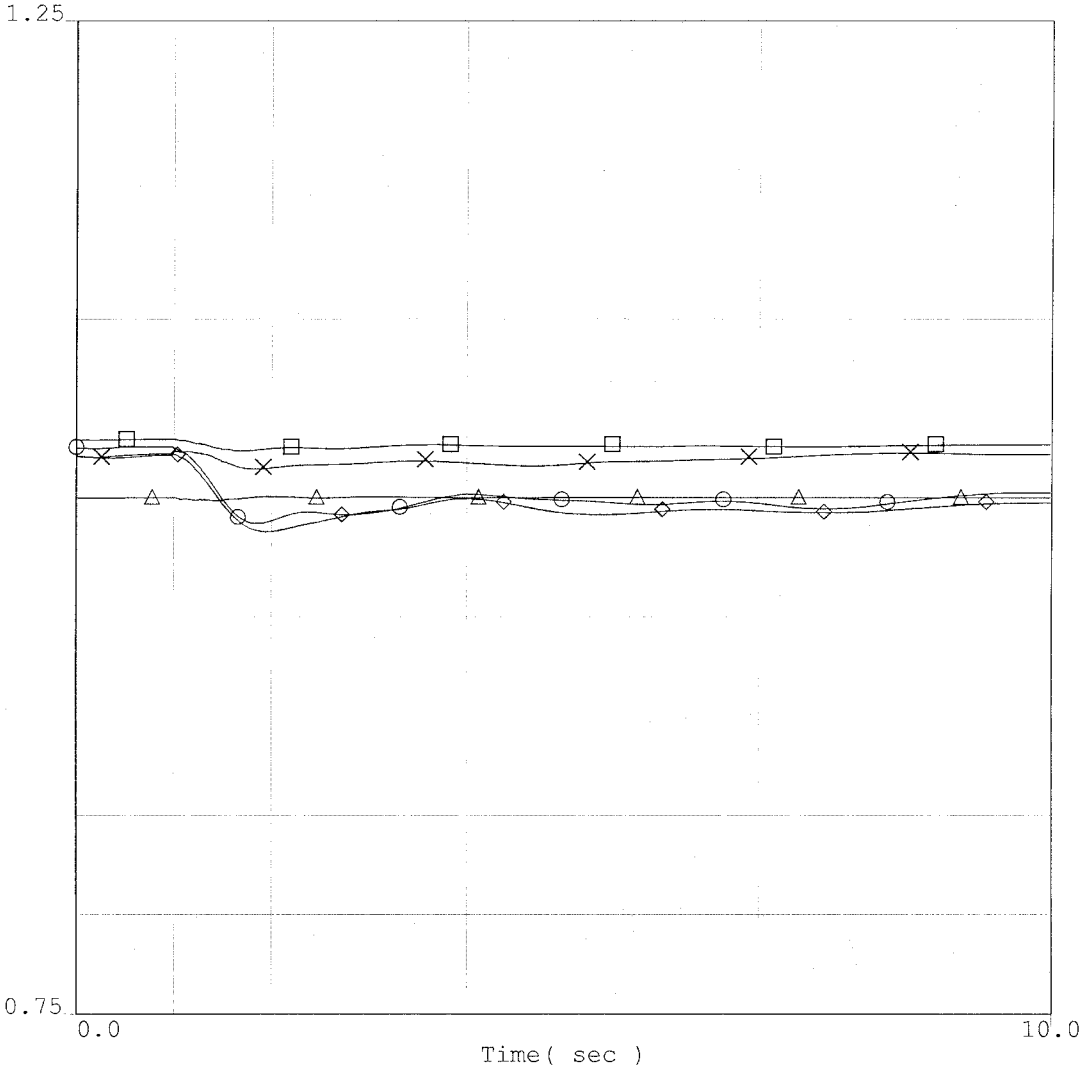
2014HS-TS12:PALO VERDE TWO GENERATORS OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

CALIFORNIA_voltages:



2014HS-TS12:PALO VERDE TWO GENERATORS OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

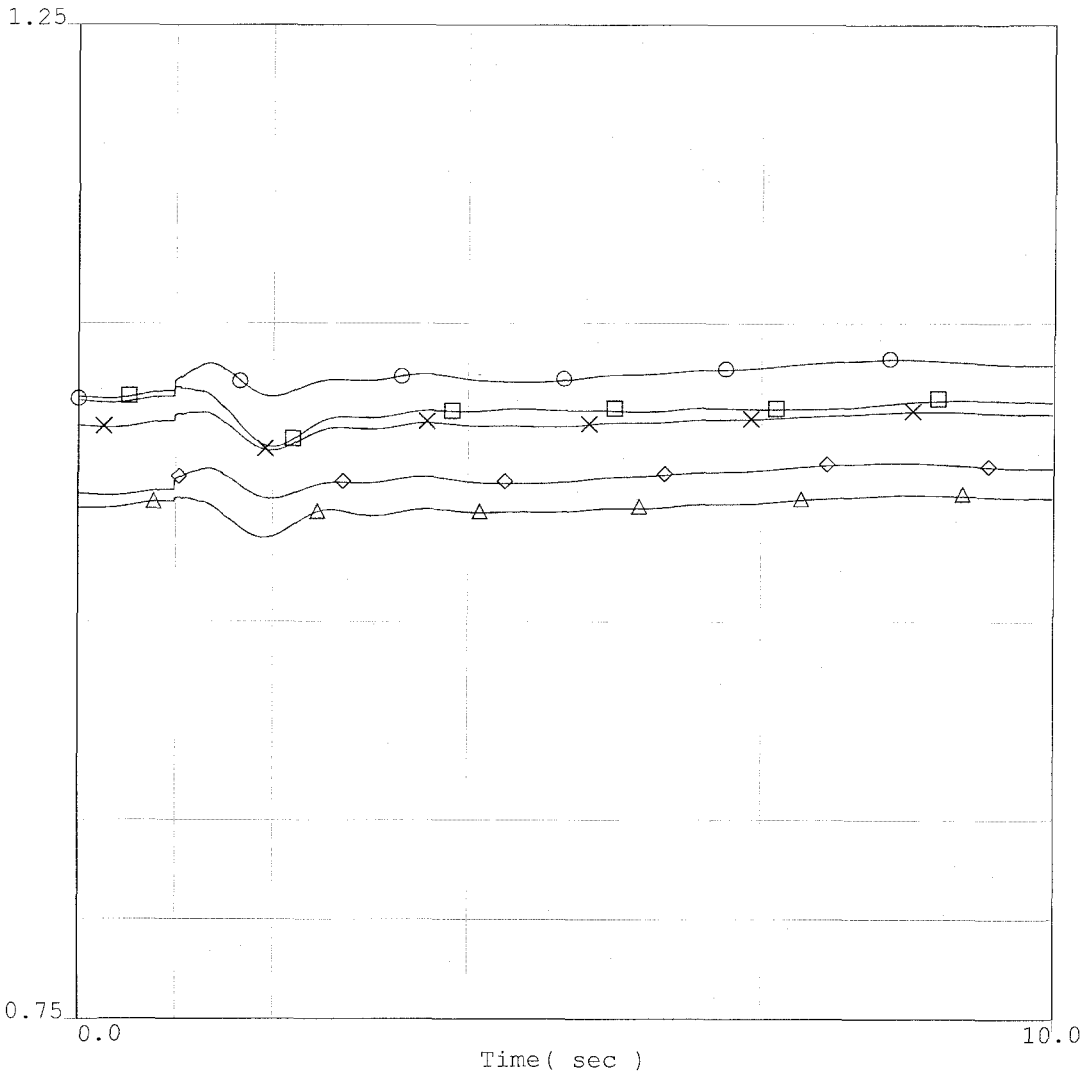
UTAH_voltages:



0.7500 vbus	66230	PINTO 138.0	0	0.0	1	1	1.2500
0.7500 vbus	18019	H ALLEN 230.0	0	0.0	1	1	1.2500
0.7500 vbus	66280	REDBUTTE 345.0	0	0.0	1	1	1.2500
0.7500 vbus	66420	SGSY 138.0	0	0.0	1	1	1.2500
0.7500 vbus	79023	DURANGO 115.0	0	0.0	1	1	1.2500

2014HS-TS12:PALO VERDE TWO GENERATORS OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

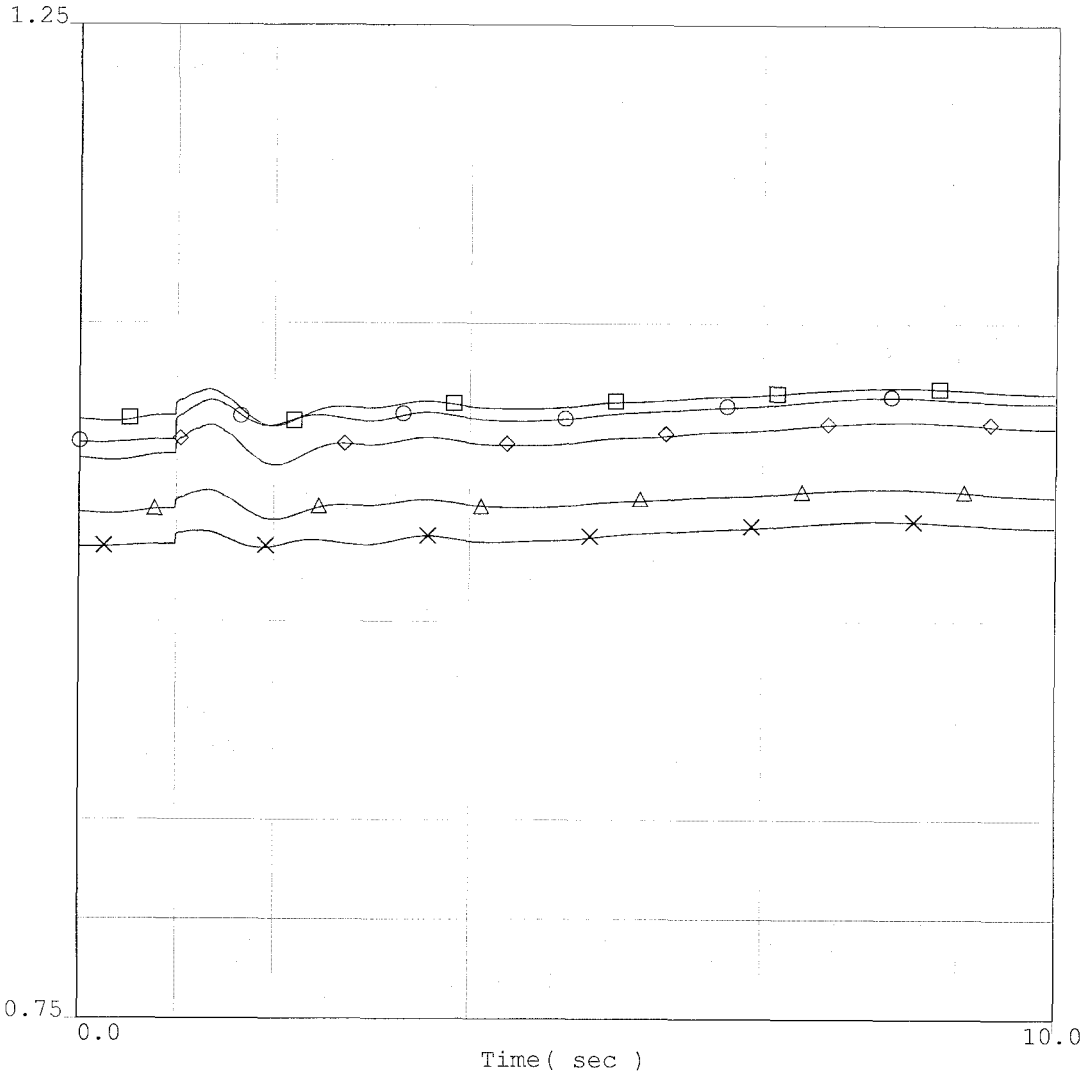
CALIFORNIA_voltages:



○	0.7500 vbus	24801	DEVERS 500.0	0	0.0	1	1	1.2500
⊗	0.7500 vbus	24086	LUGO 500.0	0	0.0	1	1	1.2500
□	0.7500 vbus	24156	VINCENT 500.0	0	0.0	1	1	1.2500
△	0.7500 vbus	26094	SYLMARLA 230.0	0	0.0	1	1	1.2500
◇	0.7500 vbus	24804	DEVERS 230.0	0	0.0	1	1	1.2500

2014HS-TS12:PALO VERDE TWO GENERATORS OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

CALIFORNIA_voltages:



0.7500 vbus	22360	IMPRLVLY 500.0	0	0.0	1	1	1.2500
0.7500 vbug	22356	IMPRLVLY 230.0	0	0.0	1	1	1.2500
0.7500 vbus	24151	VALLEYSC 500.0	0	0.0	1	1	1.2500
0.7500 vbus	24805	DEVERS 115.0	0	0.0	1	1	1.2500
0.7500 vbul	24229	VALLEY-S 115.0	0	0.0	1	1	1.2500

2014HS-TS12:PALO VERDE TWO GENERATORS OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

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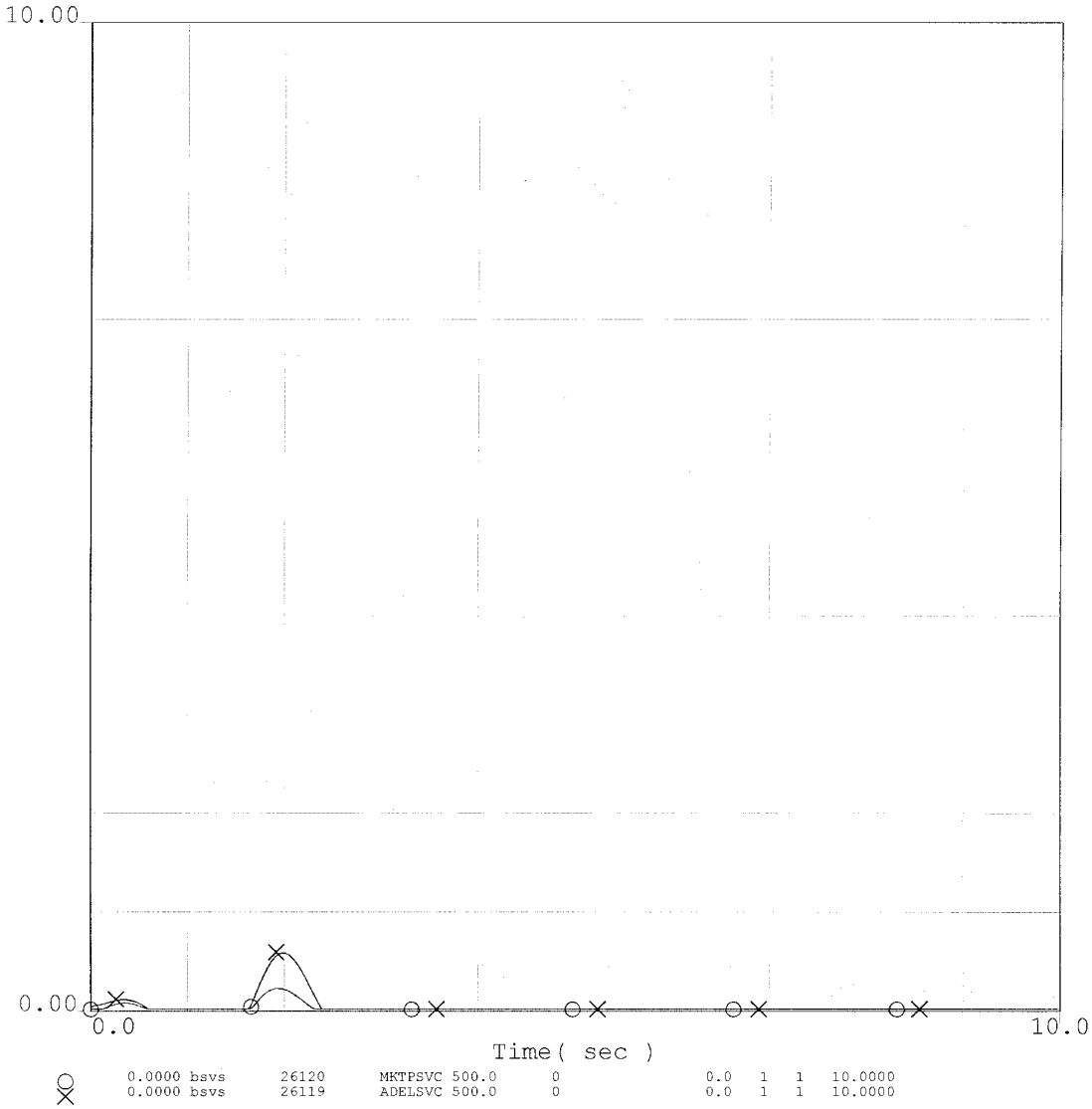
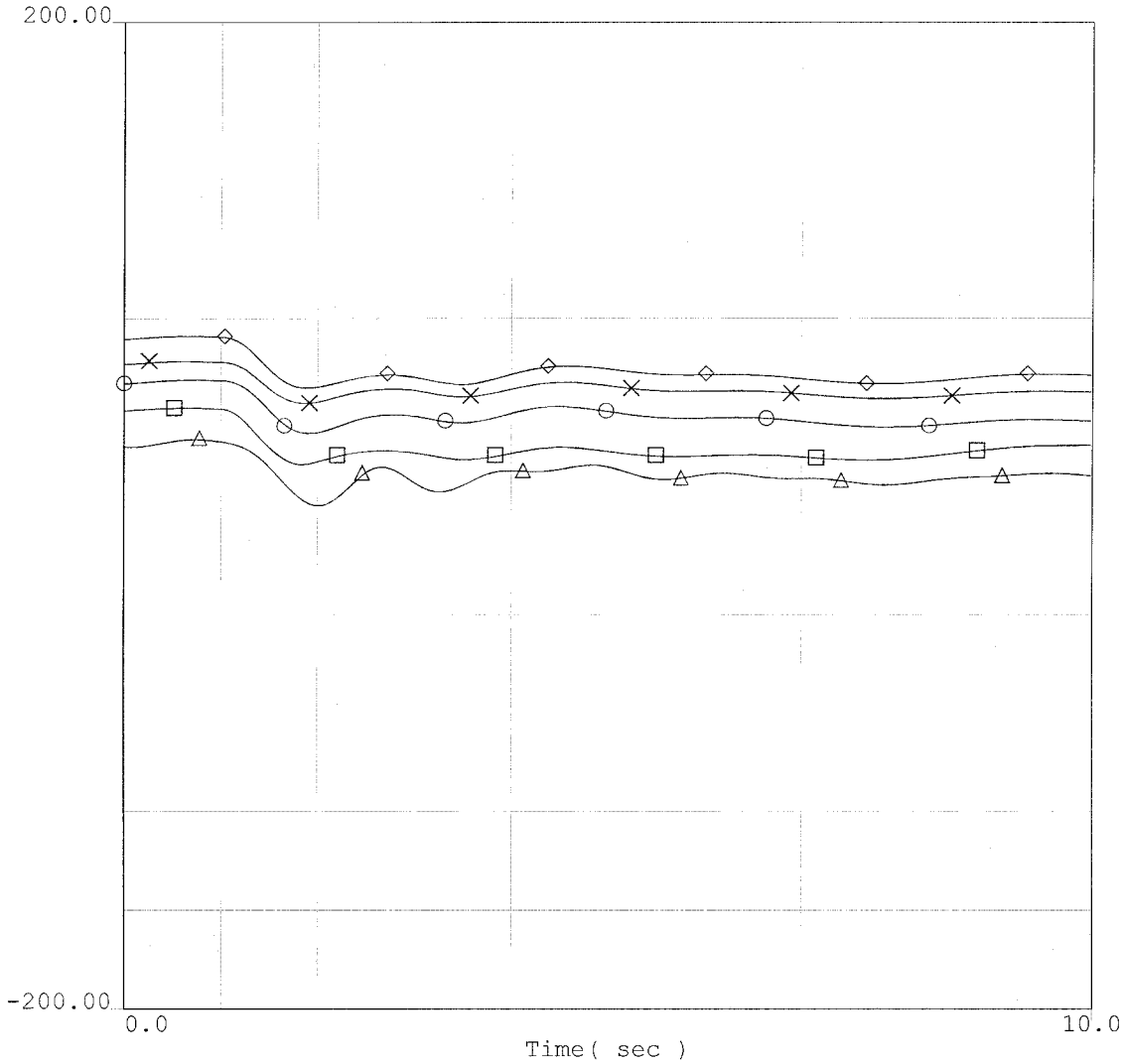
SVC_output



2014HS-TS12:PALO VERDE TWO GENERATORS OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

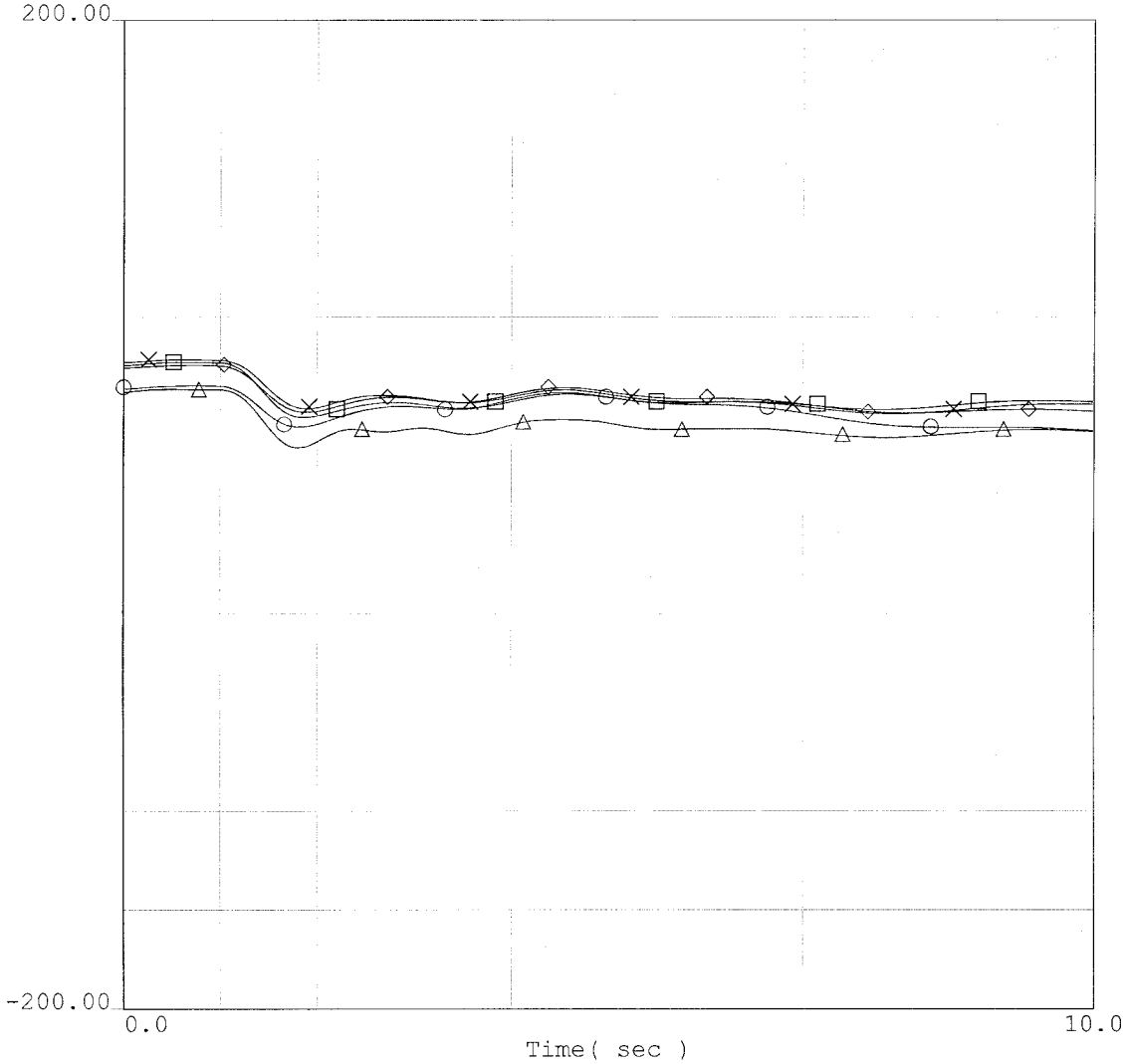
SYSTEM_Rotorangles



-200.0000 ang	16500	SPR GEN1	19.0	0	0.0	1	1	200.0000
-200.0000 ang	10321	SJUAN_G4	22.0	0	0.0	1	1	200.0000
-200.0000 ang	14942	SAGUARO2	15.5	0	0.0	1	1	200.0000
-200.0000 ang	17024	APACHCT1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	16518	SPR GEN3	21.0	0	0.0	1	1	200.0000

2014HS-TS12:PALO VERDE TWO GENERATORS OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

SYSTEM_Rotorangles



-200.0000 ang	15140	DBG-CT1	18.0	0	0.0	1	1	200.0000
-200.0000 ang	14945	SAG. CT3	13.8	0	0.0	1	1	200.0000
-200.0000 ang	14902	CHOLLA3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	15921	SANTAN 1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	14903	CHOLLA4	22.0	0	0.0	1	1	200.0000

2014HS-TS12:PALO VERDE TWO GENERATORS OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

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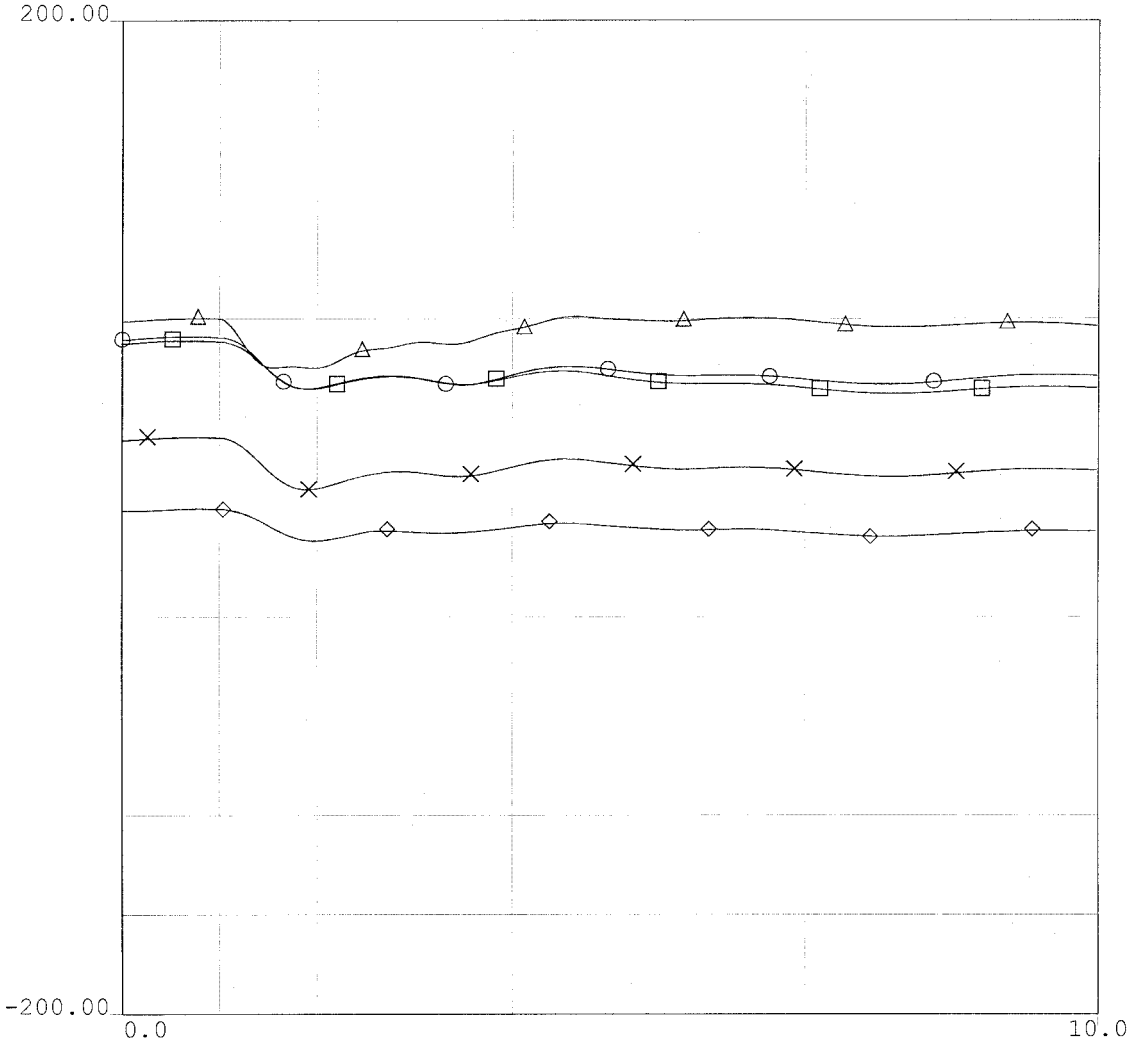
SYSTEM_Rotorangles



-200.0000 ang	16518	SPR GEN3	21.0	0	0.0	1	1	200.0000
-200.0000 ang	16503	SUNDTGE4	18.0	0	0.0	1	1	200.0000
-200.0000 ang	14914	FCNGN4CC	22.0	0	0.0	H	1	200.0000
-200.0000 ang	14931	PALOVRD1	24.0	0	0.0	1	1	200.0000
-200.0000 ang	24004	ALAMT4 G	18.0	0	0.0	H	1	200.0000

2014HS-TS12:PALO VERDE TWO GENERATORS OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

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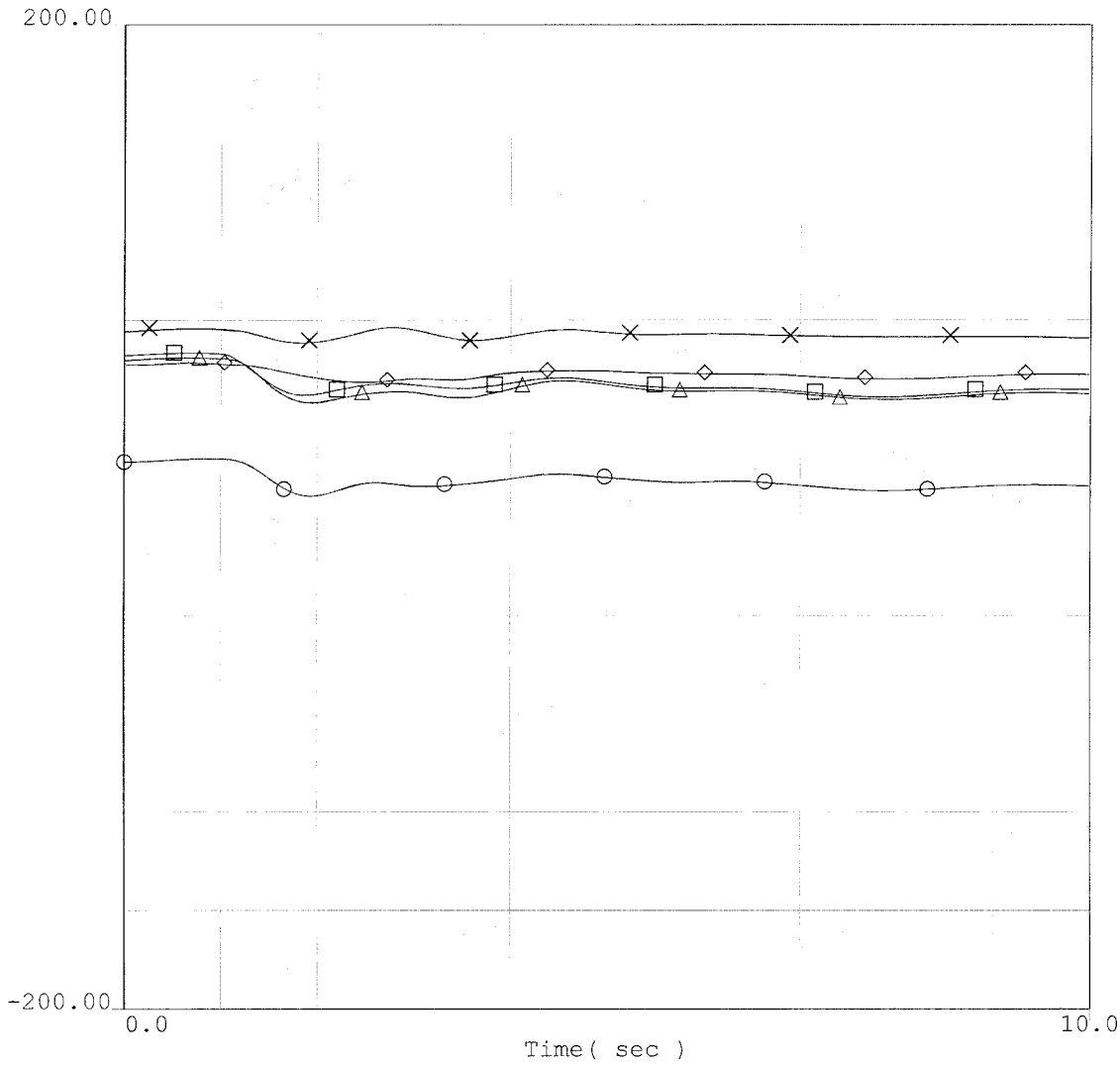
SYSTEM_Rotorangles



-200.0000 ang	24129	S.ONOFR2	22.0	0	0.0	1	1	200.0000
-200.0000 ang	26039	INTERM1G	26.0	0	0.0	1	1	200.0000
-200.0000 ang	15981	NAVAJO 1	26.0	0	0.0	1	1	200.0000
-200.0000 ang	10318	SJUAN_G1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	36411	DIABLO 1	25.0	0	0.0	1	1	200.0000

2014HS-TS12:PALO VERDE TWO GENERATORS OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

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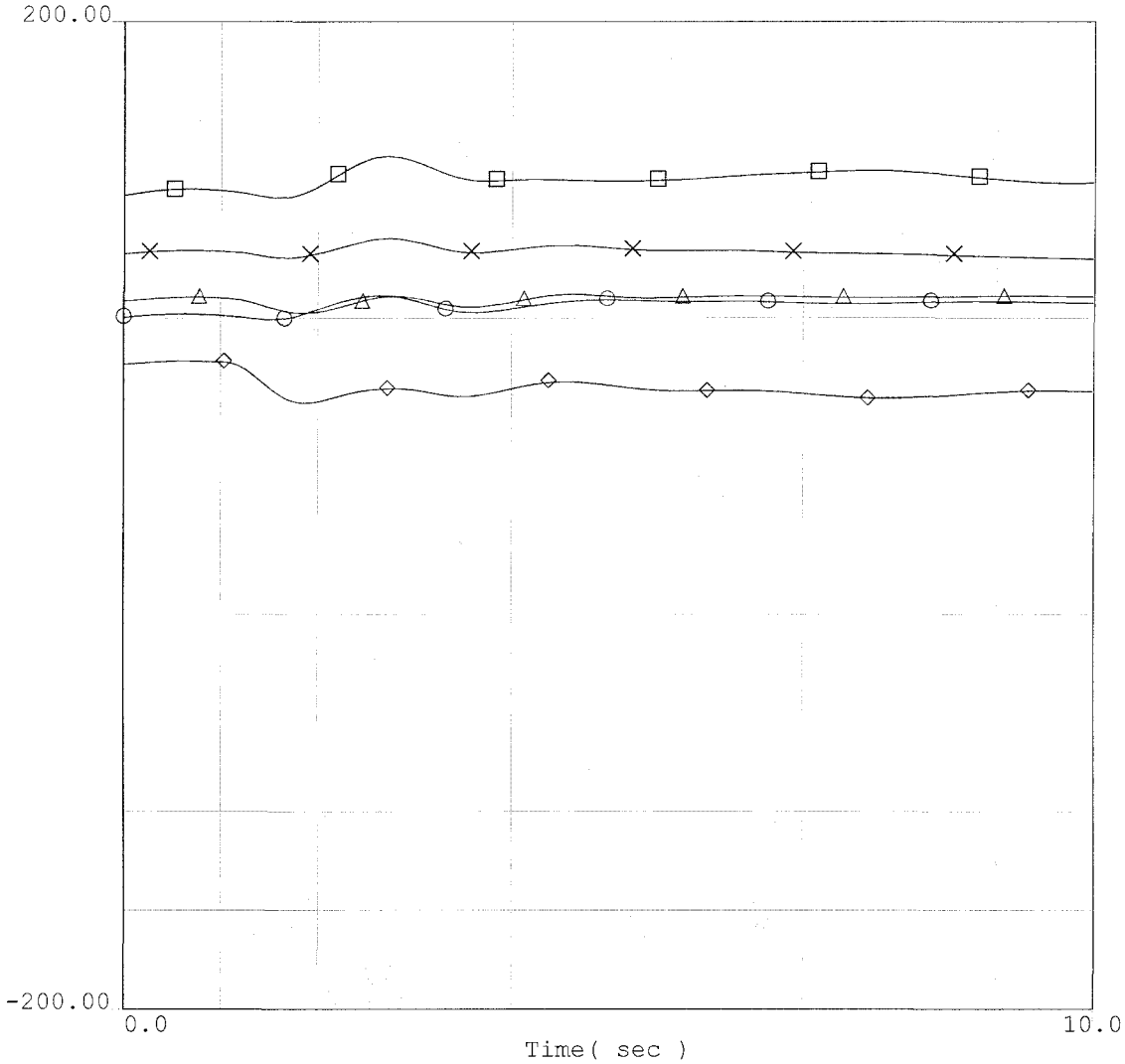
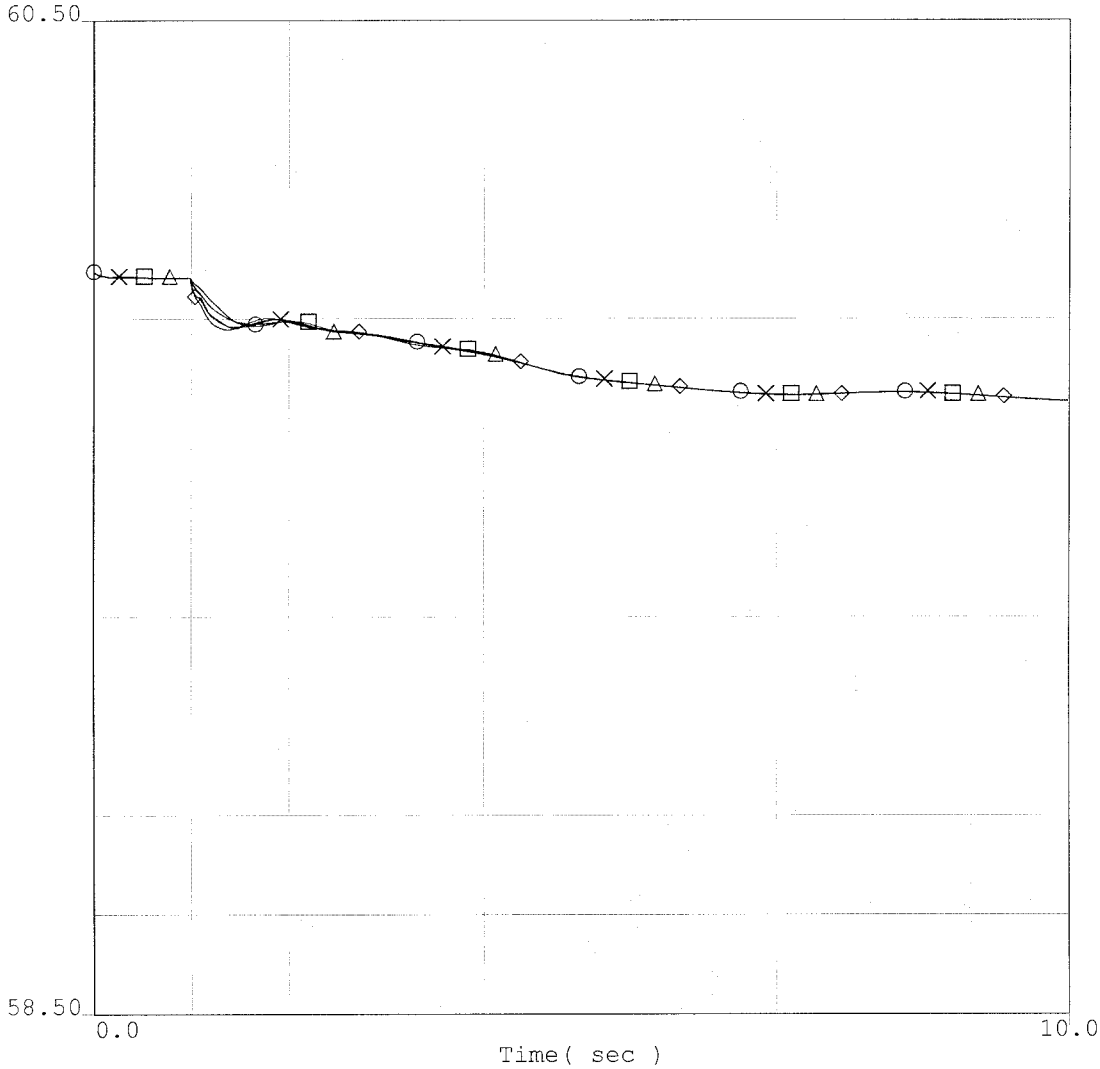
SYSTEM_Rotorangles



-200.0000 ang	73129	MBPP-1	24.0	0	0.0	1	1	200.0000
-200.0000 ang	60086	BRIDGER1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	62050	COLSTP 1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	65500	EHUNTR 3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	10321	SJUAN_G4	22.0	0	0.0	1	1	200.0000

2014HS-TS12:PALO VERDE TWO GENERATORS OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

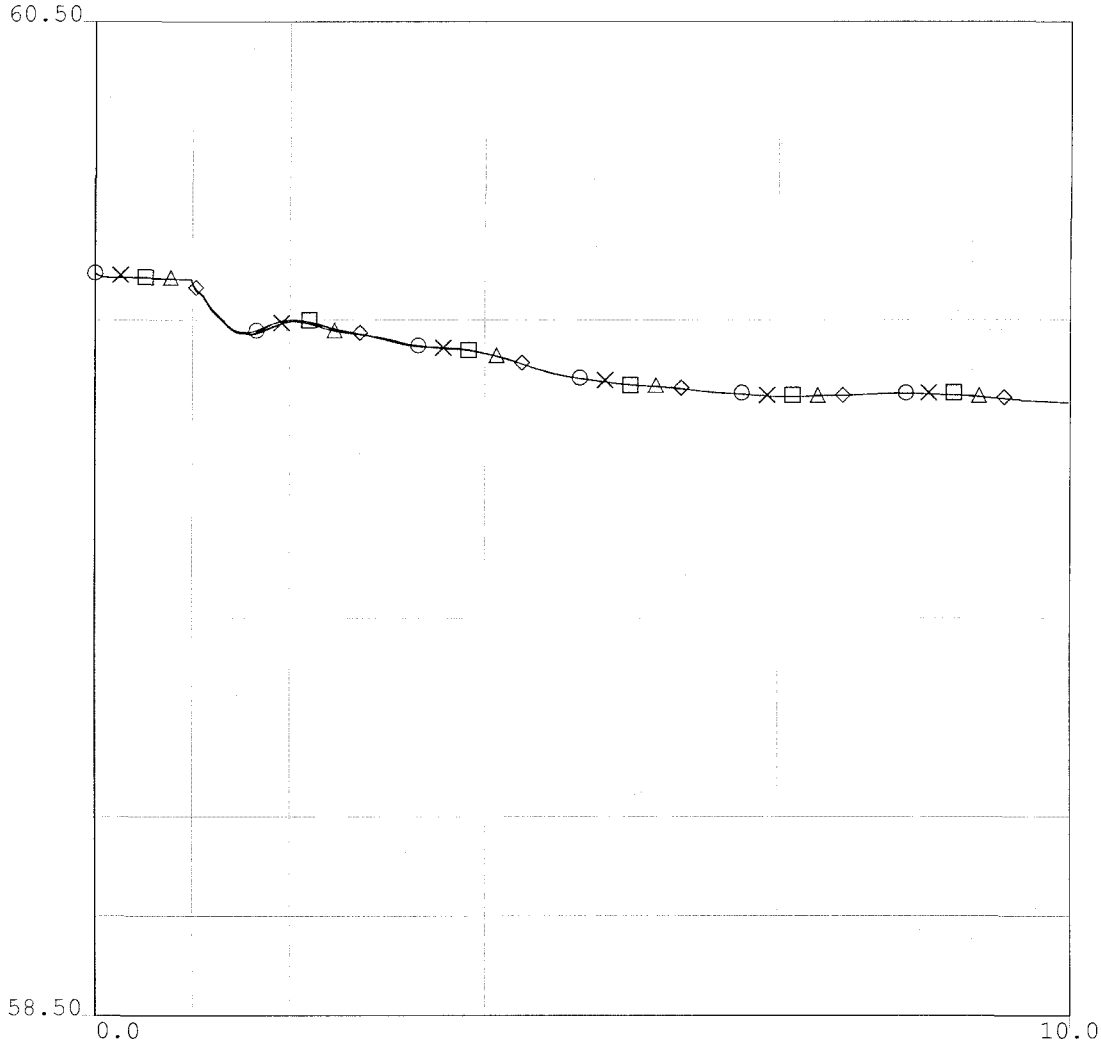
Frequencies:



○	58.5000	fbus	14003	NAVAJO 500.0	0	0.0	1	1	60.5000
×	58.5000	fbus	14005	WESTWING 500.0	0	0.0	1	1	60.5000
□	58.5000	fbus	14001	FOURCORN 500.0	0	0.0	1	1	60.5000
△	58.5000	fbus	14016	PNPKAPS 500.0	0	0.0	1	1	60.5000
◇	58.5000	fbus	15021	PALOVRDE 500.0	0	0.0	1	1	60.5000

2014HS-TS12:PALO VERDE TWO GENERATORS OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

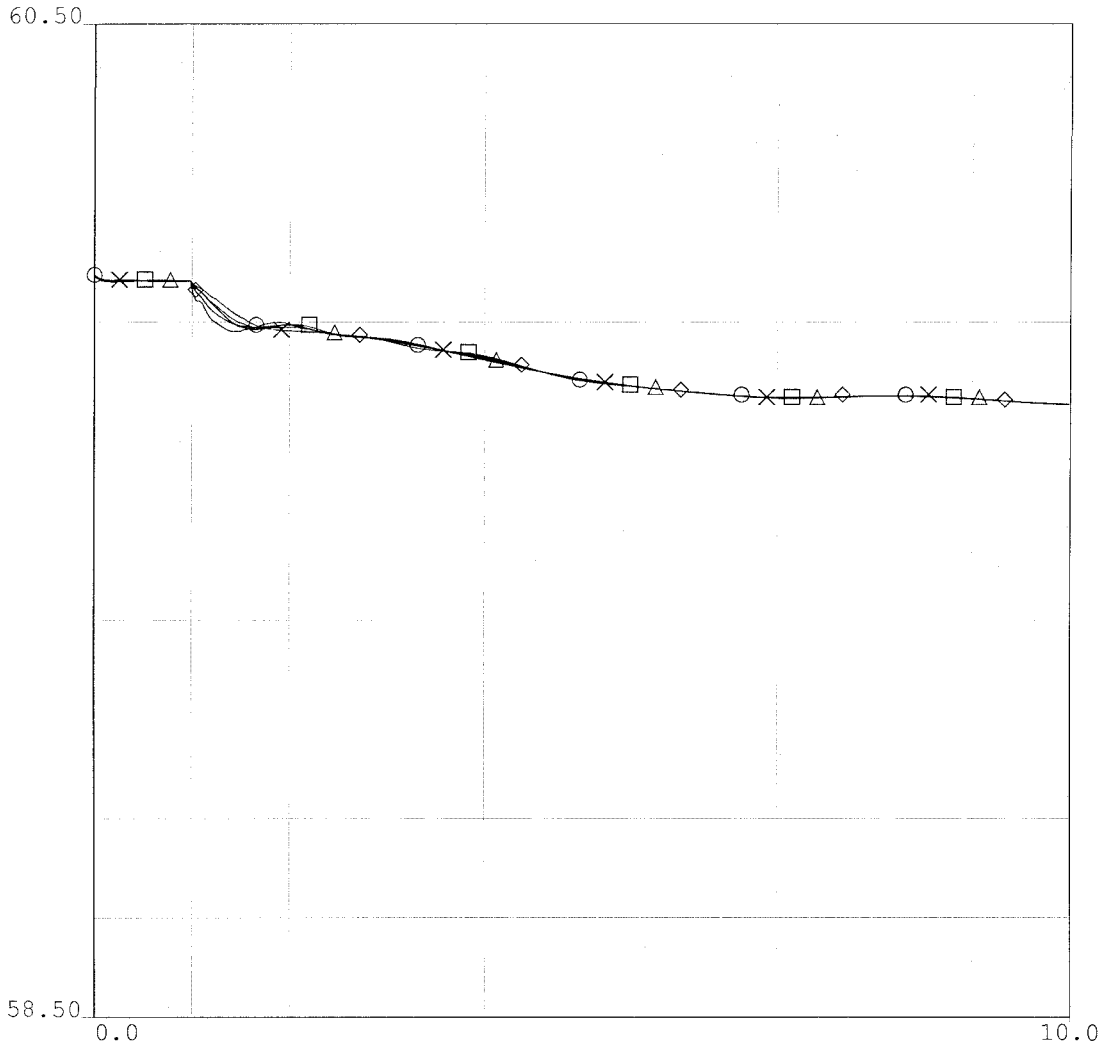
Frequencies:



58.5000 fbus	16000	TORTOLIT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	16105	VAIL 345.0	0	0.0	1	1	60.5000
58.5000 fbus	16103	SOUTH 345.0	0	0.0	1	1	60.5000
58.5000 fbul	15001	CORONADO 500.0	0	0.0	1	1	60.5000
58.5000 fbus	16109	WINCHSTR 345.0	0	0.0	1	1	60.5000

2014HS-TS12:PALO VERDE TWO GENERATORS OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

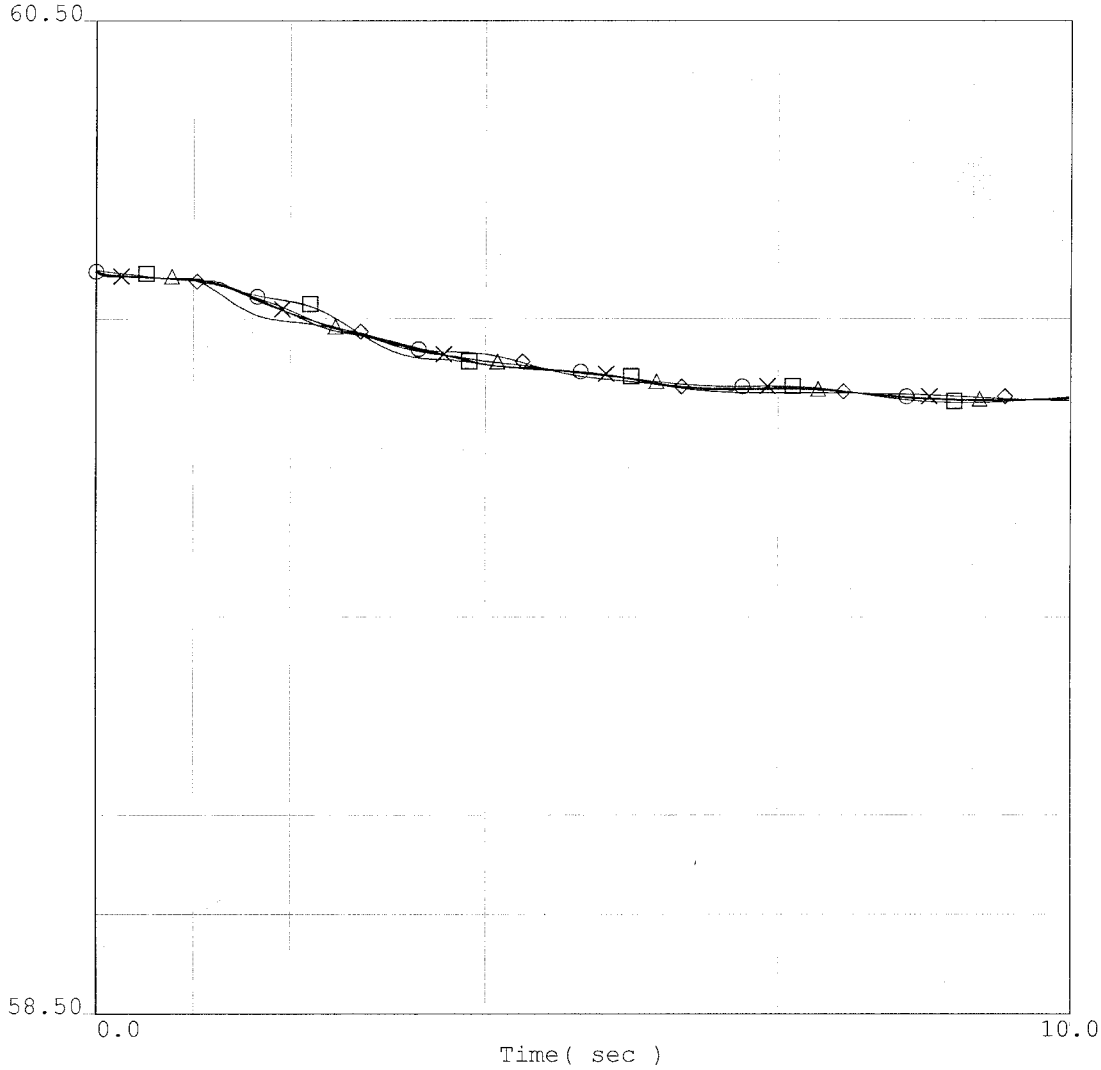
Frequencies:



58.5000 fbul	14231	WESTWNGW 230.0	0	0.0	1	1	60.5000
58.5000 fbus	26003	ADELANTO 500.0	0	0.0	1	1	60.5000
58.5000 fbus	14001	FOURCORN 500.0	0	0.0	1	1	60.5000
58.5000 fbus	26048	MCCULLGH 500.0	0	0.0	1	1	60.5000
58.5000 fbus	14003	NAVAJO 500.0	0	0.0	1	1	60.5000

2014HS-TS12:PALO VERDE TWO GENERATORS OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

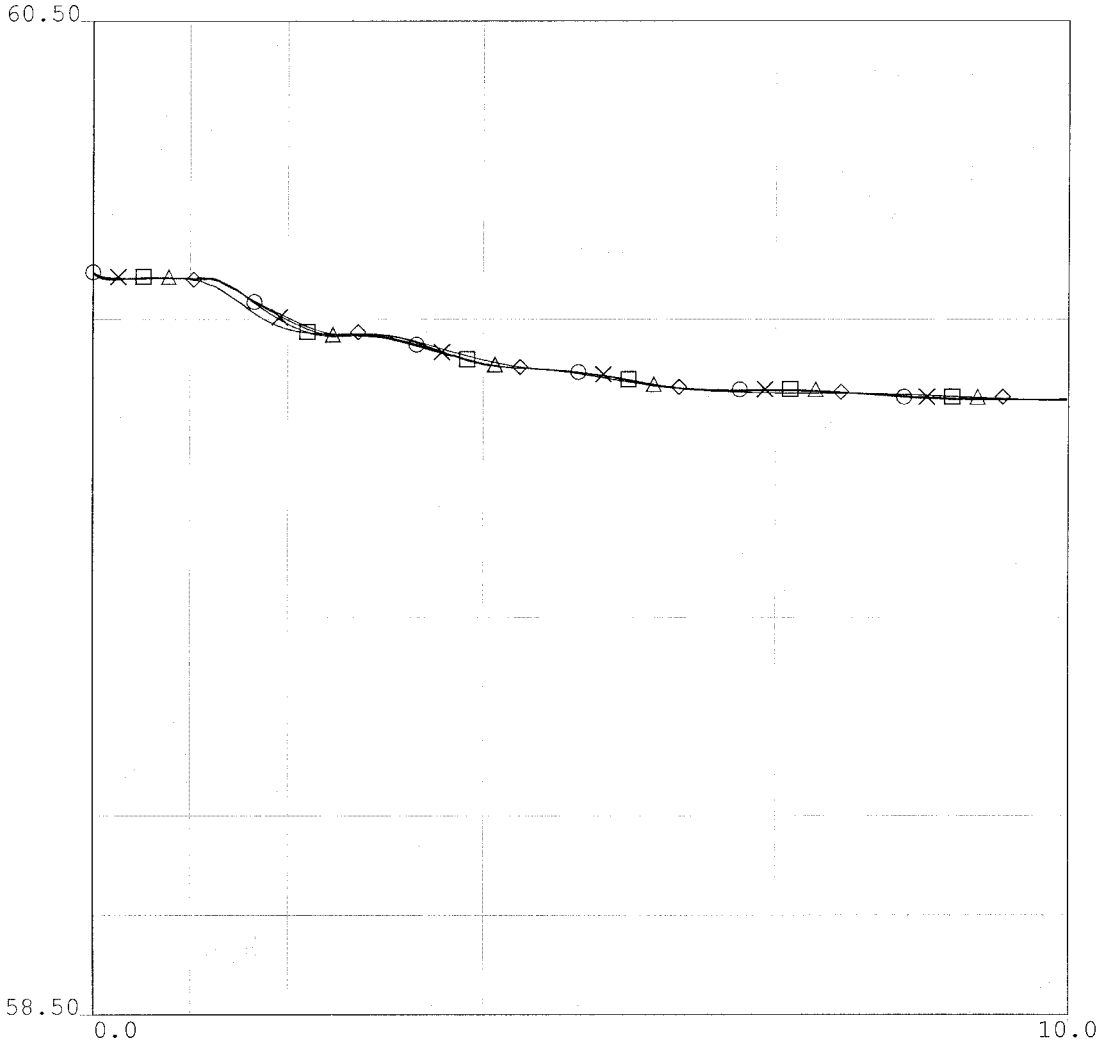
Frequencies:



○	58.5000	fbus	40489	GRIZZLY	500.0	0	0.0	1	1	60.5000
⊗	58.5000	fbus	40687	MALIN	500.0	0	0.0	1	1	60.5000
□	58.5000	fbus	40459	GARRISON	500.0	0	0.0	1	1	60.5000
△	58.5000	fbus	60235	MIDPOINT	345.0	0	0.0	1	1	60.5000
◇	58.5000	fbus	66230	PINTO	138.0	0	0.0	1	1	60.5000

2014HS-TS12:PALO VERDE TWO GENERATORS OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

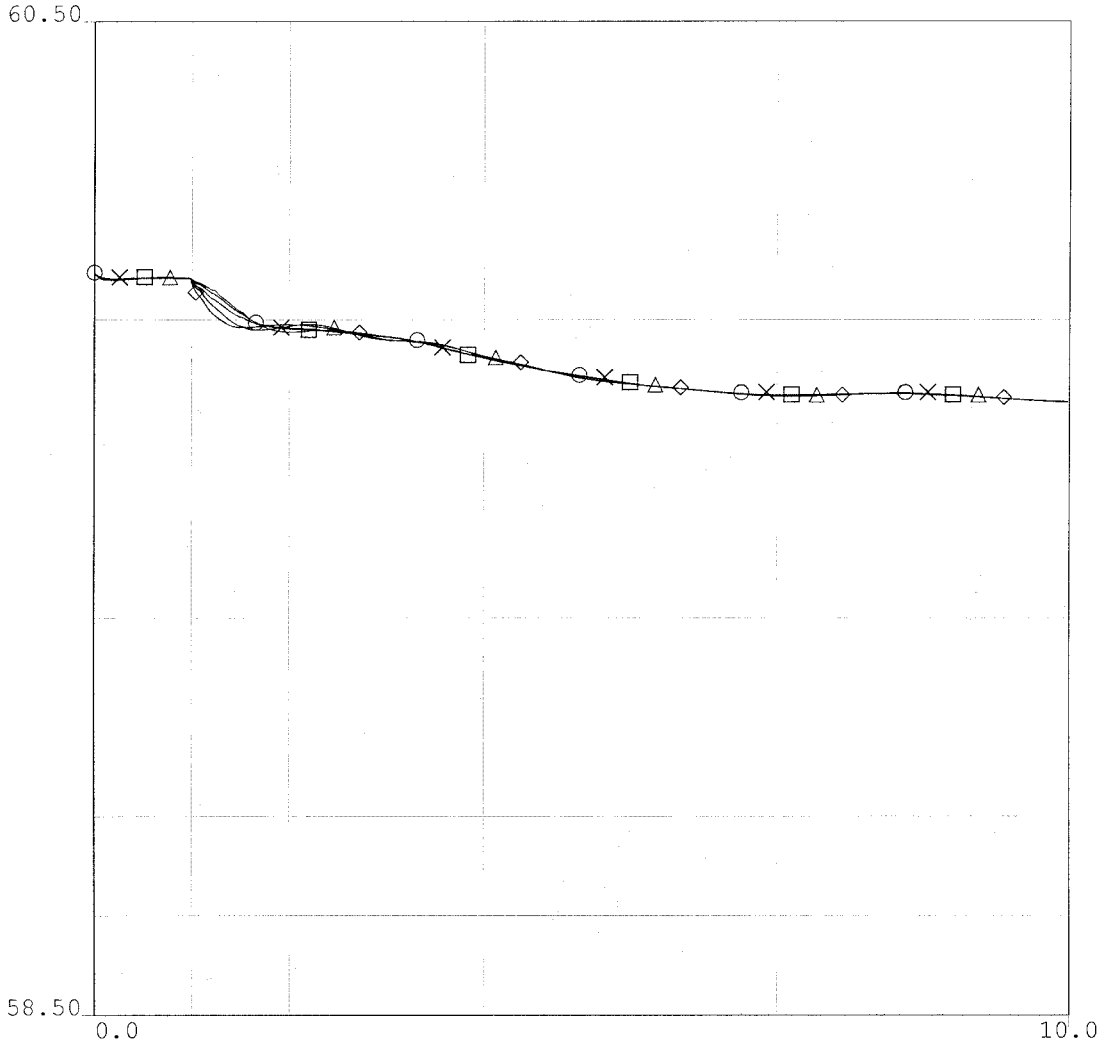
Frequencies:



58.5000 fbus	30005	ROUND MT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30015	TABLE MT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30035	TRACY 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30040	TESLA 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30060	MIDWAY 500.0	0	0.0	1	1	60.5000

2014HS-TS12:PALO VERDE TWO GENERATORS OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

Frequencies:



○	58.5000	fbus	24801	DEVERS 500.0	0	0.0	1	1	60.5000
×	58.5000	fbus	24086	LUGO 500.0	0	0.0	1	1	60.5000
□	58.5000	fbus	26094	SYLMARLA 230.0	0	0.0	1	1	60.5000
△	58.5000	fbus	22468	MIGUEL 500.0	0	0.0	1	1	60.5000
◇	58.5000	fbus	22536	N.GILA 500.0	0	0.0	1	1	60.5000

2014HS-TS12:PALO VERDE TWO GENERATORS OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/30/11)

HIGHEST VOLTAGE DIP

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct	@time
40	ALKALI C	115	vbul	1.053	0.774	27.9	3.679
40	WILOWCRI	115	vbus	1.074	0.808	26.6	3.679
40	ENTERPRS	69	vbug	1.036	0.978	5.8	2.854

VOLTAGE CRITERIA VIOLATIONS

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct	@time
40	STATELIN	69	vbul	1.003	0.743	26	2.74
40	LAGOON T	69	vbul	1.015			
40	ALKALI C	115	vbul	1.053	0.765	28.8	3.68
40	TOWER RD	115	vbus	1.037	0.777	25	3.68

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
40	ALKALI C	115	fbul	59.366	3.717
40	WLWCK C2	34.5	fbus	58.887	3.717
40	WLWCK W.	0.6	fbug	58.338	3.717

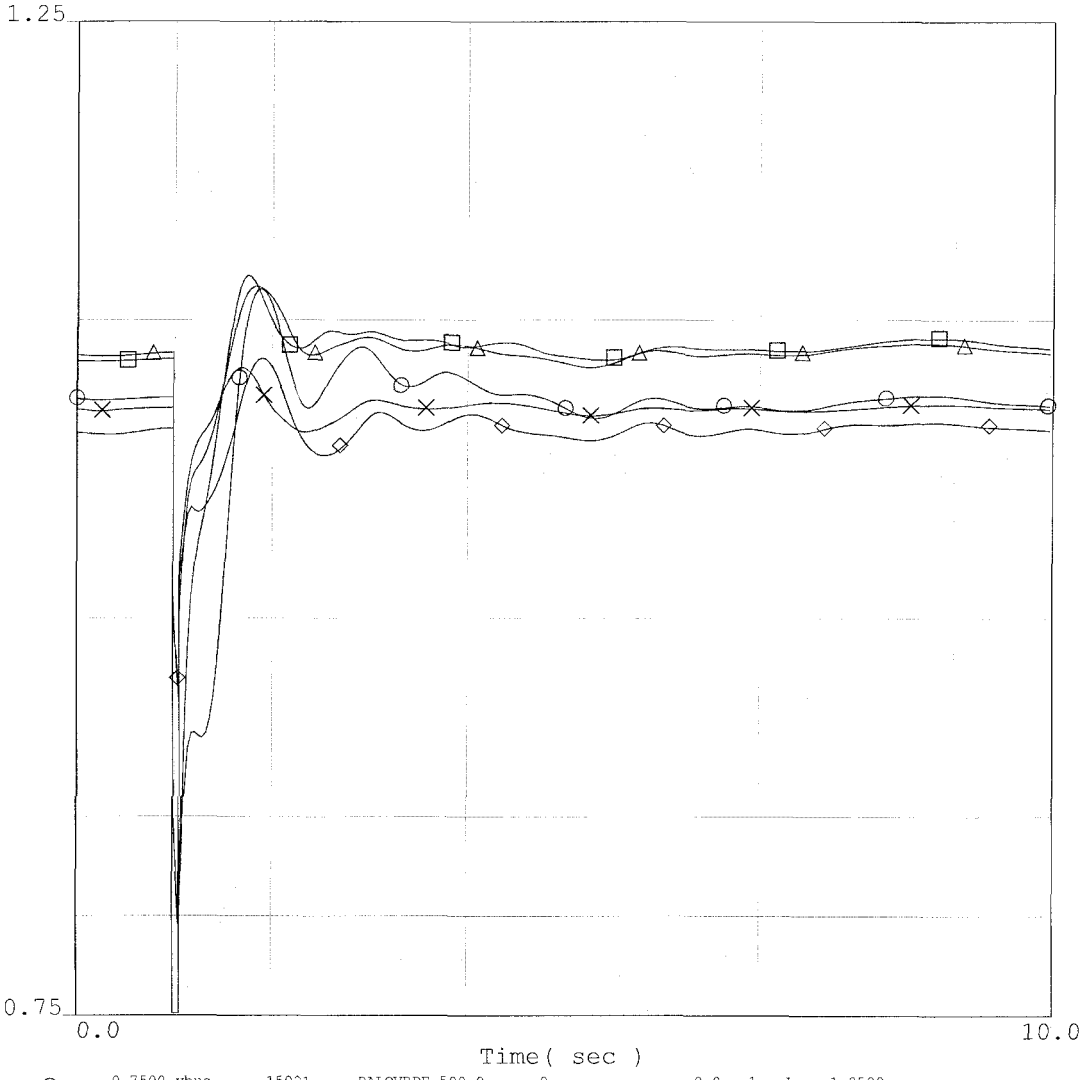
FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

There were 0 violations of MORC criteria 1 (25% Voltage Dip) !
There were 0 violations of MORC criteria 2 (20% Voltage Dip for 2(for 40 Cycl(les)!
There were 0 violations of MORC criteria 3 (59.6 HZ for 6 Cycles)!

Cycles	From	To
22.5	2.667	3.042
22.5	3.342	3.717

ARIZONA_voltages:



○	0.7500	vbus	15021	PALOVRDE 500.0	0	0.0	1	1	1.2500
×	0.7500	vbus	14001	FOURCORN 500.0	0	0.0	1	1	1.2500
□	0.7500	vbus	15011	KYRENE 500.0	0	0.0	1	1	1.2500
△	0.7500	vbus	14003	NAVAJO 500.0	0	0.0	1	1	1.2500
◇	0.7500	vbus	26003	ADELANTO 500.0	0	0.0	1	1	1.2500

2014HS-TS14:THREE PHASE FAULT HAA BUS&LOSS OF HAA-JOJO&HAA-PINAL W LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

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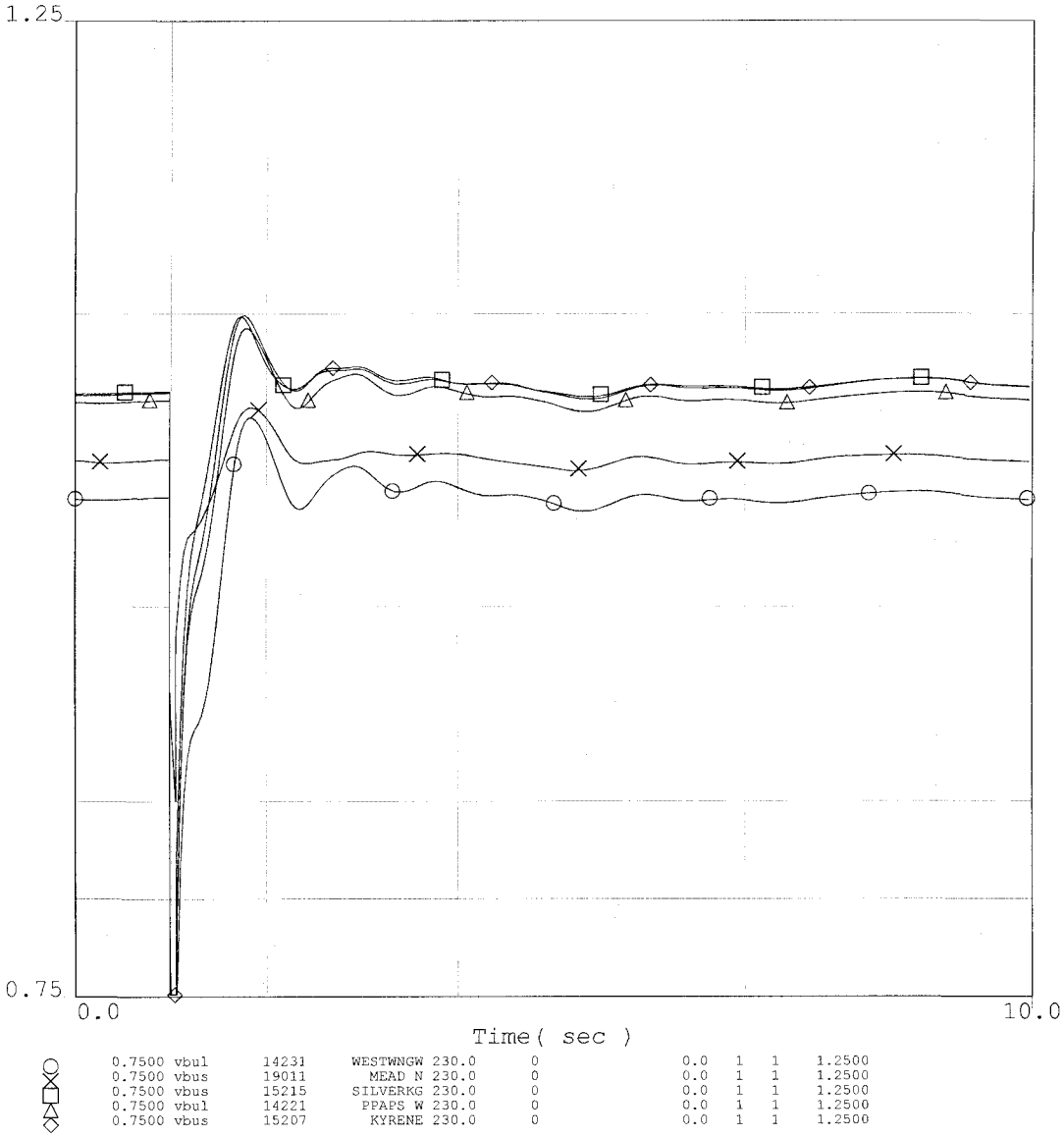

2014HS-TS14:THREE PHASE FAULT HAA BUS&LOSS OF HAA-JOJO&HAA-PINAL W LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
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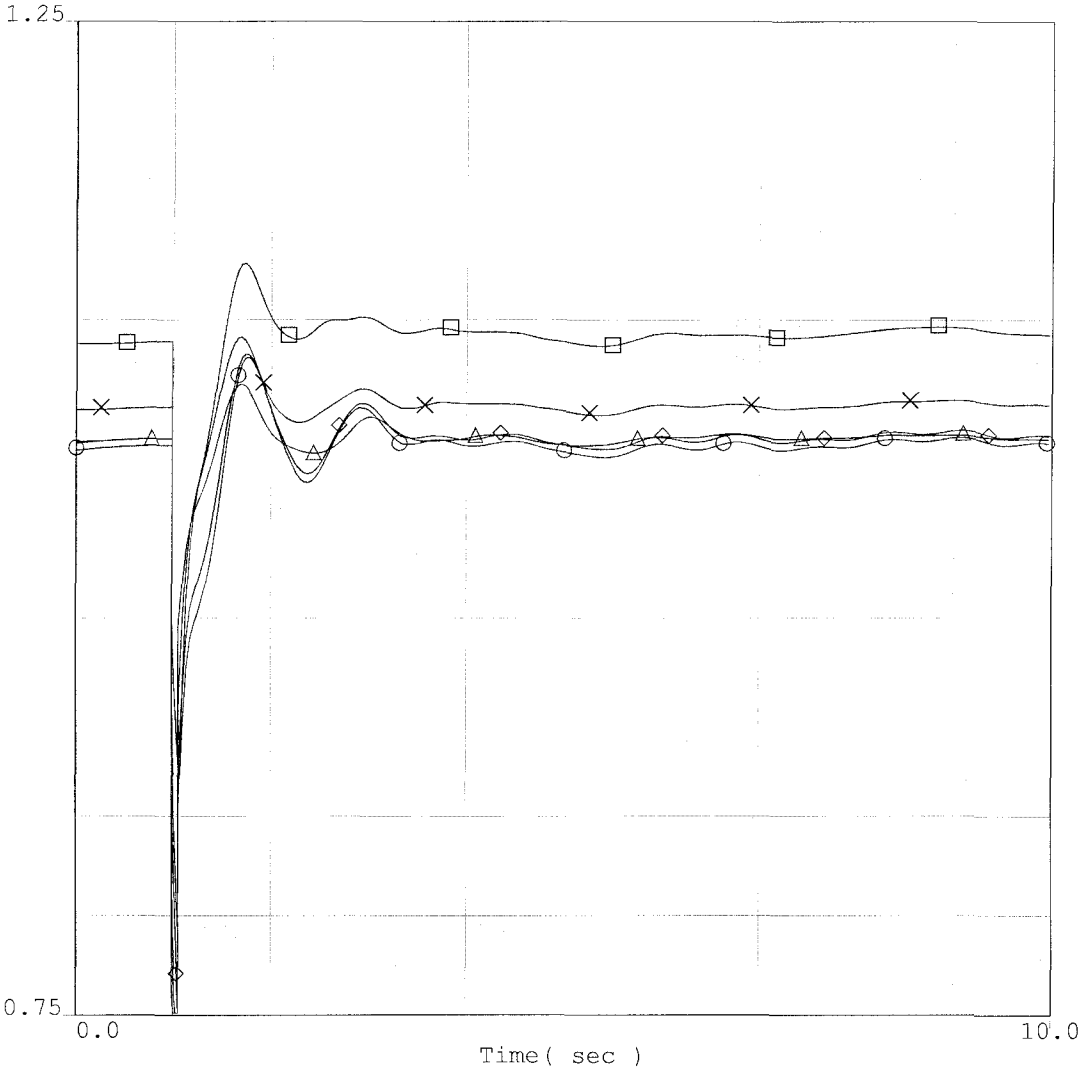
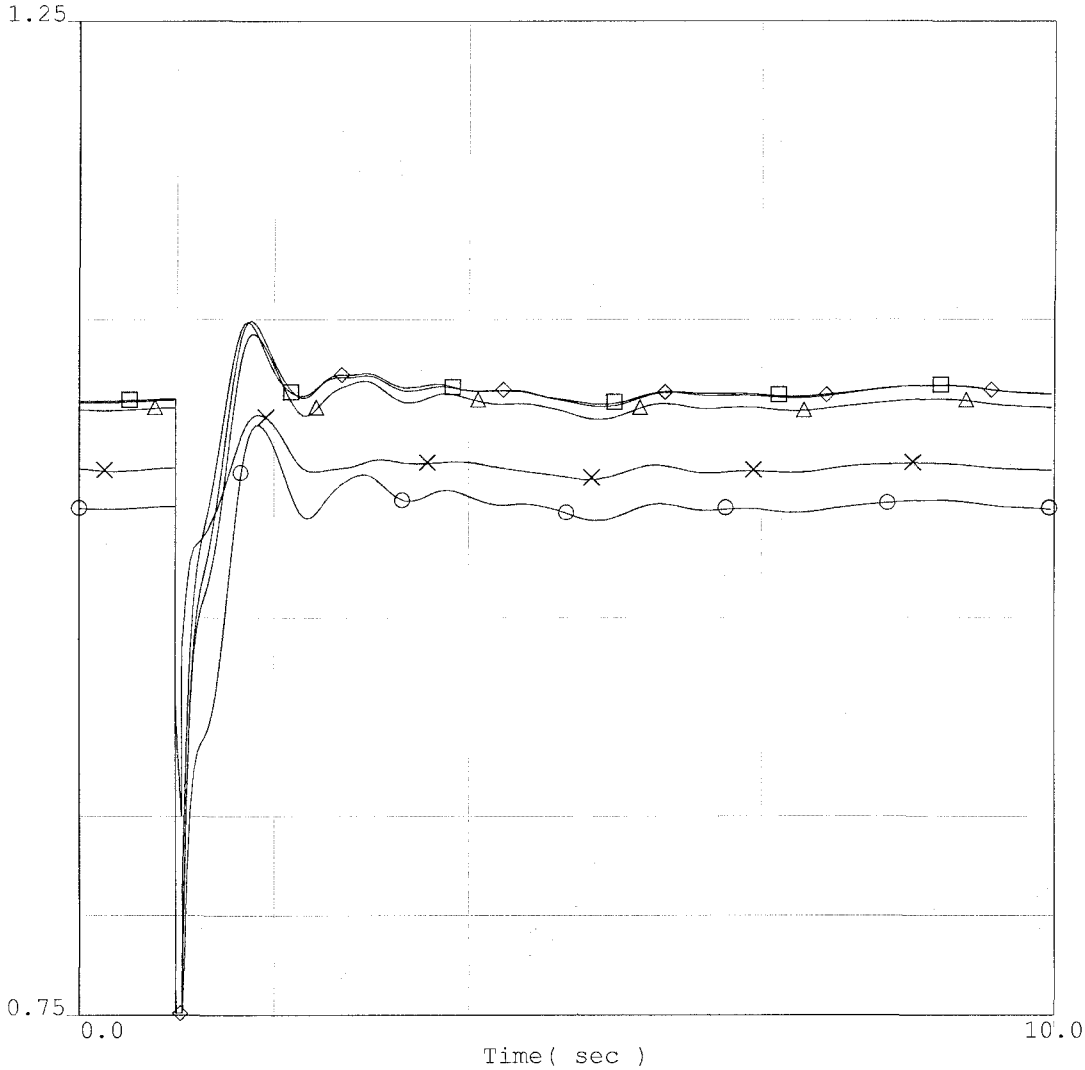
ARIZONA_voltages:



0.7500 vbus	16103	SOUTH 345.0	0	0.0	1	1	1.2500
0.7500 vbus	14000	CHOLLA 500.0	0	0.0	1	1	1.2500
0.7500 vbus	15041	SILVERKG 500.0	0	0.0	1	1	1.2500
0.7500 vbus	16104	SPRINGR 345.0	0	0.0	1	1	1.2500
0.7500 vbus	16109	WINCHSTR 345.0	0	0.0	1	1	1.2500

2014HS-TS14:THREE PHASE FAULT HAA BUS&LOSS OF HAA-JOJO&HAA-PINAL W LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

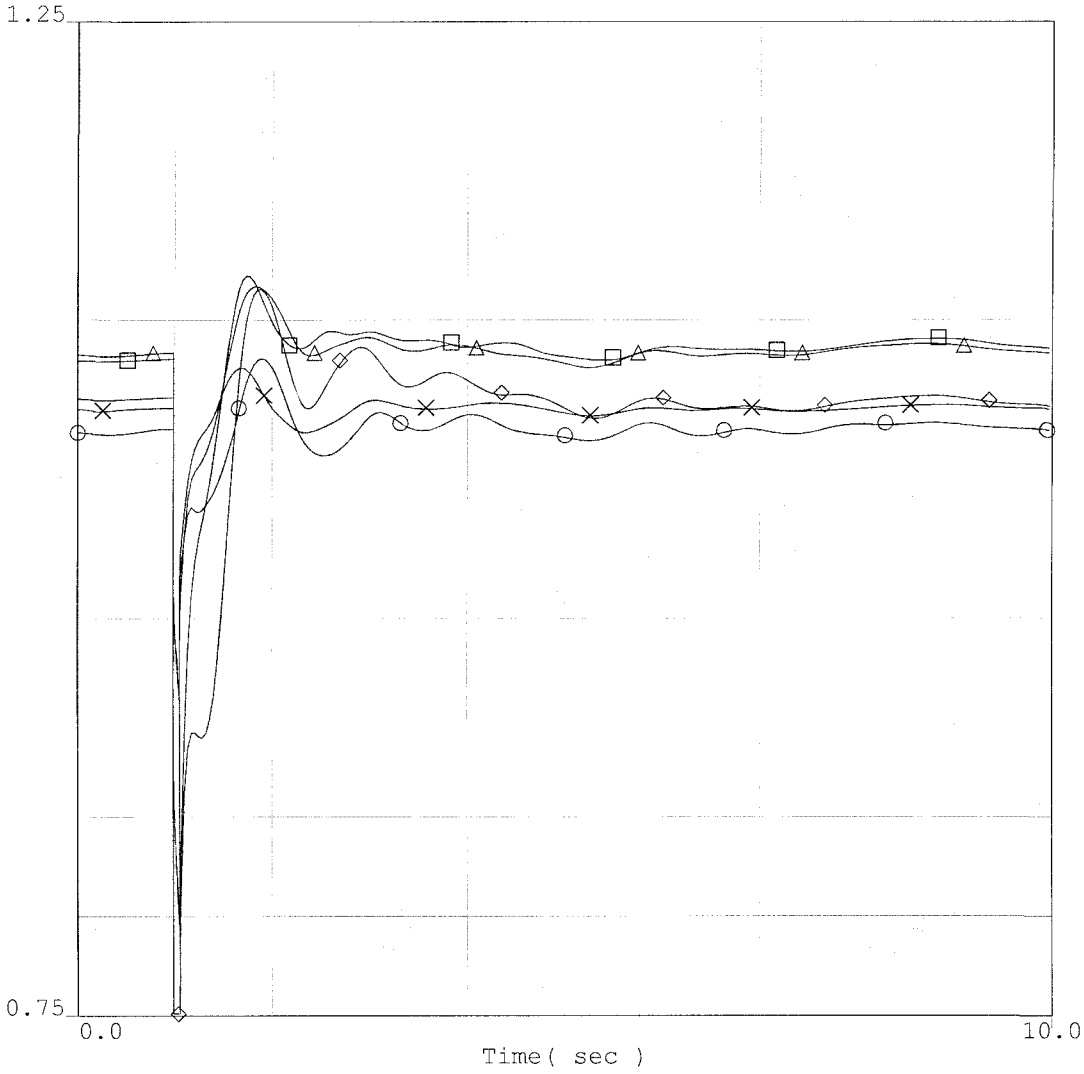
ARIZONA_voltages:



0.7500 vbul	14231	WESTWNGW 230.0	0	0.0	1	1	1.2500
0.7500 vbus	19011	MEAD N 230.0	0	0.0	1	1	1.2500
0.7500 vbus	15215	SILVERKG 230.0	0	0.0	1	1	1.2500
0.7500 vbul	14221	PPAPS W 230.0	0	0.0	1	1	1.2500
0.7500 vbus	15207	KYRENE 230.0	0	0.0	1	1	1.2500

2014HS-TS14:THREE PHASE FAULT HAA BUS&LOSS OF HAA-JOJO&HAA-PINAL W LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

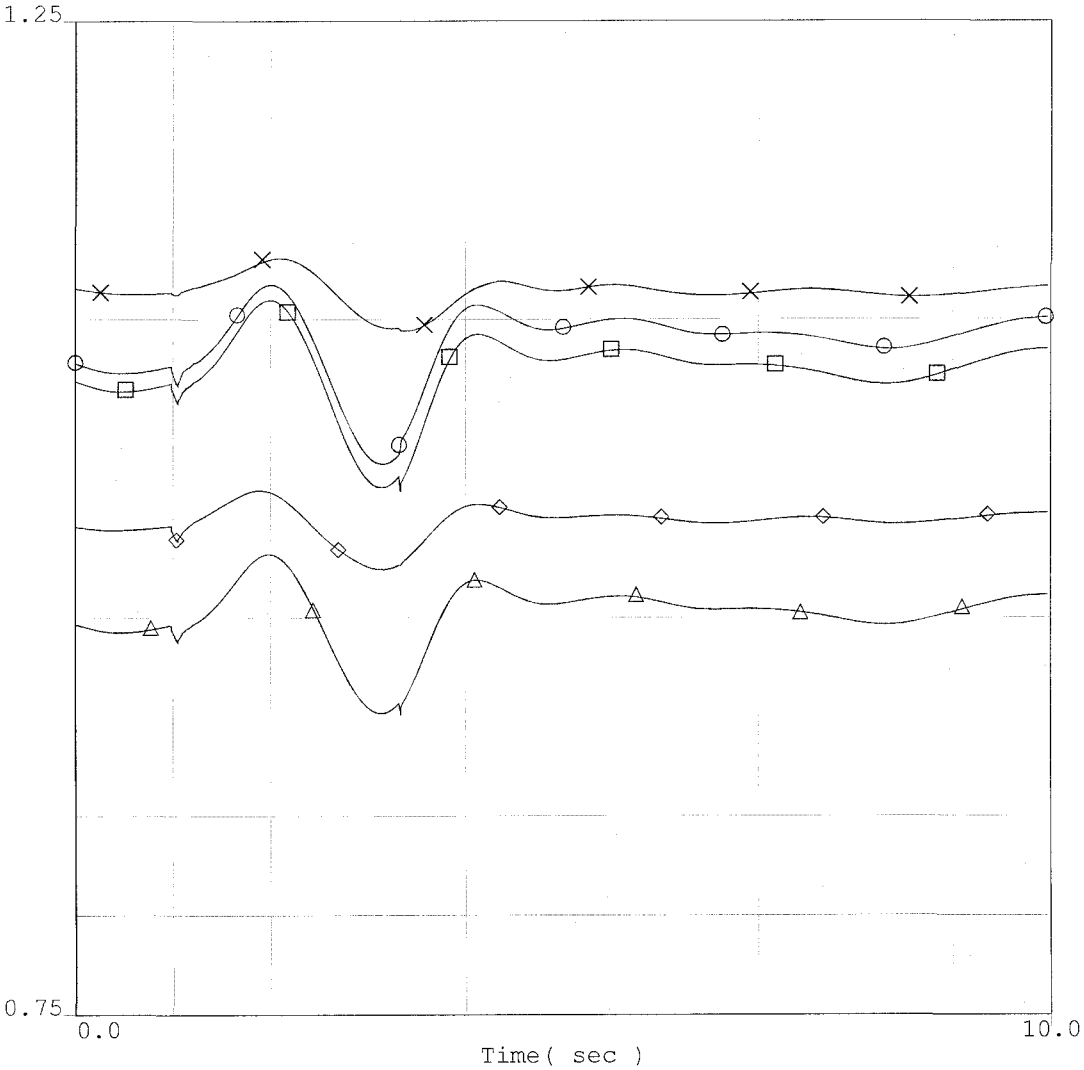
ARIZONA_voltages:



0.7500 vbus	26003	ADELANTO 500.0	0	0.0	1	1	1.2500
0.7500 vbus	14001	FOURCORN 500.0	0	0.0	1	1	1.2500
0.7500 vbus	15011	KYRENE 500.0	0	0.0	1	1	1.2500
0.7500 vbus	14003	NAVAJO 500.0	0	0.0	1	1	1.2500
0.7500 vbus	15021	PALOVRDE 500.0	0	0.0	1	1	1.2500

2014HS-TS14:THREE PHASE FAULT HAA BUS&LOSS OF HAA-JOJO&HAA-PINAL W LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

NORTHWEST_voltages:



0.7500	vbus	40489	GRIZZLY 500.0	0	0.0	1	1	1.2500
0.7500	vbus	40459	GARRISON 500.0	0	0.0	1	1	1.2500
0.7500	vbus	40687	MALIN 500.0	0	0.0	1	1	1.2500
0.7500	vbul	45215	NEWELL 69.0	0	0.0	1	1	1.2500
0.7500	vbus	60235	MIDPOINT 345.0	0	0.0	1	1	1.2500

2014HS-TS14:THREE PHASE FAULT HAA BUS&LOSS OF HAA-JOJO&HAA-PINAL W LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
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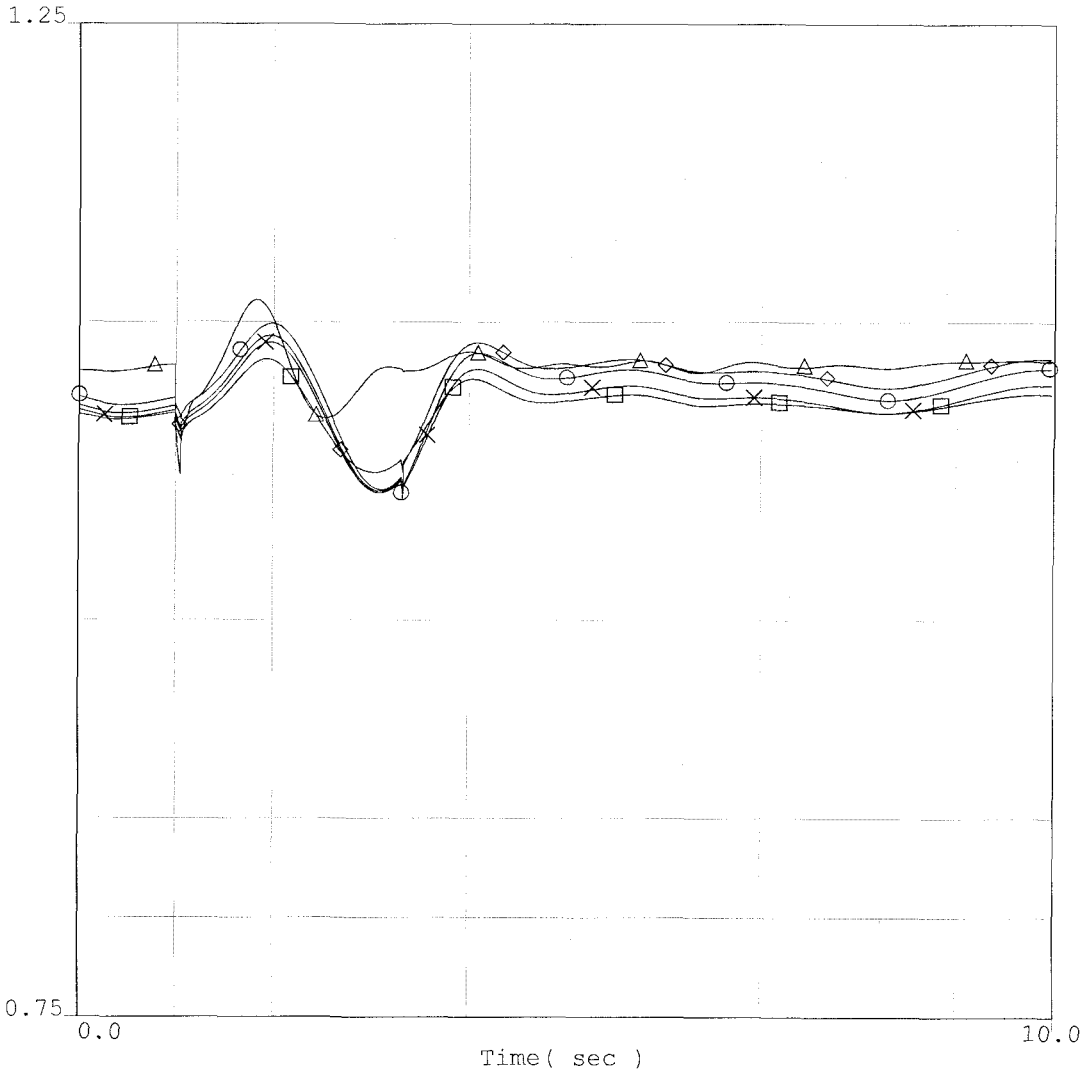
CALIFORNIA_voltages:



○	0.7500 vbus	30005	ROUND MT 500.0	0	0.0	1	1	1.2500
⊗	0.7500 vbus	30015	TABLE MT 500.0	0	0.0	1	1	1.2500
□	0.7500 vbus	30040	TESLA 500.0	0	0.0	1	1	1.2500
△	0.7500 vbus	30060	MIDWAY 500.0	0	0.0	1	1	1.2500
◇	0.7500 vbus	30020	OLINDA 500.0	0	0.0	1	1	1.2500

2014HS-TS14:THREE PHASE FAULT HAA BUS&LOSS OF HAA-JOJO&HAA-PINAL W LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
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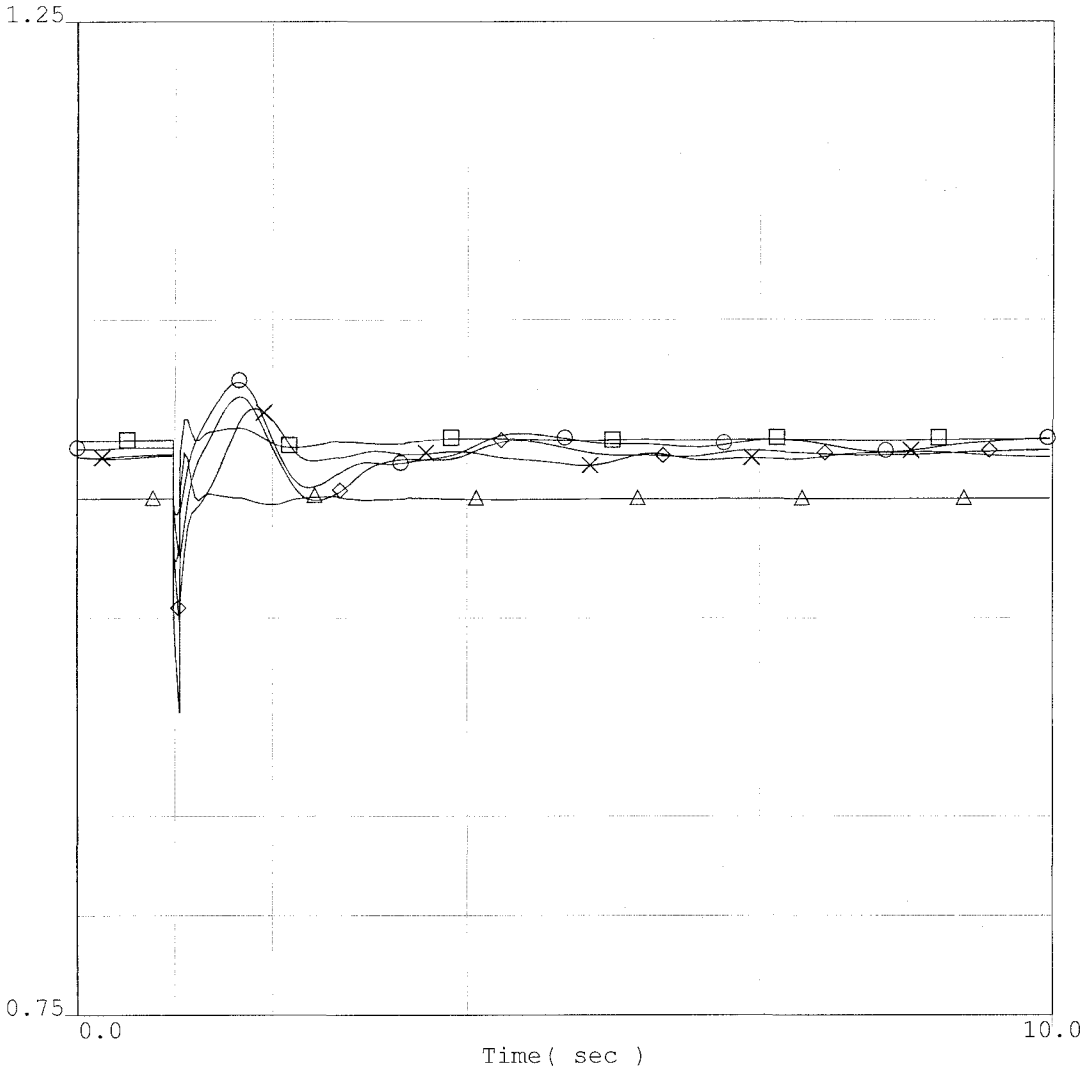
UTAH_voltages:



0.7500 vbus	66230	PINTO 138.0	0	0.0	1	1	1.2500
0.7500 vbus	18019	H ALLEN 230.0	0	0.0	1	1	1.2500
0.7500 vbus	66280	REDBUTTE 345.0	0	0.0	1	1	1.2500
0.7500 vbus	66420	SGSY 138.0	0	0.0	1	1	1.2500
0.7500 vbus	79023	DURANGO 115.0	0	0.0	1	1	1.2500

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SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

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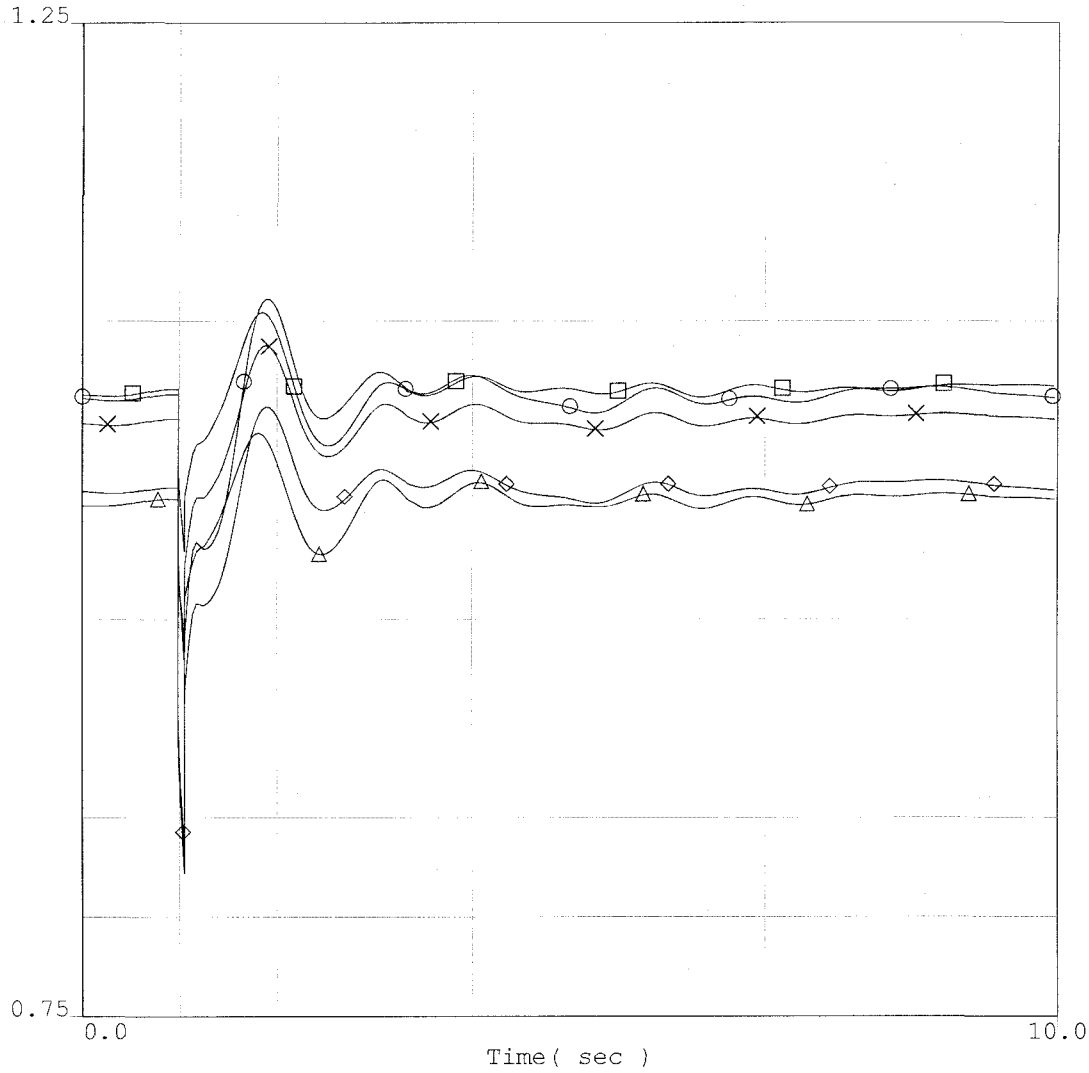

0.7500 vbus	24801	DEVERS 500.0	0	0.0	1	1	1.2500
0.7500 vbus	24086	LUGO 500.0	0	0.0	1	1	1.2500
0.7500 vbus	24156	VINCENT 500.0	0	0.0	1	1	1.2500
0.7500 vbus	26094	SYLMARLA 230.0	0	0.0	1	1	1.2500
0.7500 vbus	24804	DEVERS 230.0	0	0.0	1	1	1.2500

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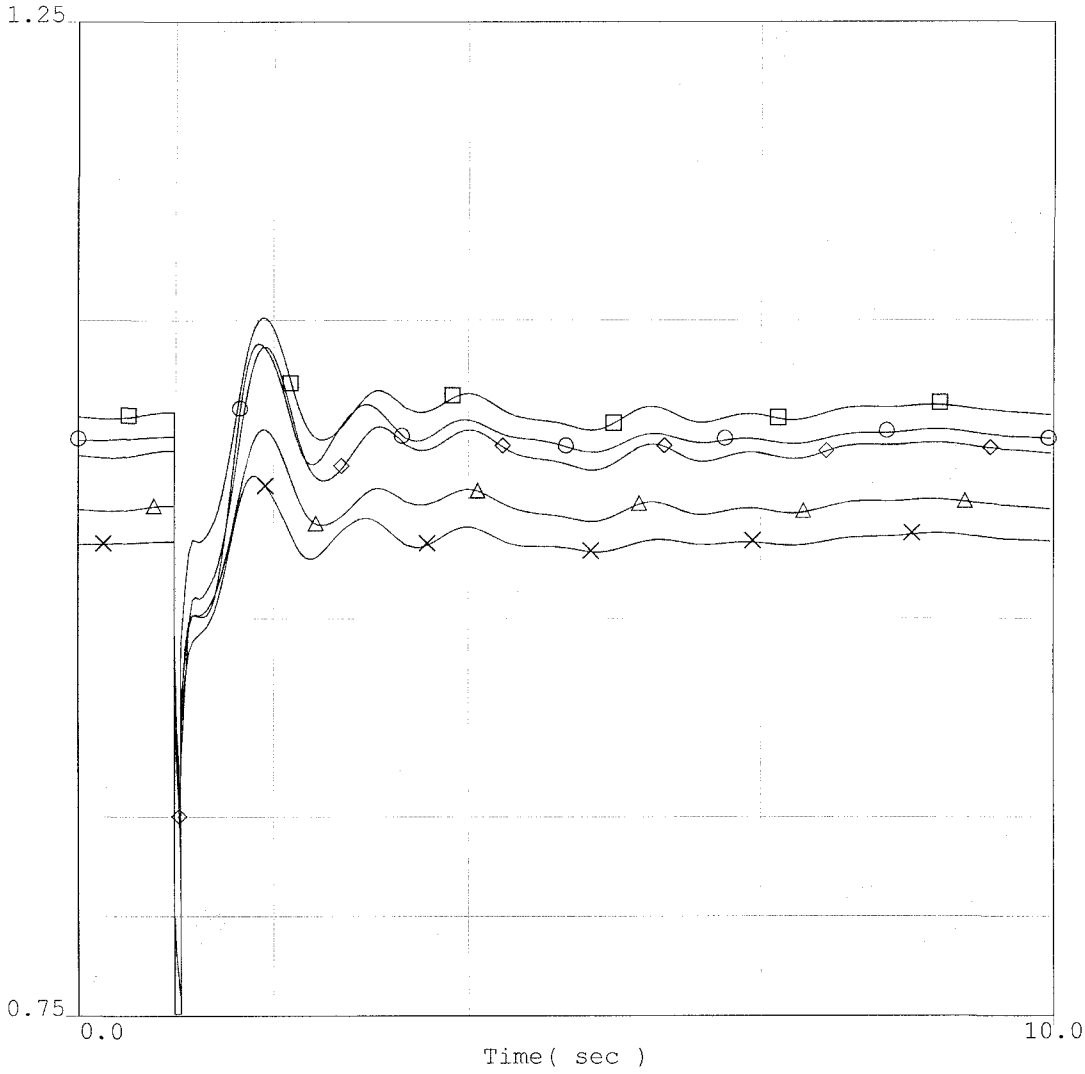
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

CALIFORNIA_voltages:



0.7500 vbus	22360	IMPRLVLY 500.0	0	0.0	1	1	1.2500
0.7500 vbug	22356	IMPRLVLY 230.0	0	0.0	1	1	1.2500
0.7500 vbus	24151	VALLEYSC 500.0	0	0.0	1	1	1.2500
0.7500 vbus	24805	DEVERS 115.0	0	0.0	1	1	1.2500
0.7500 vbul	24229	VALLEY-S 115.0	0	0.0	1	1	1.2500

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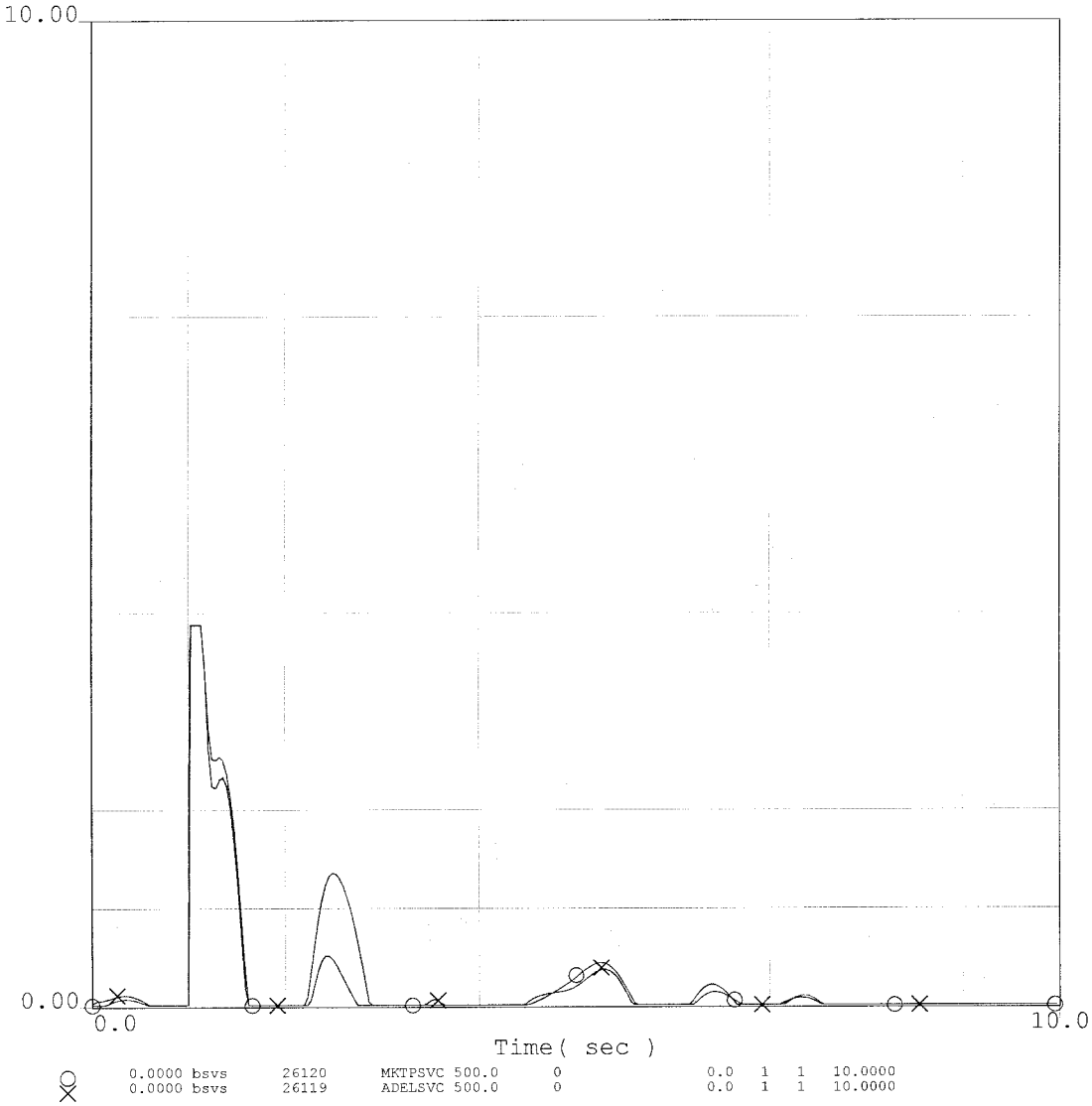
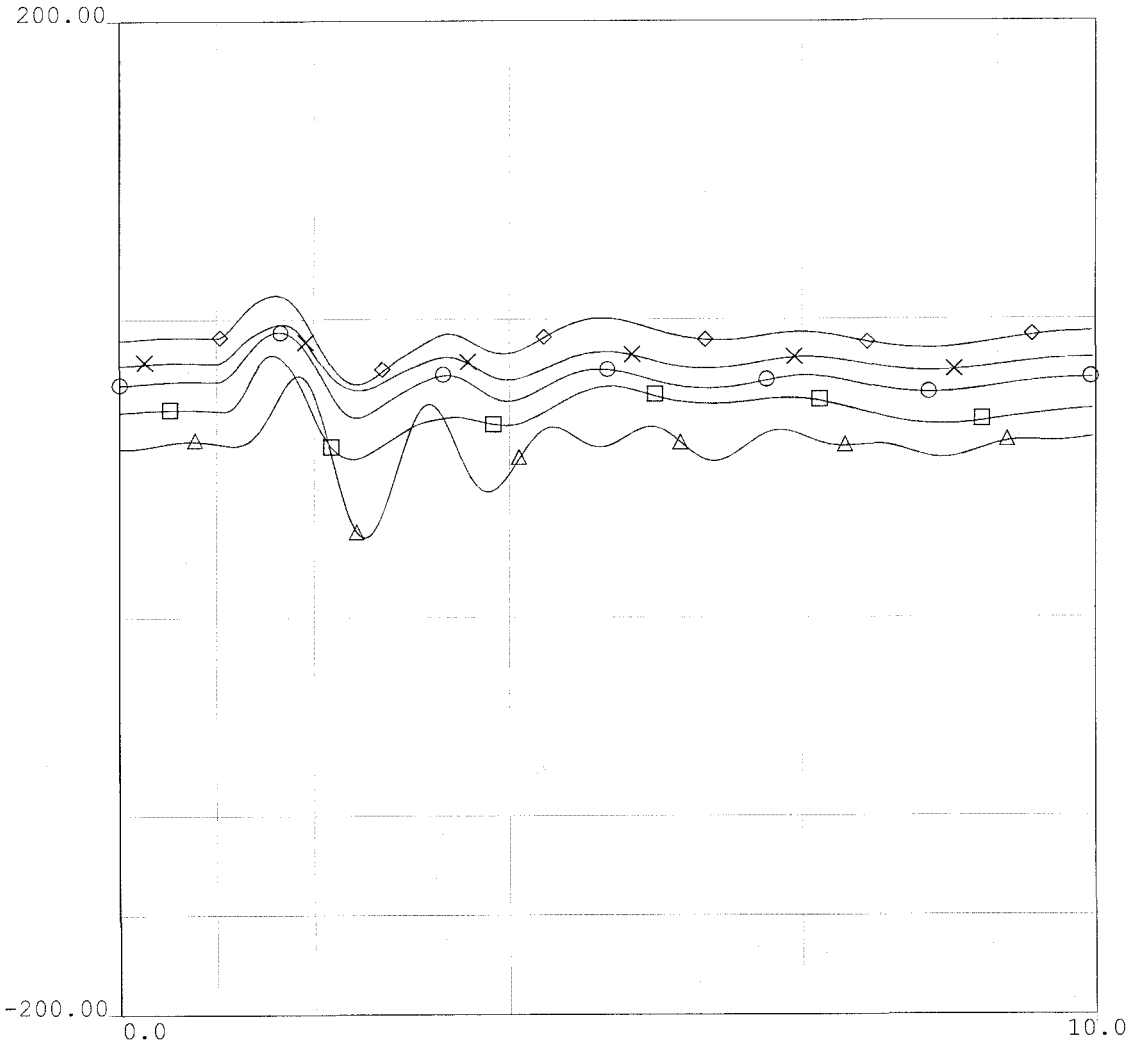
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

SVC_output



2014HS-TS14:THREE PHASE FAULT HAA BUS&LOSS OF HAA-JOJO&HAA-PINAL W LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

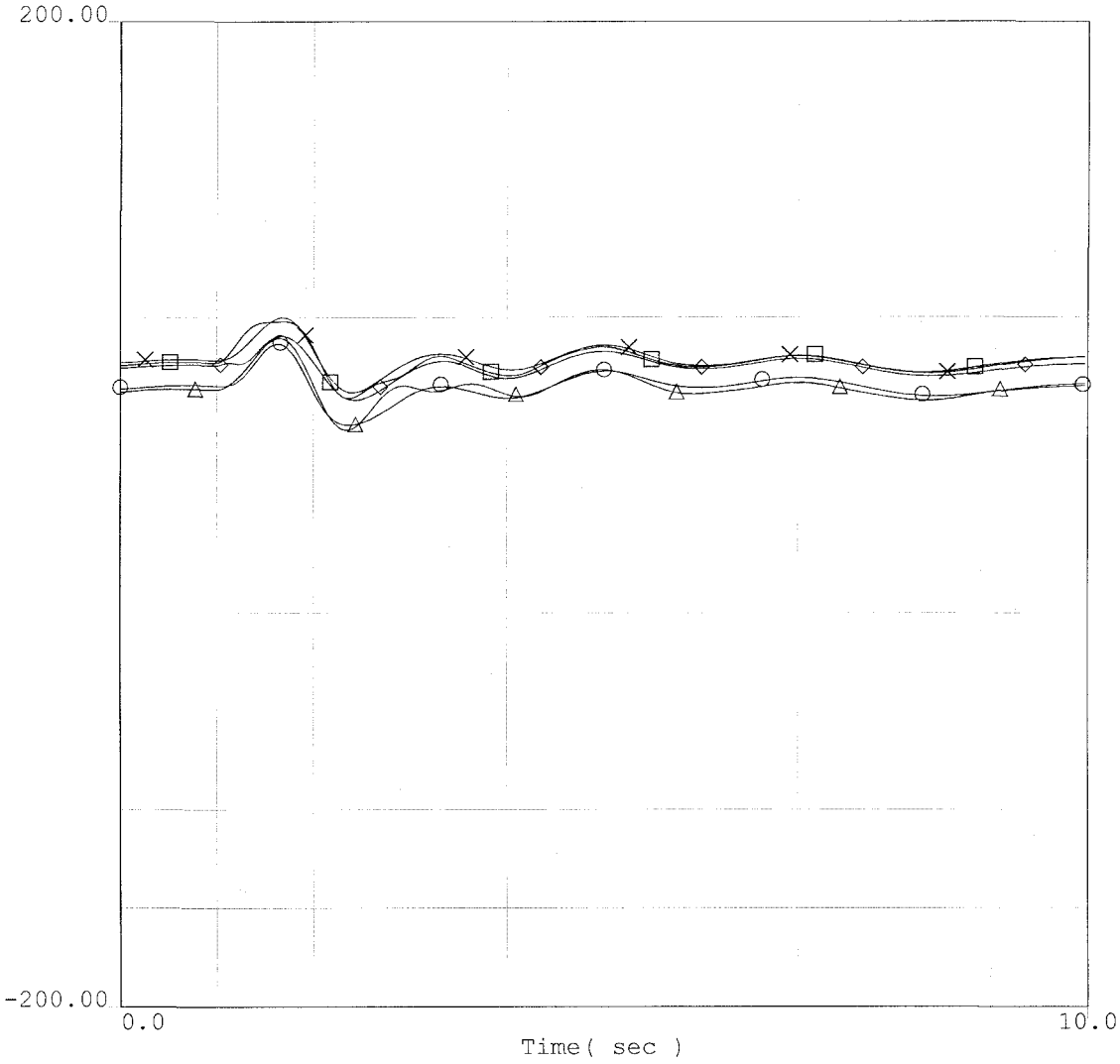
SYSTEM_Rotorangles



-200.0000 ang	16500	SPR GEN1	19.0	0	0.0	1	1	200.0000
-200.0000 ang	10321	SJUAN_G4	22.0	0	0.0	1	1	200.0000
-200.0000 ang	14942	SAGUARO2	15.5	0	0.0	1	1	200.0000
-200.0000 ang	17024	APACHCT1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	16518	SPR GEN3	21.0	0	0.0	1	1	200.0000

2014HS-TS14:THREE PHASE FAULT HAA BUS&LOSS OF HAA-JOJO&HAA-PINAL W LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

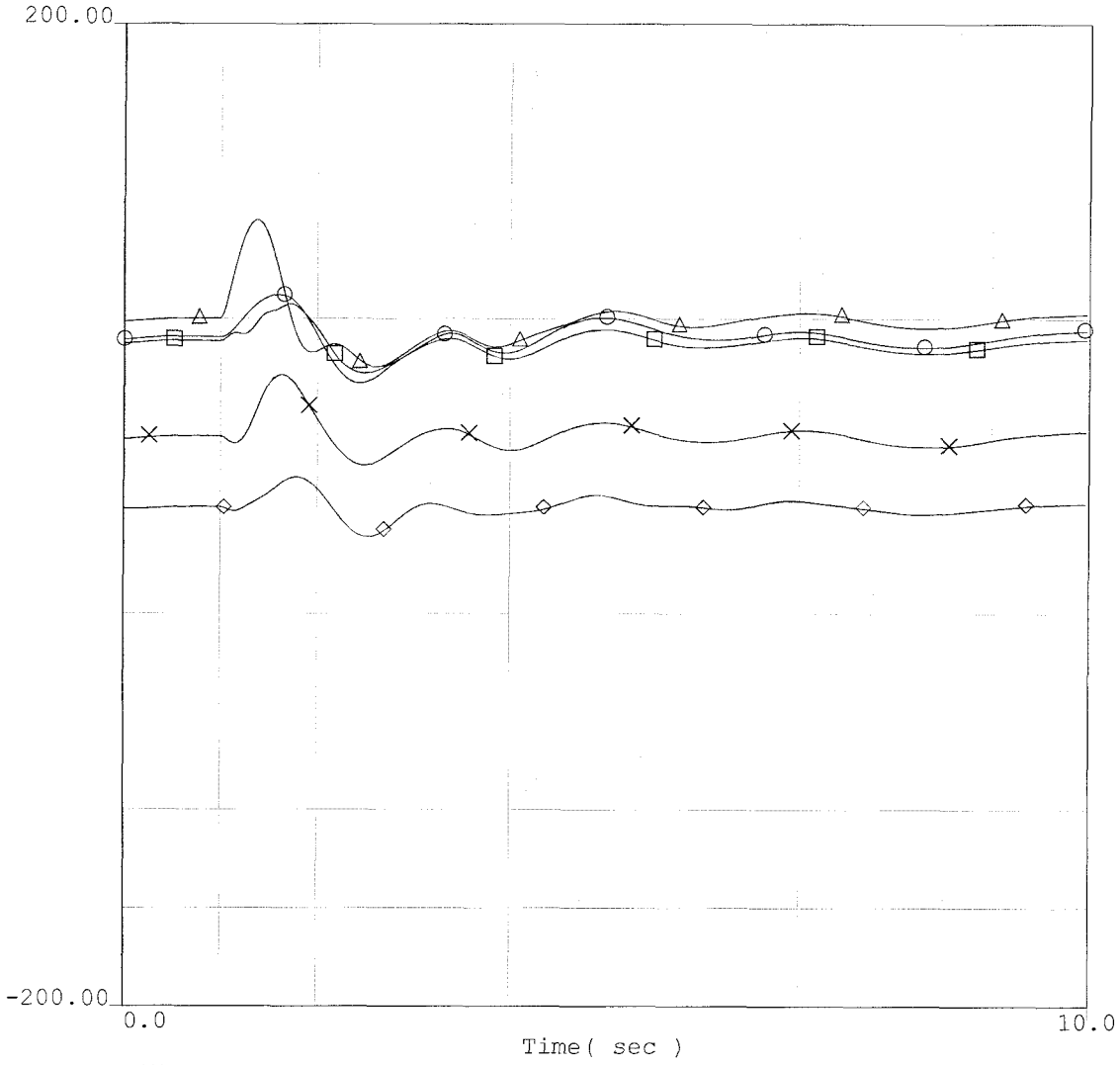
SYSTEM_Rotorangles



-200.0000 ang	15140	DBG-CT1	18.0	0	0.0	1	1	200.0000
-200.0000 ang	14945	SAG. CT3	13.8	0	0.0	1	1	200.0000
-200.0000 ang	14902	CHOLLA3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	15921	SANTAN 1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	14903	CHOLLA4	22.0	0	0.0	1	1	200.0000

2014HS-TS14:THREE PHASE FAULT HAA BUS&LOSS OF HAA-JOJO&HAA-PINAL W LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

SYSTEM_Rotorangles



○	-200.0000 ang	16518	SPR GEN3	21.0	0	0.0	1	1	200.0000
⊗	-200.0000 ang	16503	SUNDTGE4	18.0	0	0.0	1	1	200.0000
△	-200.0000 ang	14914	FCNGN4CC	22.0	0	0.0	H	1	200.0000
□	-200.0000 ang	14931	PALOVRD1	24.0	0	0.0	1	1	200.0000
◇	-200.0000 ang	24004	ALAMT4 G	18.0	0	0.0	H	1	200.0000

2014HS-TS14:THREE PHASE FAULT HAA BUS&LOSS OF HAA-JOJO&HAA-PINAL W LINES
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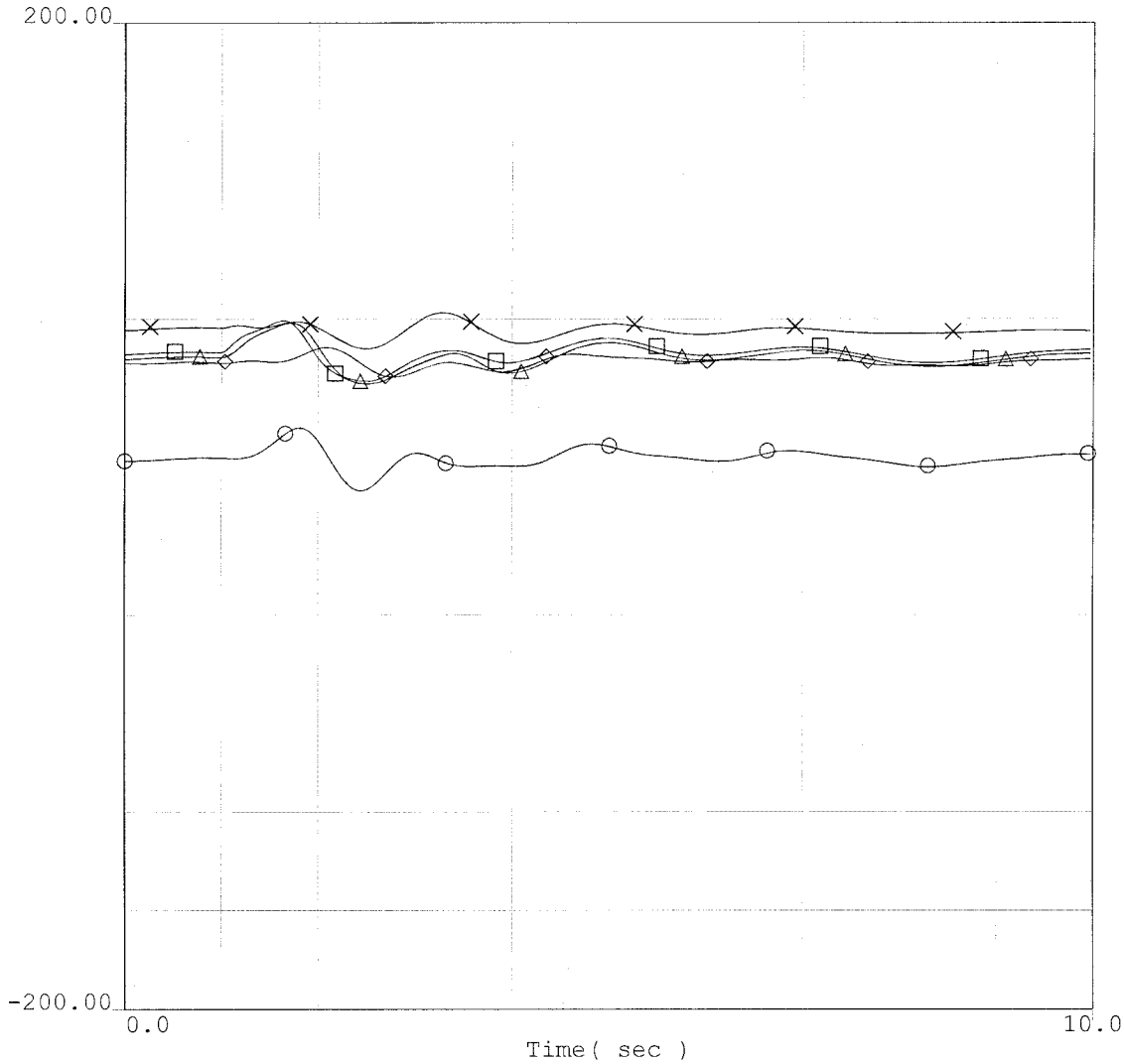
SYSTEM_Rotorangles



-200.0000 ang	24129	S.ONOFR2	22.0	0	0.0	1	1	200.0000
-200.0000 ang	26039	INTERM1G	26.0	0	0.0	1	1	200.0000
-200.0000 ang	15981	NAVAJO 1	26.0	0	0.0	1	1	200.0000
-200.0000 ang	10318	SJUAN_G1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	36411	DIABLO 1	25.0	0	0.0	1	1	200.0000

2014HS-TS14:THREE PHASE FAULT HAA BUS&LOSS OF HAA-JOJO&HAA-PINAL W LINES
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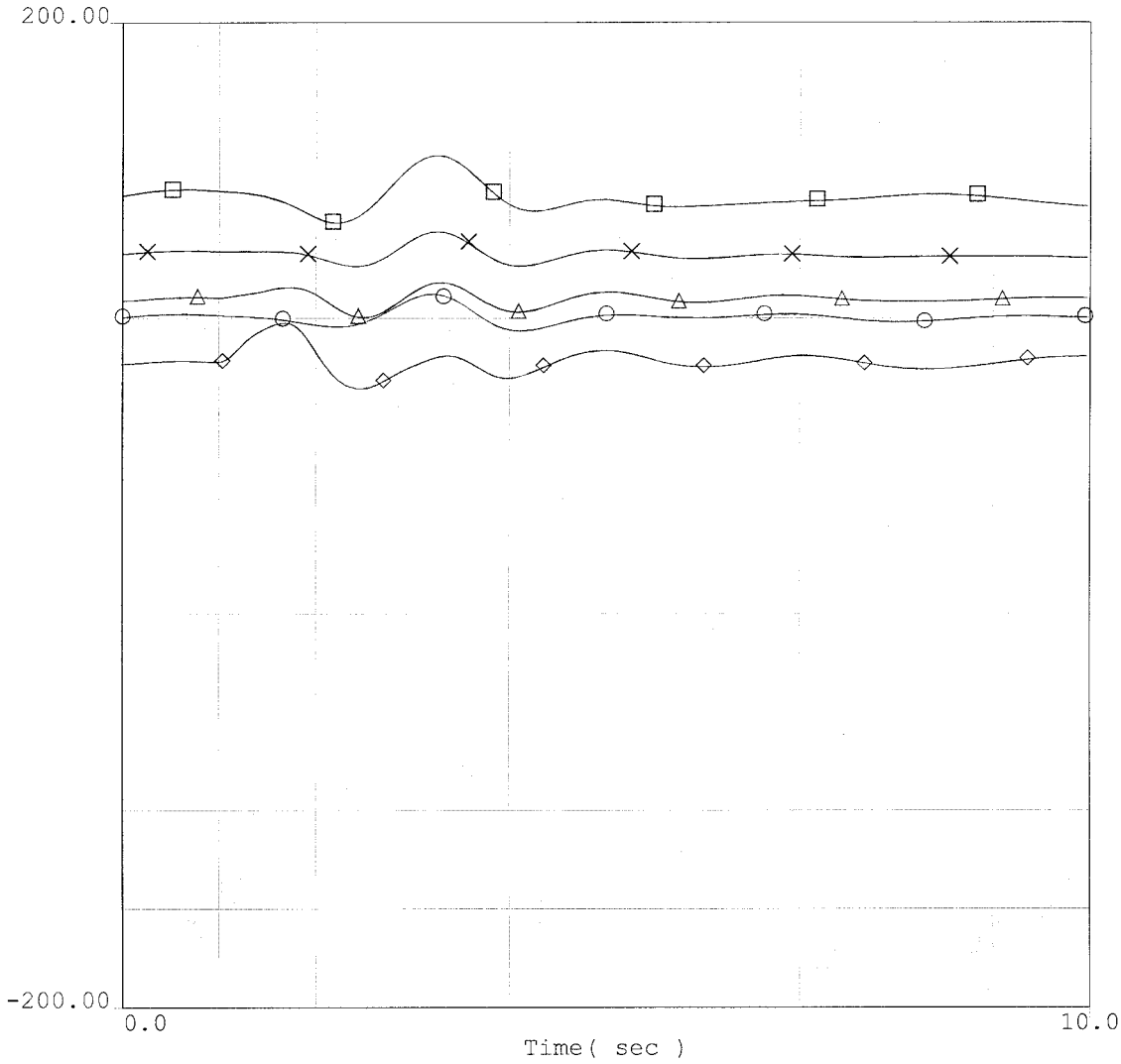
SYSTEM_Rotorangles



-200.0000 ang	73129	MBPP-1	24.0	0	0.0	1	1	200.0000
-200.0000 ang	60086	BRIDGER1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	62050	COLSTP 1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	65500	EHUNTR 3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	10321	SJUAN_G4	22.0	0	0.0	1	1	200.0000

2014HS-TS14:THREE PHASE FAULT HAA BUS&LOSS OF HAA-JOJO&HAA-PINAL W LINES
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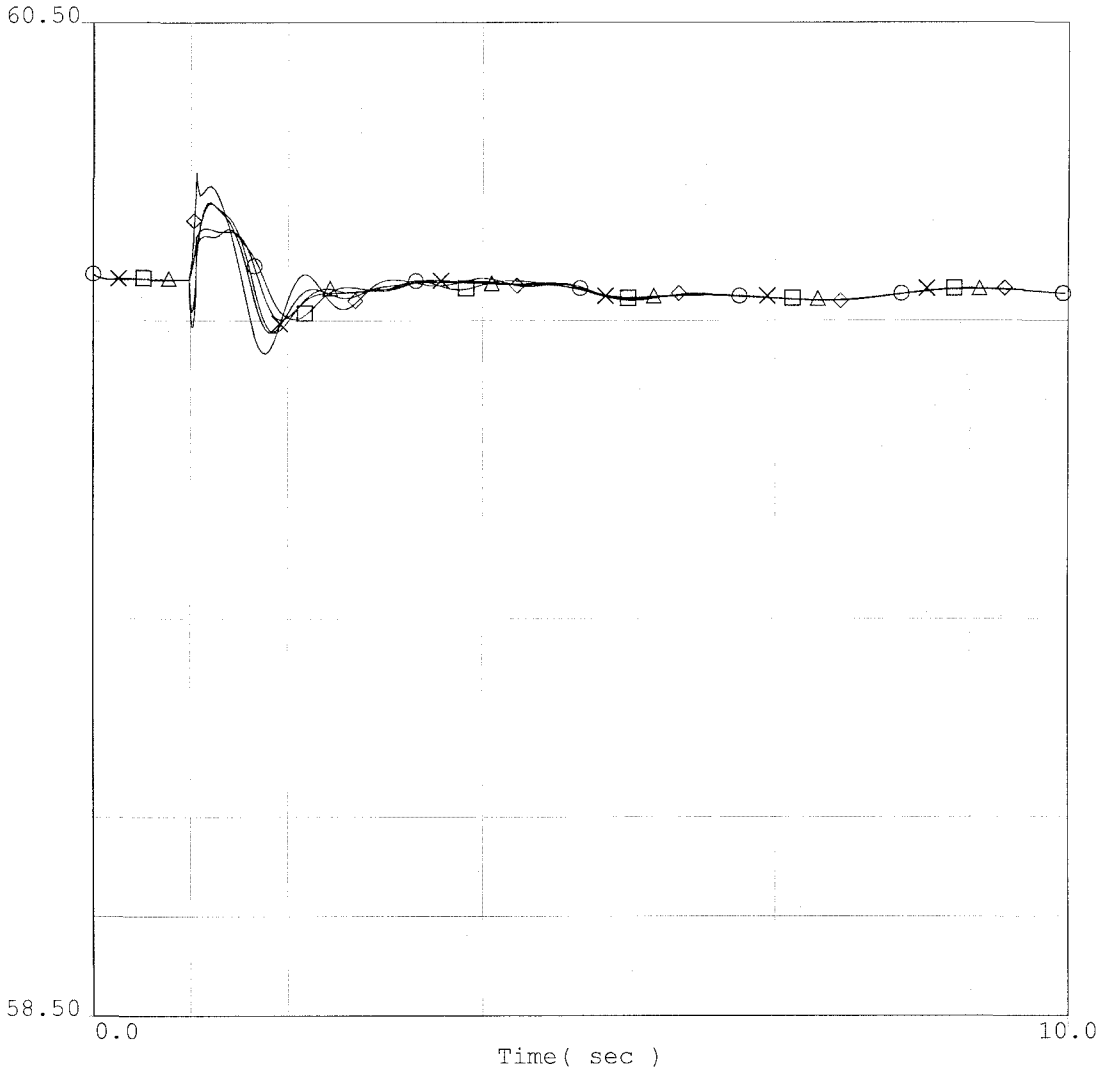
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

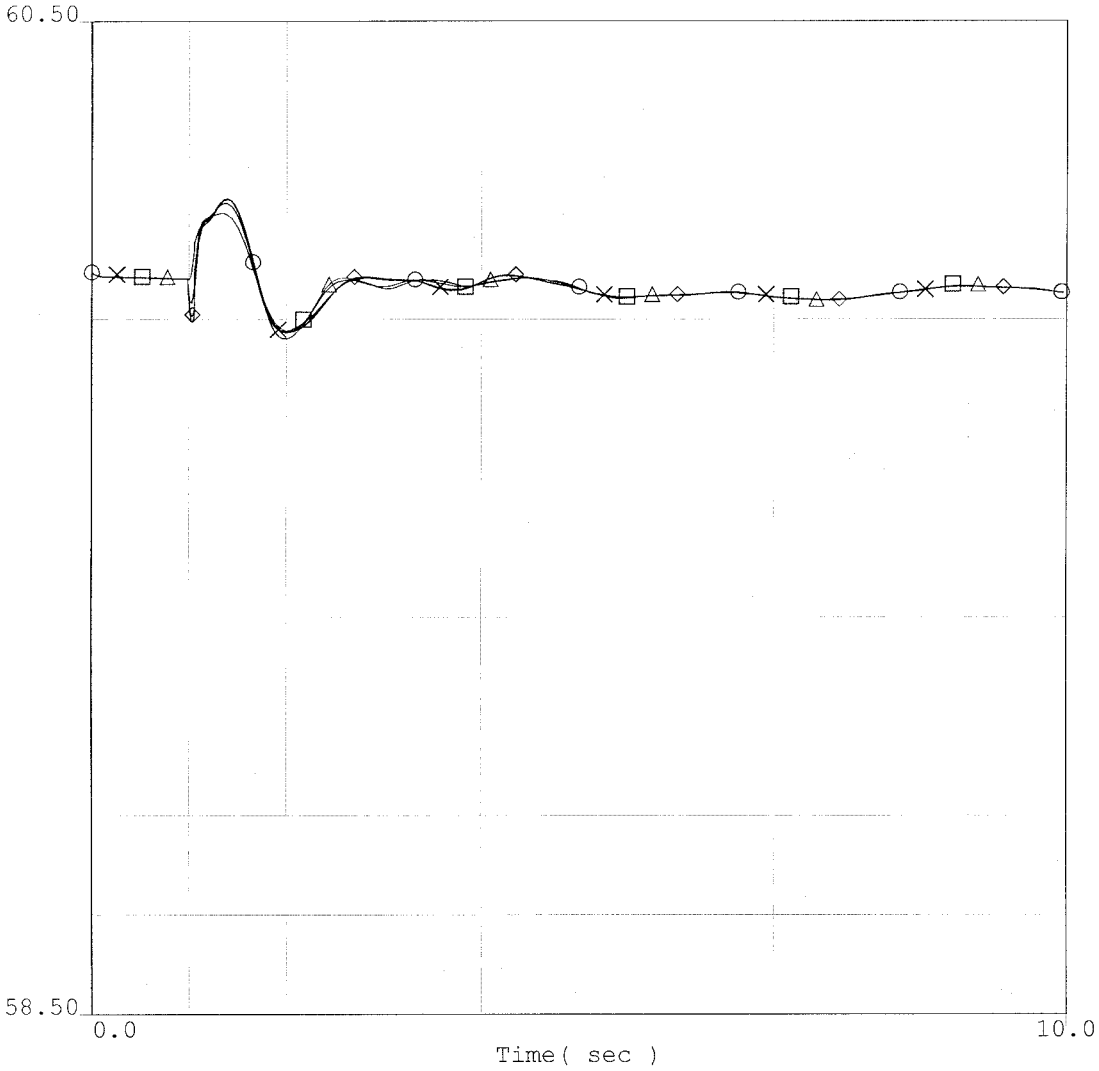
Frequencies:



58.5000 fbus	14003	NAVAJO 500.0	0	0.0	1	1	60.5000
58.5000 fbus	14005	WESTWING 500.0	0	0.0	1	1	60.5000
58.5000 fbus	14001	FOURCORN 500.0	0	0.0	1	1	60.5000
58.5000 fbus	14016	PNPKAPS 500.0	0	0.0	1	1	60.5000
58.5000 fbus	15021	PALOVRDE 500.0	0	0.0	1	1	60.5000

2014HS-TS14:THREE PHASE FAULT HAA BUS&LOSS OF HAA-JOJO&HAA-PINAL W LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

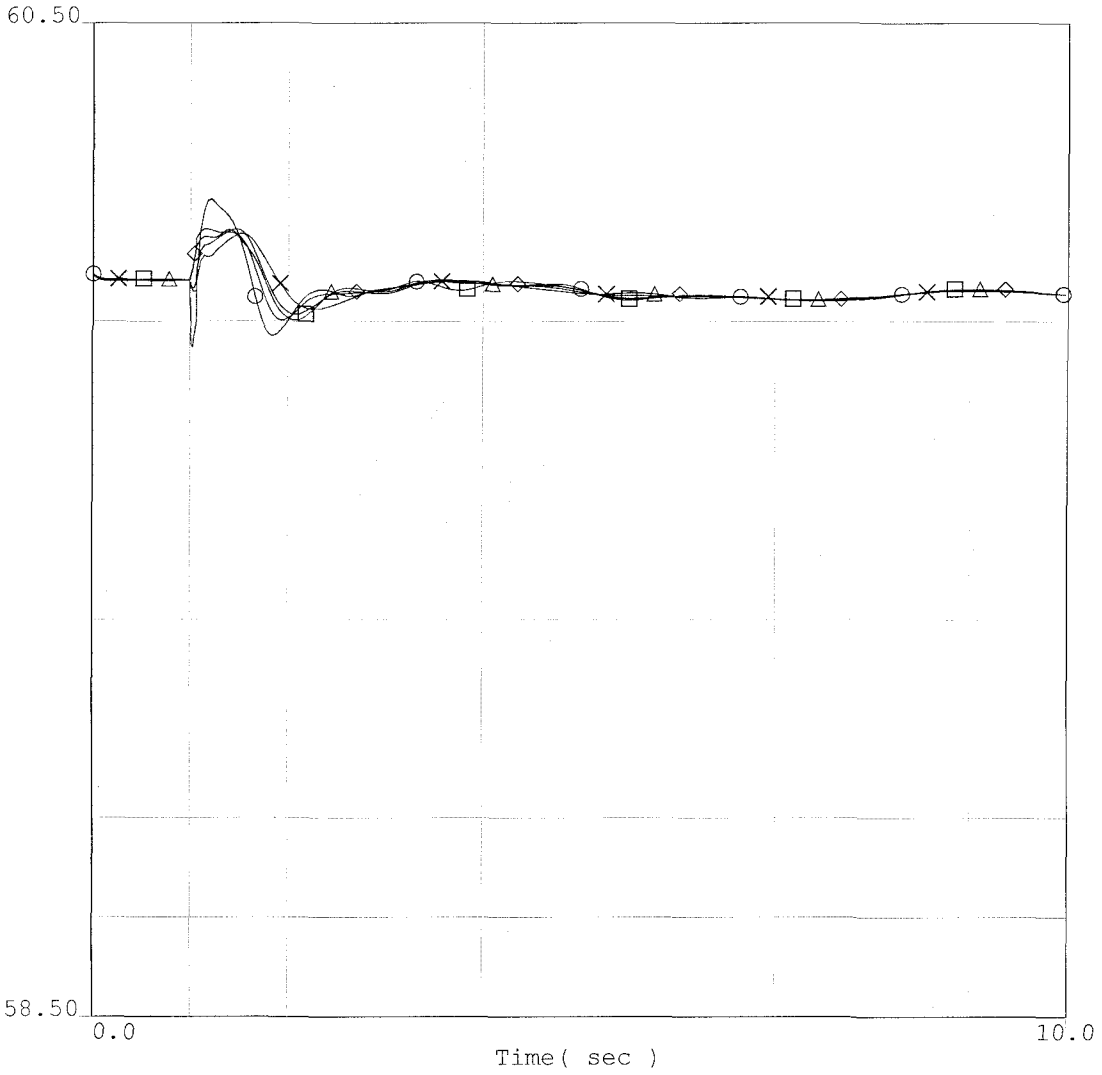
Frequencies:



58.5000	fbus	16000	TORTOLIT 500.0	0	0.0	1	1	60.5000
58.5000	fbus	16105	VAIL 345.0	0	0.0	1	1	60.5000
58.5000	fbus	16103	SOUTH 345.0	0	0.0	1	1	60.5000
58.5000	fbul	15001	CORONADO 500.0	0	0.0	1	1	60.5000
58.5000	fbus	16109	WINCHSTR 345.0	0	0.0	1	1	60.5000

2014HS-TS14:THREE PHASE FAULT HAA BUS&LOSS OF HAA-JOJO&HAA-PINAL W LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

Frequencies:



58.5000	fbul	14231	WESTWNGW 230.0	0	0.0	1	1	60.5000
58.5000	fbus	26003	ADELANTO 500.0	0	0.0	1	1	60.5000
58.5000	fbus	14001	FOURCORN 500.0	0	0.0	1	1	60.5000
58.5000	fbus	26048	MCCULLGH 500.0	0	0.0	1	1	60.5000
58.5000	fbus	14003	NAVAJO 500.0	0	0.0	1	1	60.5000

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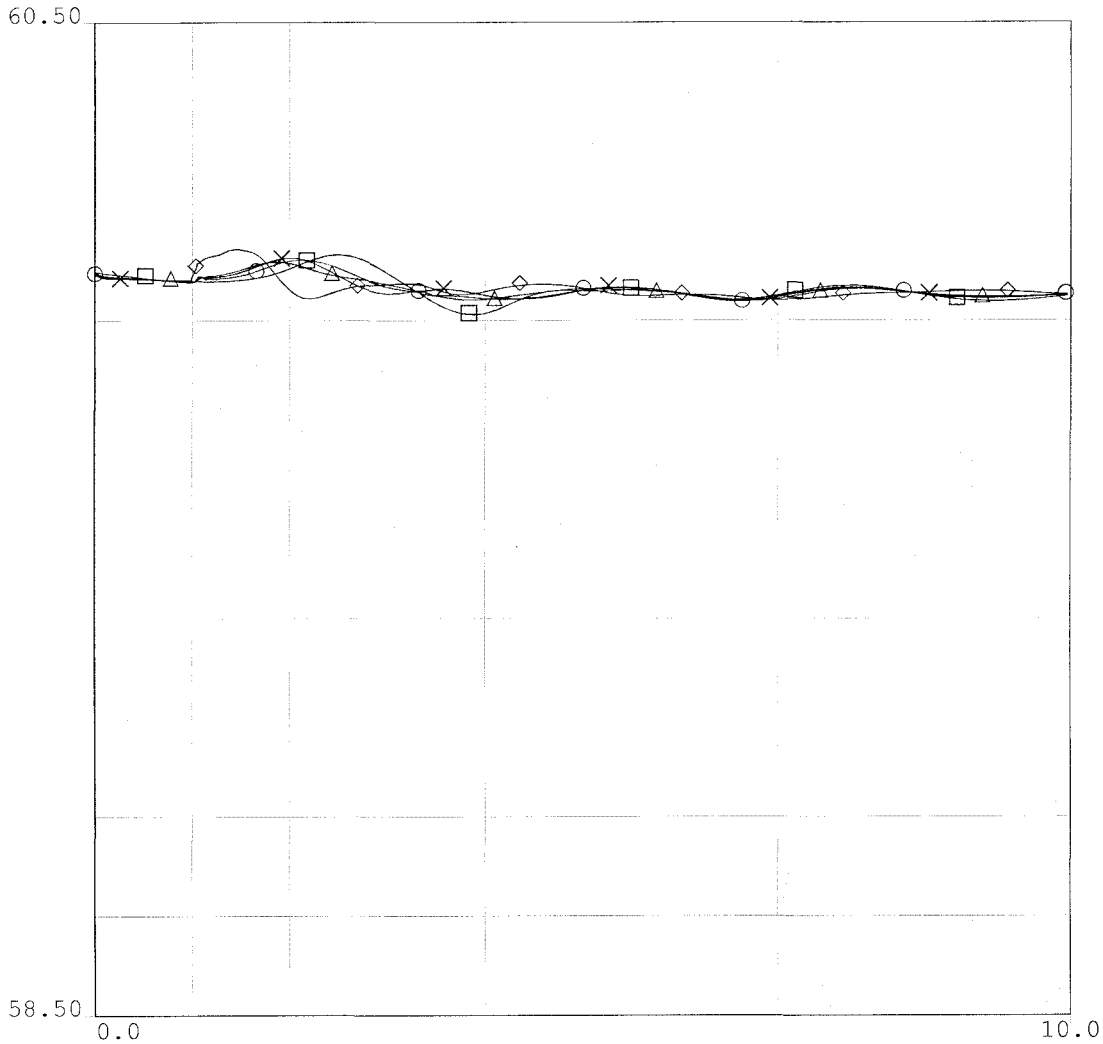
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

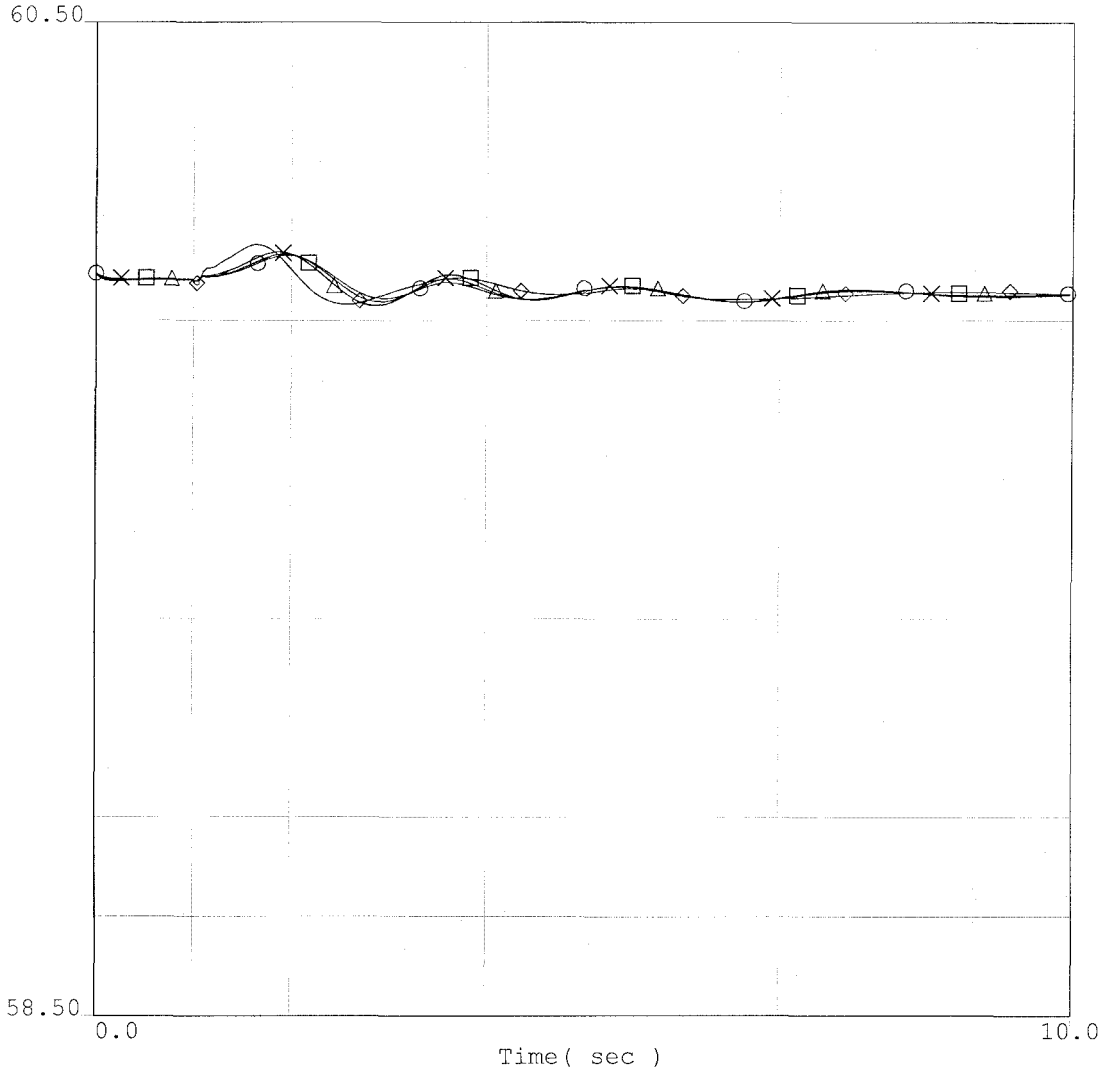
Frequencies:



○	58.5000	fbus	40489	GRIZZLY 500.0	0	0.0	1	1	60.5000
⊗	58.5000	fbus	40687	MALIN 500.0	0	0.0	1	1	60.5000
□	58.5000	fbus	40459	GARRISON 500.0	0	0.0	1	1	60.5000
△	58.5000	fbus	60235	MIDPOINT 345.0	0	0.0	1	1	60.5000
◇	58.5000	fbus	66230	PINTO 138.0	0	0.0	1	1	60.5000

2014HS-TS14:THREE PHASE FAULT HAA BUS&LOSS OF HAA-JOJO&HAA-PINAL W LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

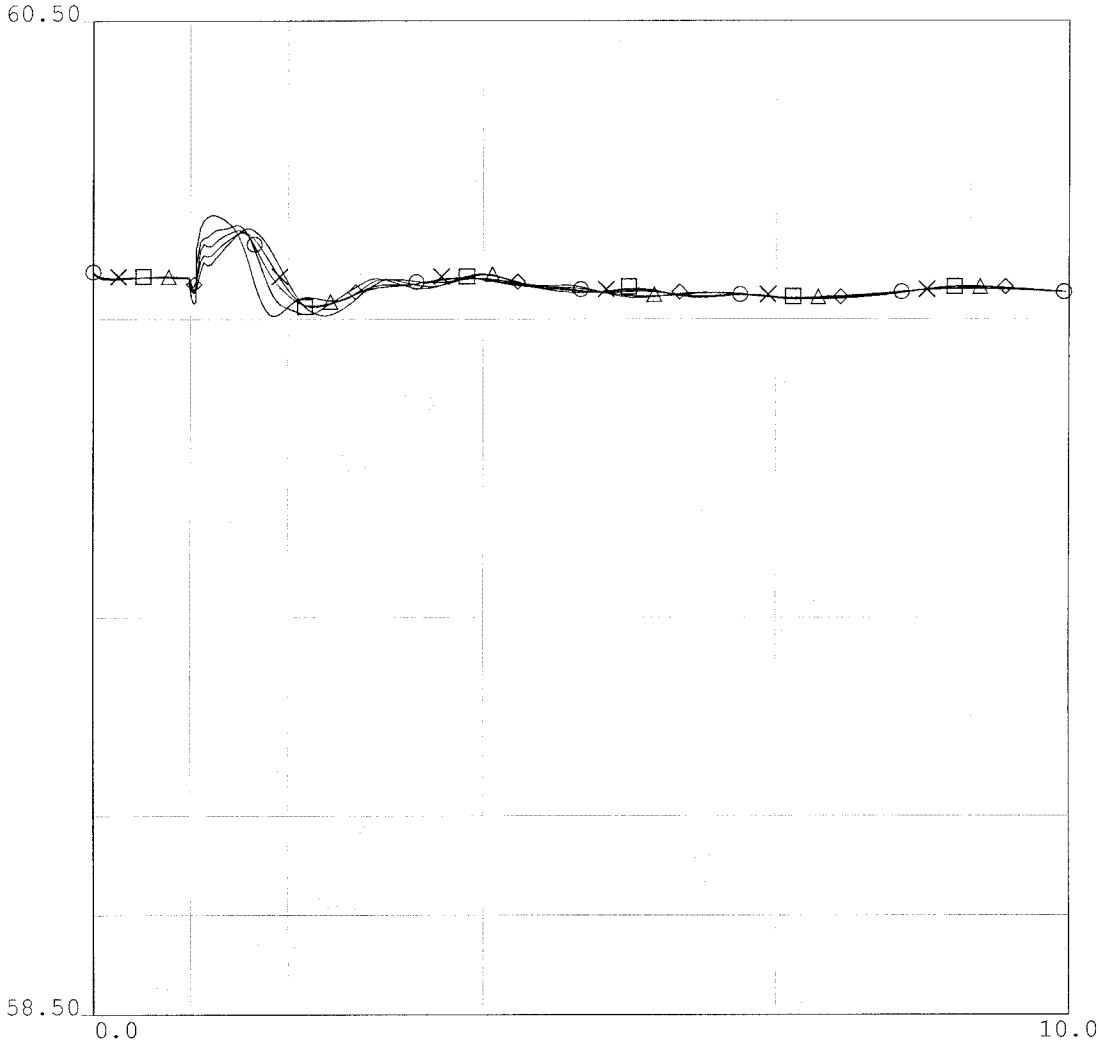
Frequencies:



58.5000 fbus	30005	ROUND MT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30015	TABLE MT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30035	TRACY 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30040	TESLA 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30060	MIDWAY 500.0	0	0.0	1	1	60.5000

2014HS-TS14:THREE PHASE FAULT HAA BUS&LOSS OF HAA-JOJO&HAA-PINAL W LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

Frequencies:



58.5000 fbus	24801	DEVERS 500.0	0	0.0	1	1	60.5000
58.5000 fbus	24086	LUGO 500.0	0	0.0	1	1	60.5000
58.5000 fbus	26094	SYLMARLA 230.0	0	0.0	1	1	60.5000
58.5000 fbus	22468	MIGUEL 500.0	0	0.0	1	1	60.5000
58.5000 fbus	22536	N.GILA 500.0	0	0.0	1	1	60.5000

2014HS-TS14:THREE PHASE FAULT HAA BUS&LOSS OF HAA-JOJO&HAA-PINAL W LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

HIGHEST VOLTAGE DIP

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct	@time
14	RUDD	69	vbul	1	0.949	5	1.525
14	Q1SOLAR	230	vbus	1.02	0.936	8.2	1.525
24	DEVRSVC1	500	vbug	1.06	1.019	3.8	1.525

LOWEST FREQUENCY

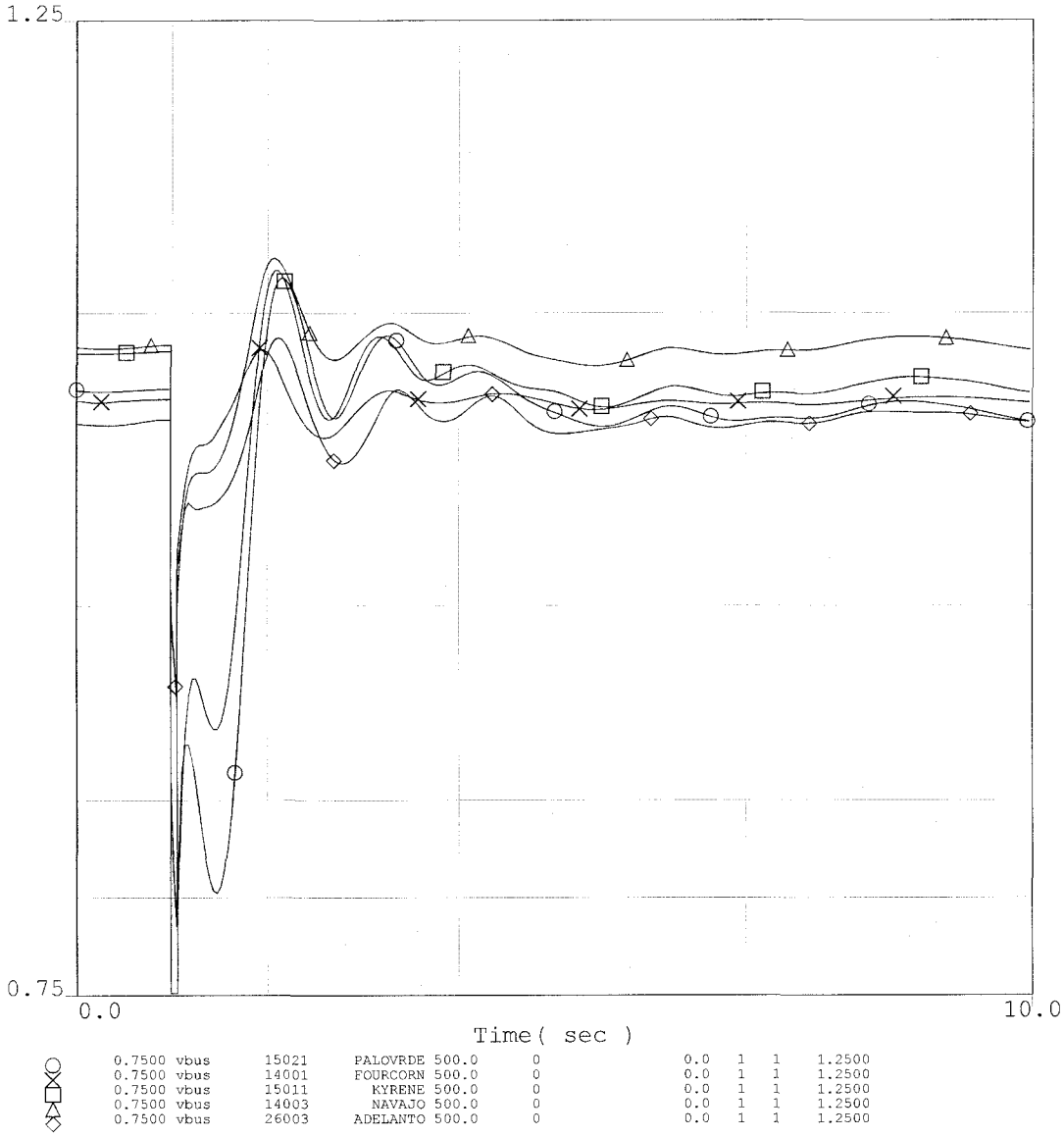
AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
14	WHITETNK	69	fbul	59.515	1.042
14	Q1COL1	34.5	fbus	55.318	1.054
14	HGC-ST1	13.8	fbug	59.741	1.75

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

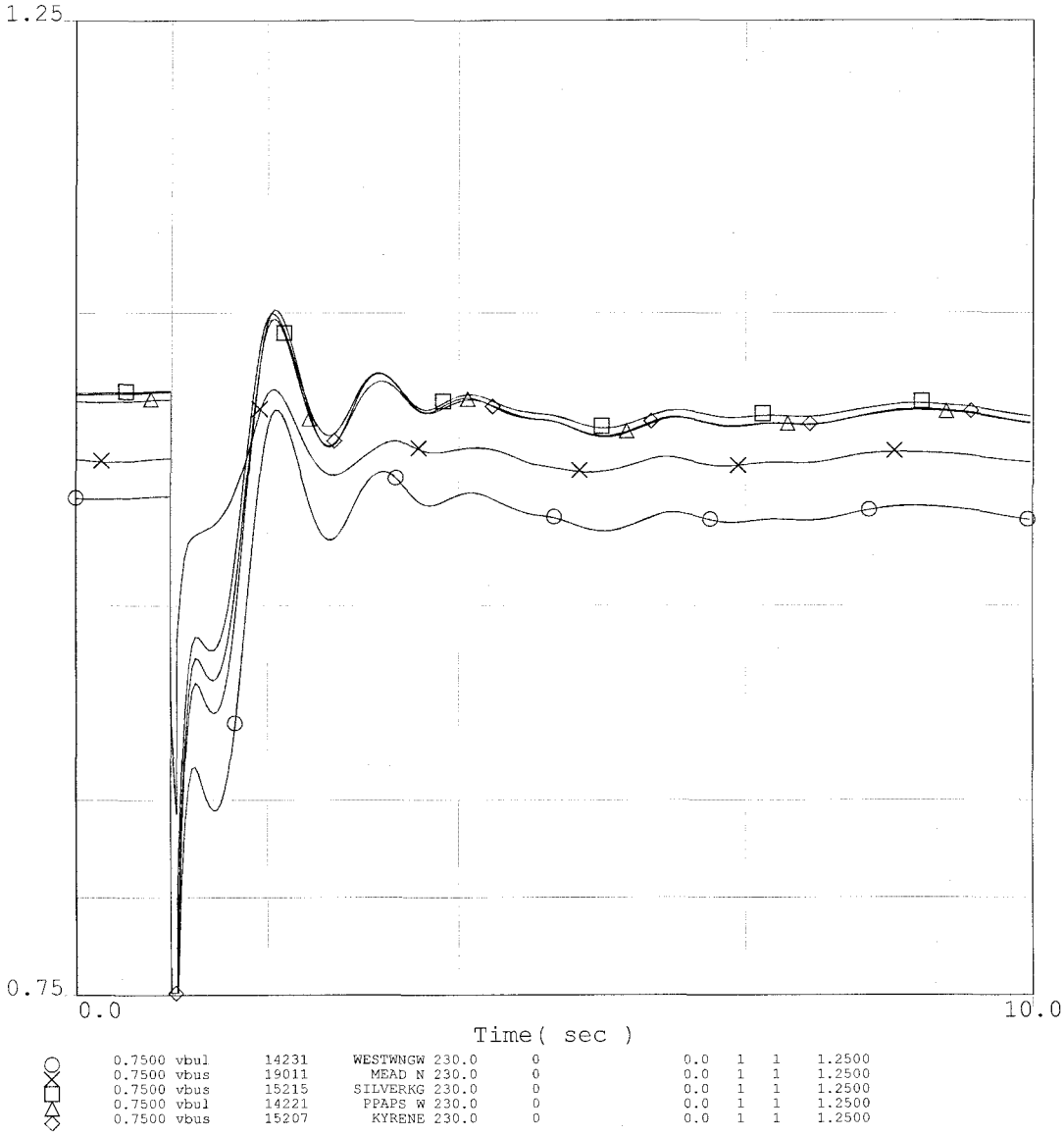
There were 0 violations of MORC criteria 1 (25% Voltage Dip) !
There were 0 violations of MORC criteria 2 (20% Voltage Dip for 20 Cycles)!
There were 0 violations of MORC criteria 3 (59.6 HZ for 6 Cycles)!

ARIZONA_voltages:



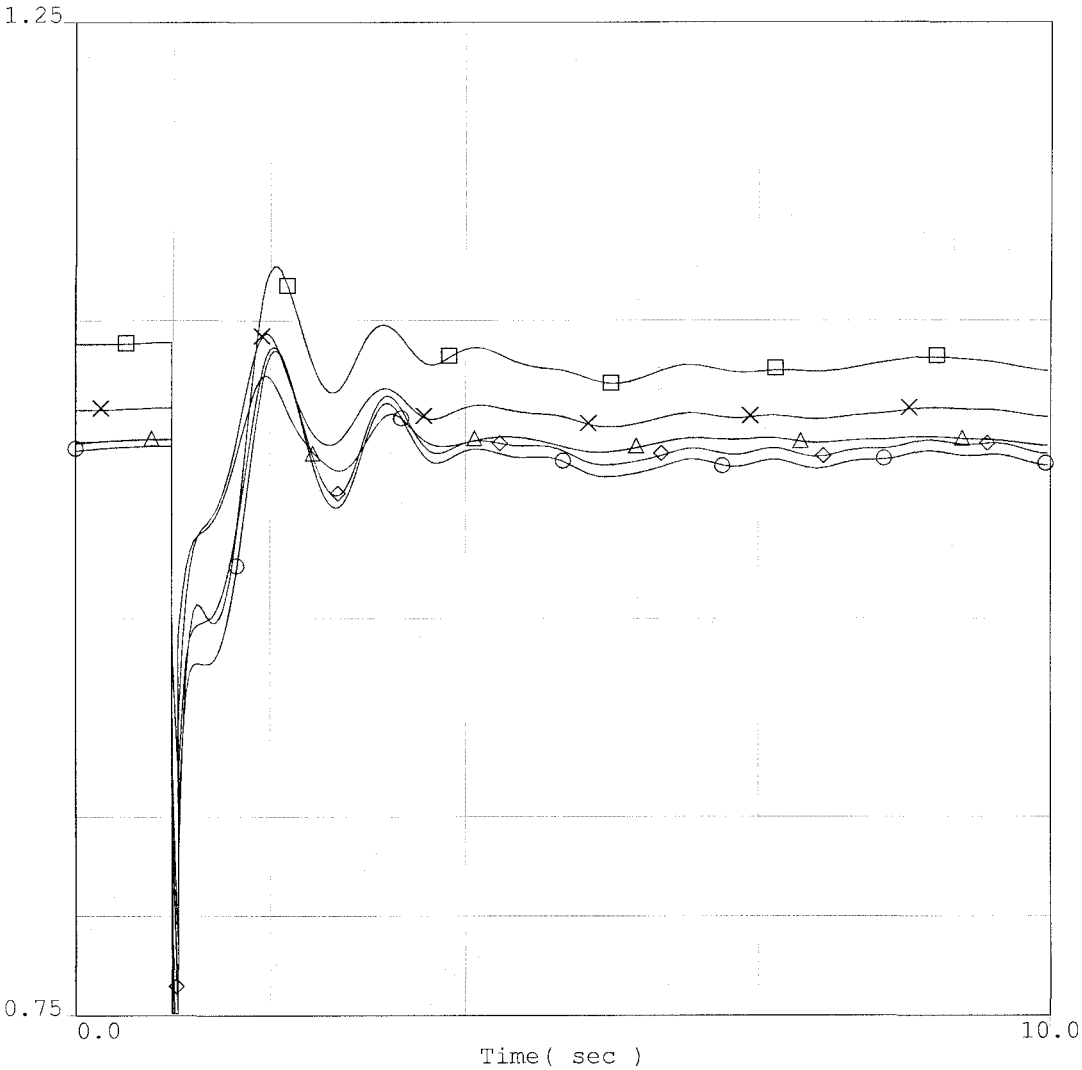
2014HS-TS15:THREE PHASE FAULT PV BUS&LOSS OF PV-WWG#1&PVRUDD 500kV LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

ARIZONA_voltages:



2014HS-TS15:THREE PHASE FAULT PV BUS&LOSS OF PV-WWG#1&PVRUDD 500kV LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

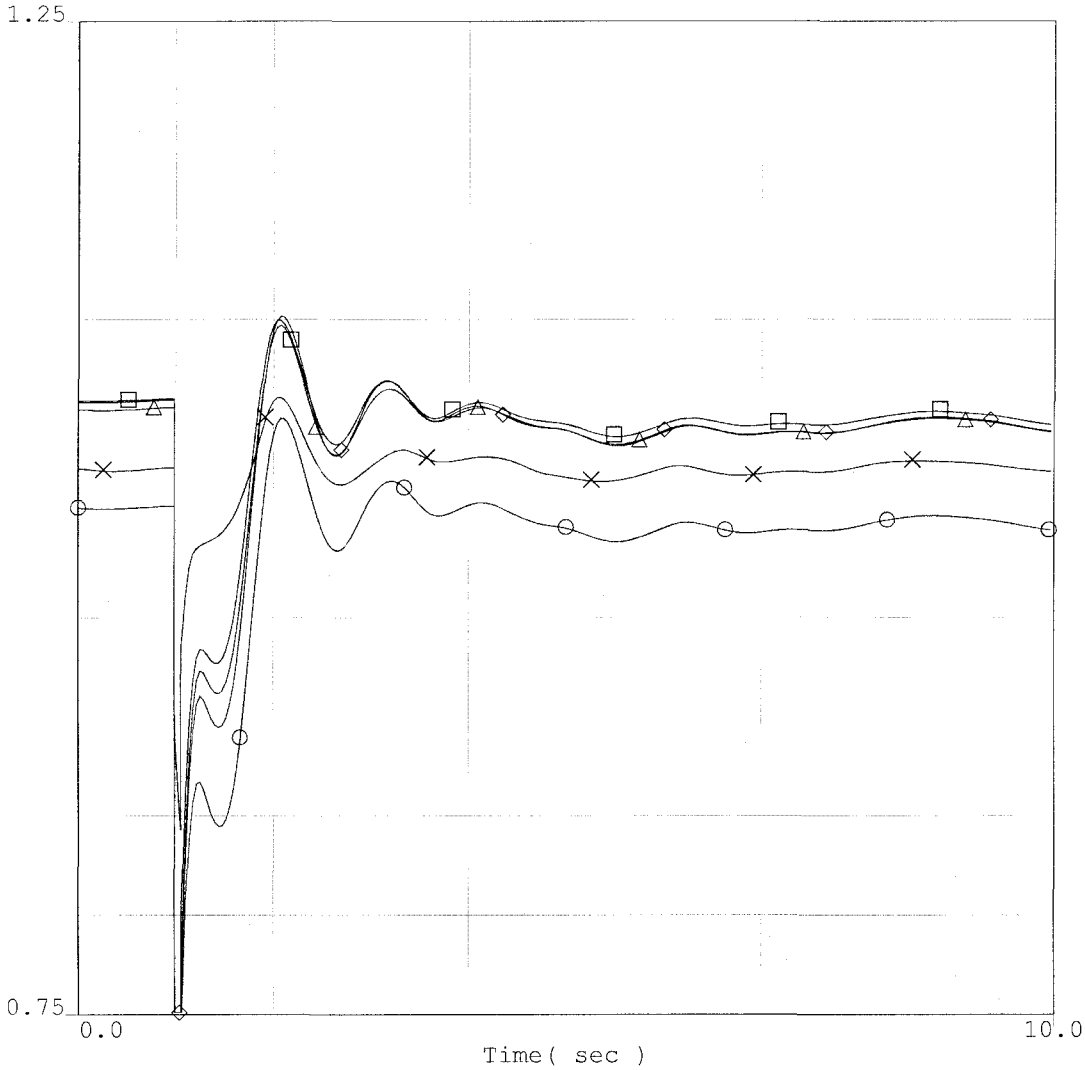
ARIZONA_voltages:



0.7500 vbus	16103	SOUTH 345.0	0	0.0	1	1	1.2500
0.7500 vbus	14000	CHOLLA 500.0	0	0.0	1	1	1.2500
0.7500 vbus	15041	SILVERKG 500.0	0	0.0	1	1	1.2500
0.7500 vbus	16104	SPRINGR 345.0	0	0.0	1	1	1.2500
0.7500 vbus	16109	WINCHSTR 345.0	0	0.0	1	1	1.2500

2014HS-TS15:THREE PHASE FAULT PV BUS&LOSS OF PV-WWG#1&PVRUDD 500kV LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

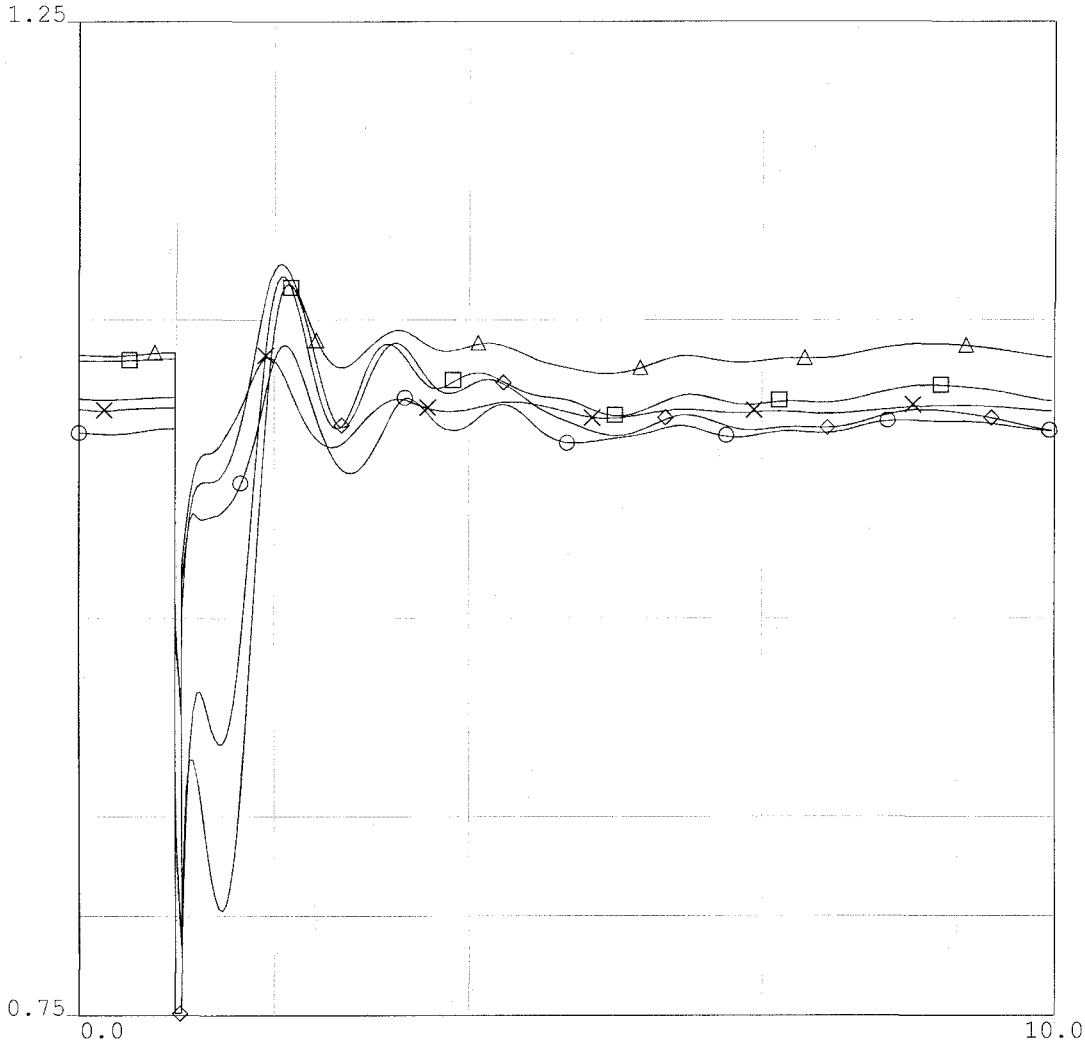
ARIZONA_voltages:



0.7500 vbul	14231	WESTWNGW 230.0	0	0.0	1	1	1.2500
0.7500 vbus	19011	MEAD N 230.0	0	0.0	1	1	1.2500
0.7500 vbus	15215	SILVERKG 230.0	0	0.0	1	1	1.2500
0.7500 vbul	14221	PPAPS W 230.0	0	0.0	1	1	1.2500
0.7500 vbus	15207	KYRENE 230.0	0	0.0	1	1	1.2500

2014HS-TS15:THREE PHASE FAULT PV BUS&LOSS OF PV-WWG#1&PVRUDD 500kV LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

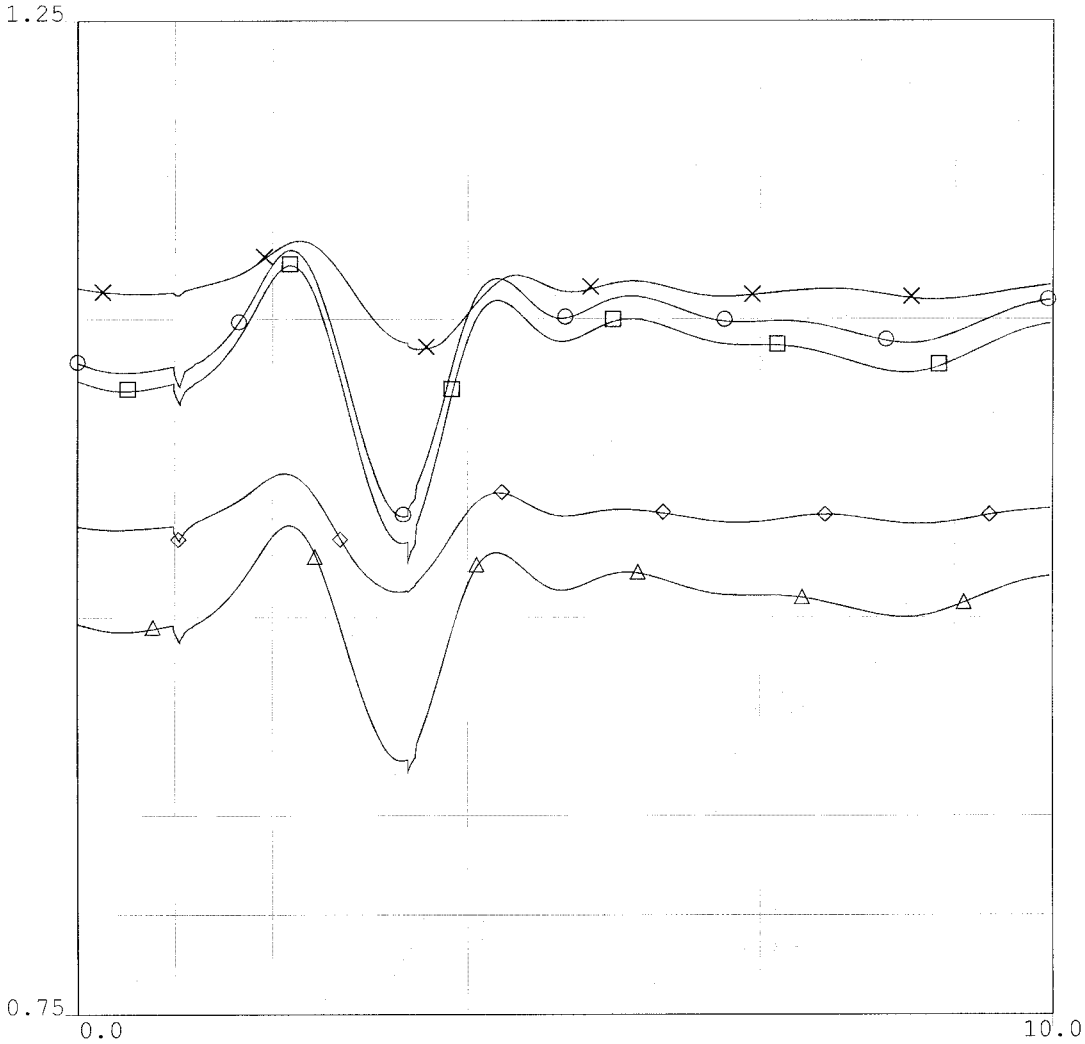
ARIZONA_voltages:



0.7500 vbus	26003	ADELANTO 500.0	0	0.0	1	1	1.2500
0.7500 vbus	14001	FOURCORN 500.0	0	0.0	1	1	1.2500
0.7500 vbus	15011	KYRENE 500.0	0	0.0	1	1	1.2500
0.7500 vbus	14003	NAVAJO 500.0	0	0.0	1	1	1.2500
0.7500 vbus	15021	PALOVRDE 500.0	0	0.0	1	1	1.2500

2014HS-TS15:THREE PHASE FAULT PV BUS&LOSS OF PV-WWG#1&PVRUDD 500kV LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

NORTHWEST_voltages:



○	0.7500 vbus	40489	GRIZZLY 500.0	0	0.0	1	1	1.2500
×	0.7500 vbus	40459	GARRISON 500.0	0	0.0	1	1	1.2500
□	0.7500 vbus	40687	MALIN 500.0	0	0.0	1	1	1.2500
△	0.7500 vbul	45215	NEWELL 69.0	0	0.0	1	1	1.2500
◇	0.7500 vbus	60235	MIDPOINT 345.0	0	0.0	1	1	1.2500

2014HS-TS15:THREE PHASE FAULT PV BUS&LOSS OF PV-WWG#1&PVRUDD 500kV LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

14hs_q3_pv-wg-rd.chf

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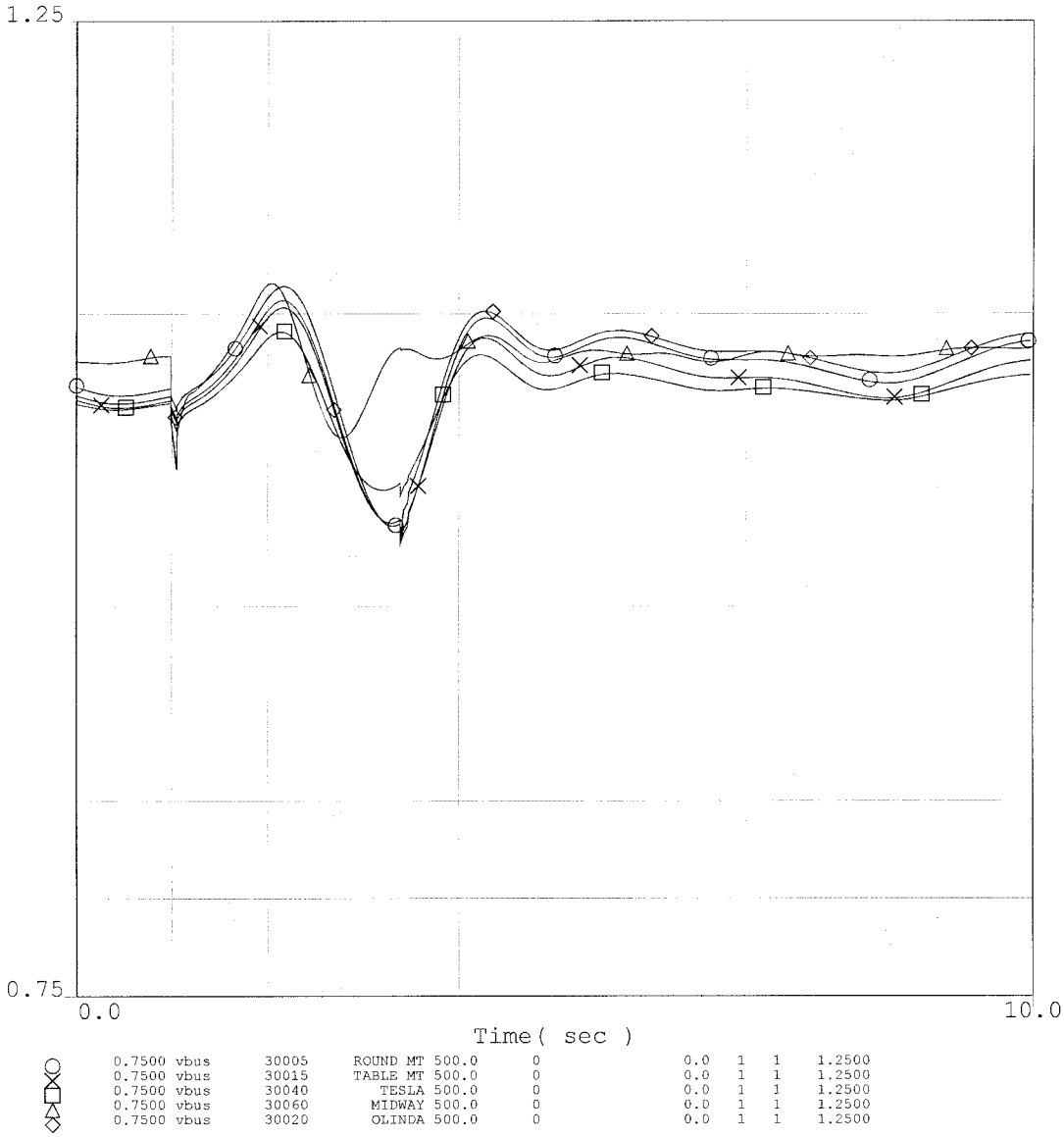
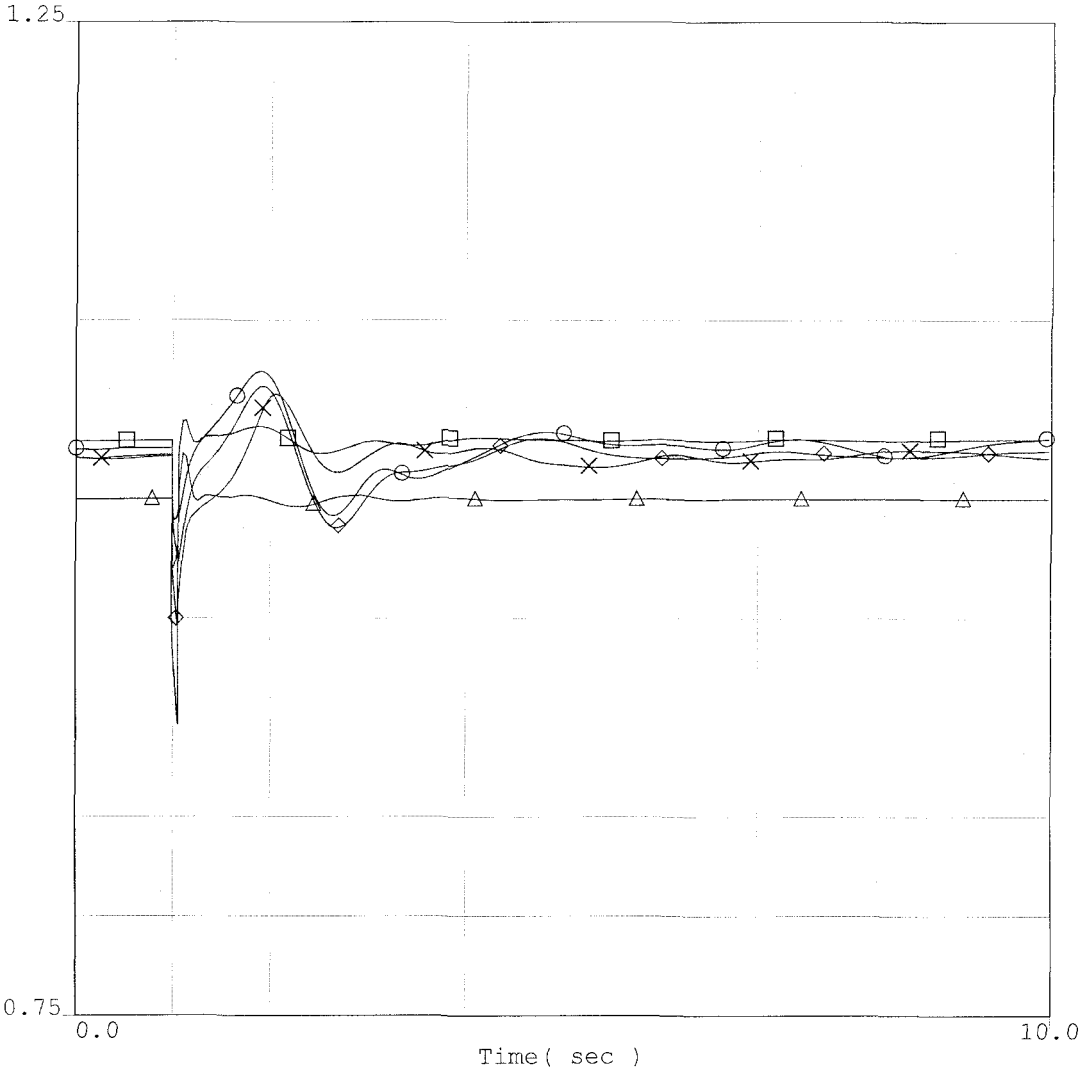
Thu Mar 31 05:56:11 2011

CALIFORNIA_voltages:



2014HS-TS15:THREE PHASE FAULT PV BUS&LOSS OF PV-WWG#1&PVRUDD 500kV LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

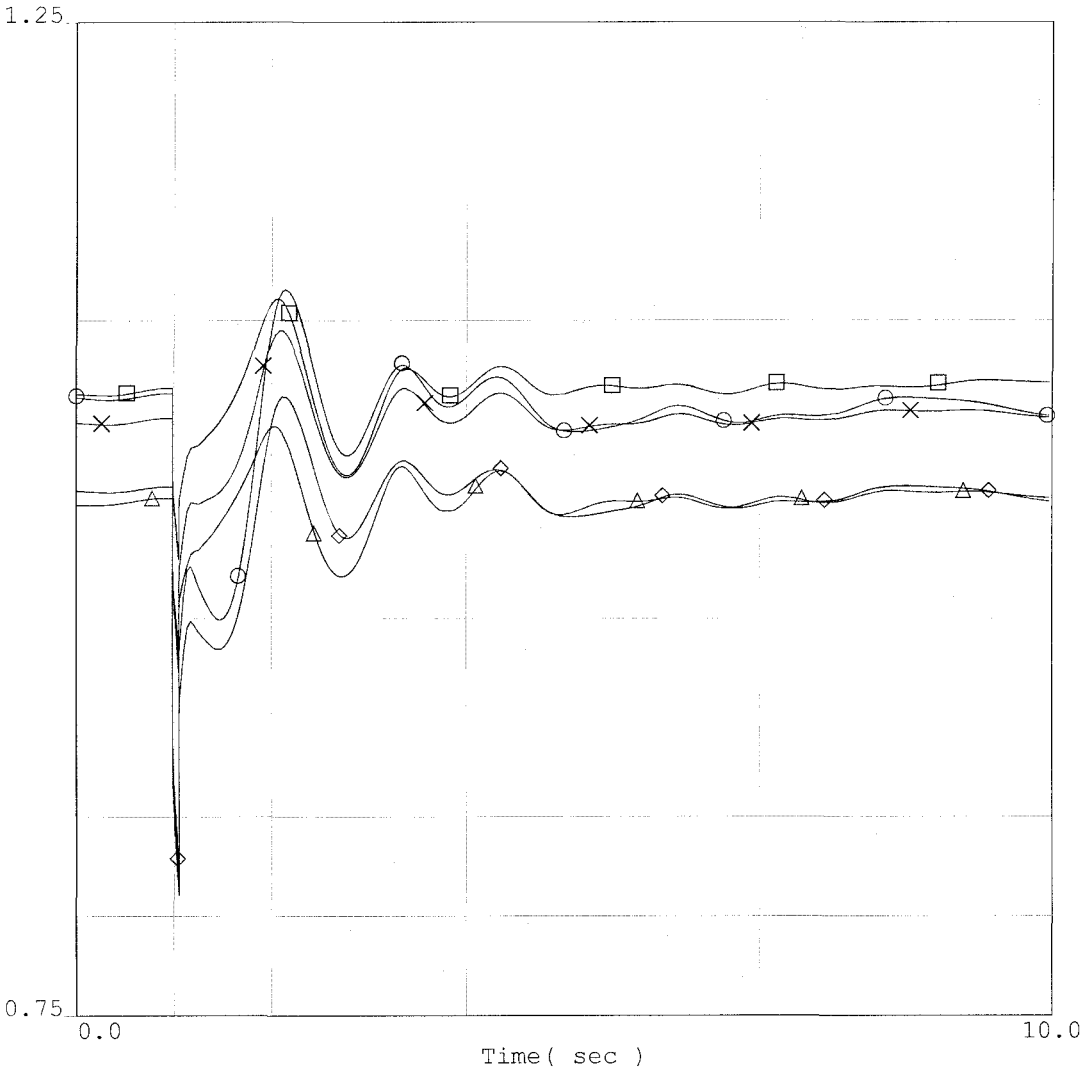
UTAH_voltages:



0.7500 vbus	66230	PINTO 138.0	0	0.0	1	1	1.2500
0.7500 vbus	18019	H ALLEN 230.0	0	0.0	1	1	1.2500
0.7500 vbus	66280	REDBUTTE 345.0	0	0.0	1	1	1.2500
0.7500 vbus	66420	SGSY 138.0	0	0.0	1	1	1.2500
0.7500 vbus	79023	DURANGO 115.0	0	0.0	1	1	1.2500

2014HS-TS15:THREE PHASE FAULT PV BUS&LOSS OF PV-WWG#1&PVRUDD 500kV LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

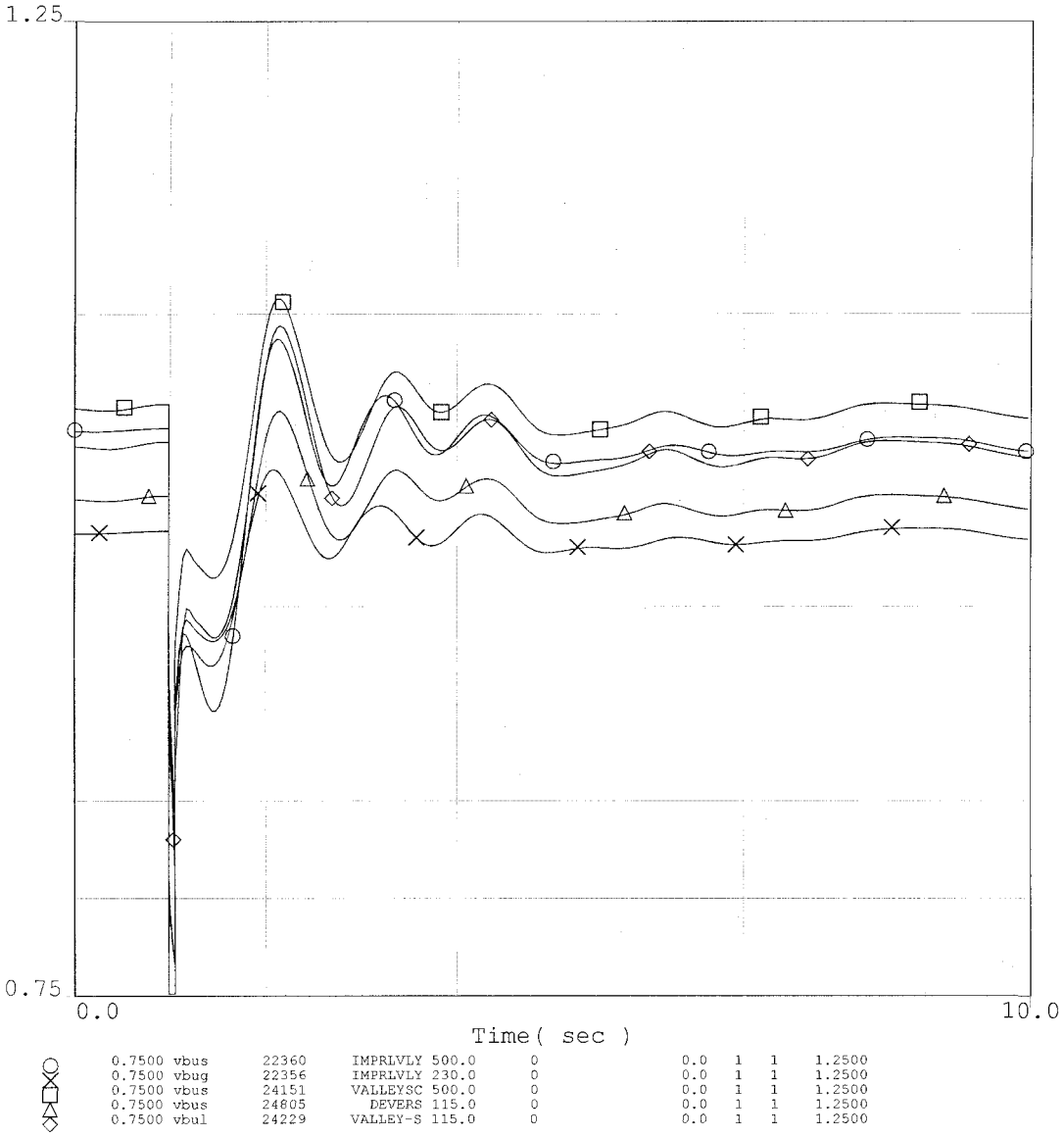
CALIFORNIA_voltages:



○	0.7500 vbus	24801	DEVERS 500.0	0	0.0	1	1	1.2500
⊗	0.7500 vbus	24086	LUGO 500.0	0	0.0	1	1	1.2500
□	0.7500 vbus	24156	VINCENT 500.0	0	0.0	1	1	1.2500
△	0.7500 vbus	26094	SYLMARLA 230.0	0	0.0	1	1	1.2500
◇	0.7500 vbus	24804	DEVERS 230.0	0	0.0	1	1	1.2500

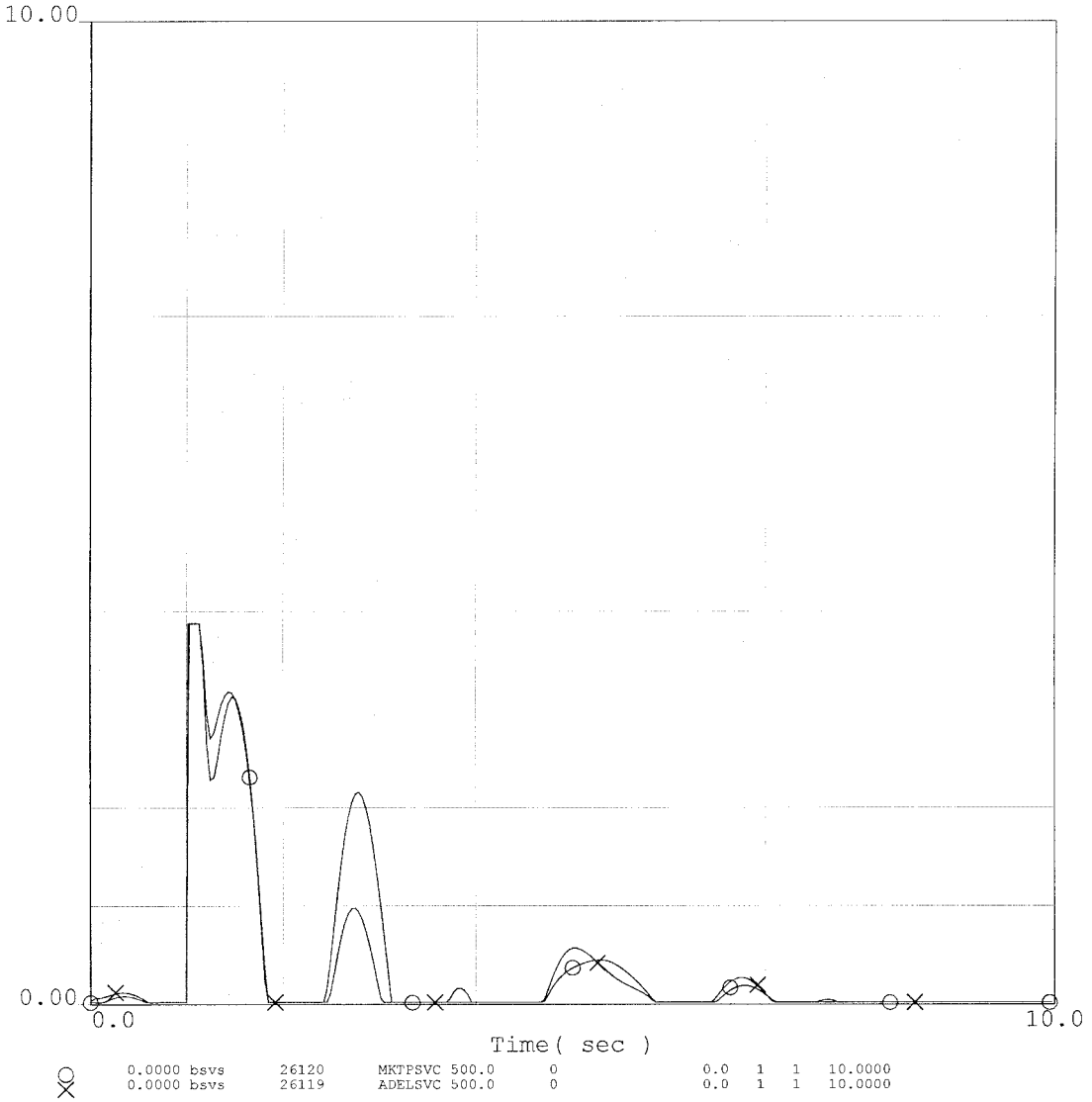
2014HS-TS15:THREE PHASE FAULT PV BUS&LOSS OF PV-WWG#1&PVRUDD 500kV LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

CALIFORNIA_voltages:



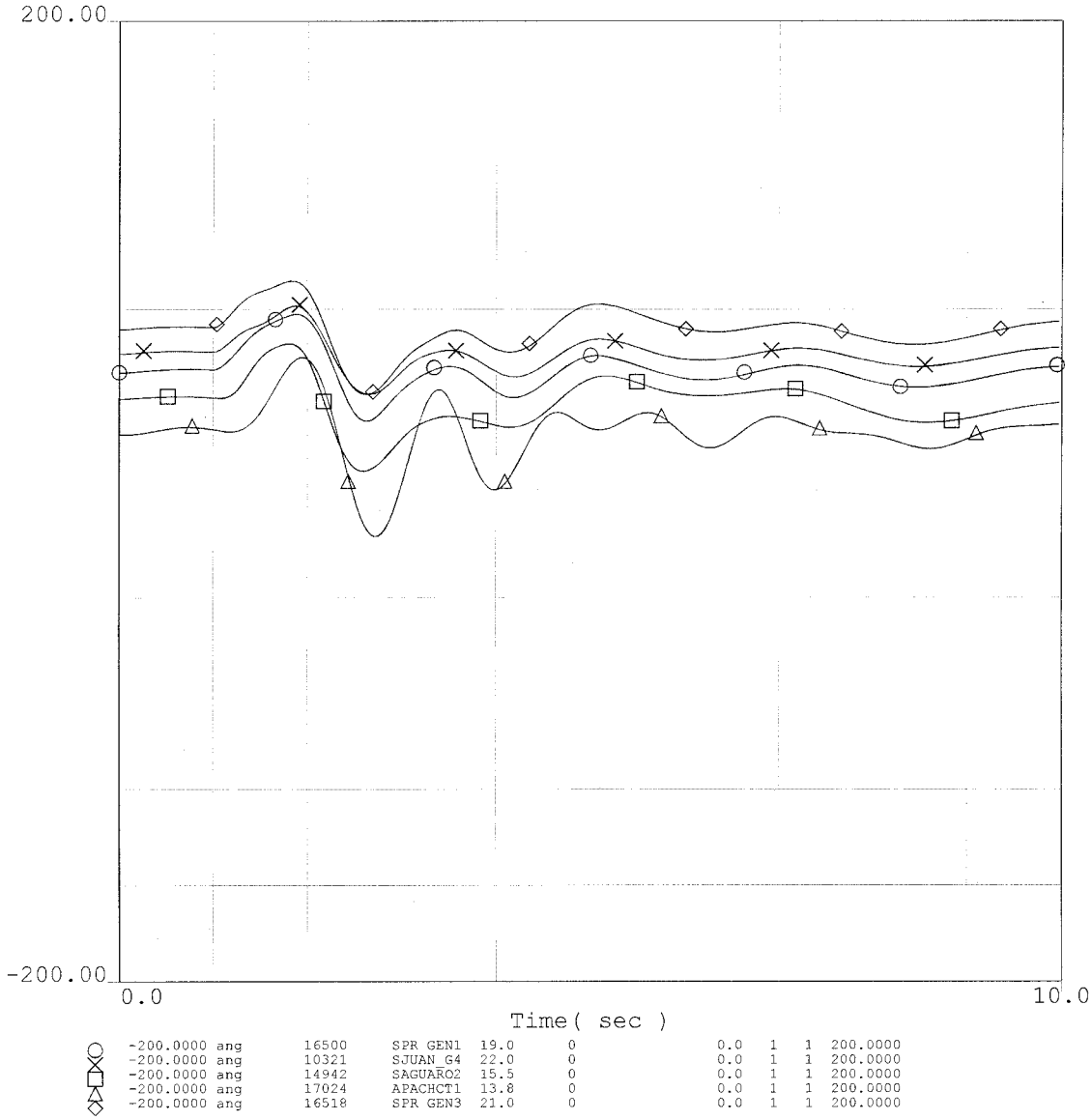
2014HS-TS15:THREE PHASE FAULT PV BUS&LOSS OF PV-WWG#1&PVRUDD 500kV LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

SVC_output



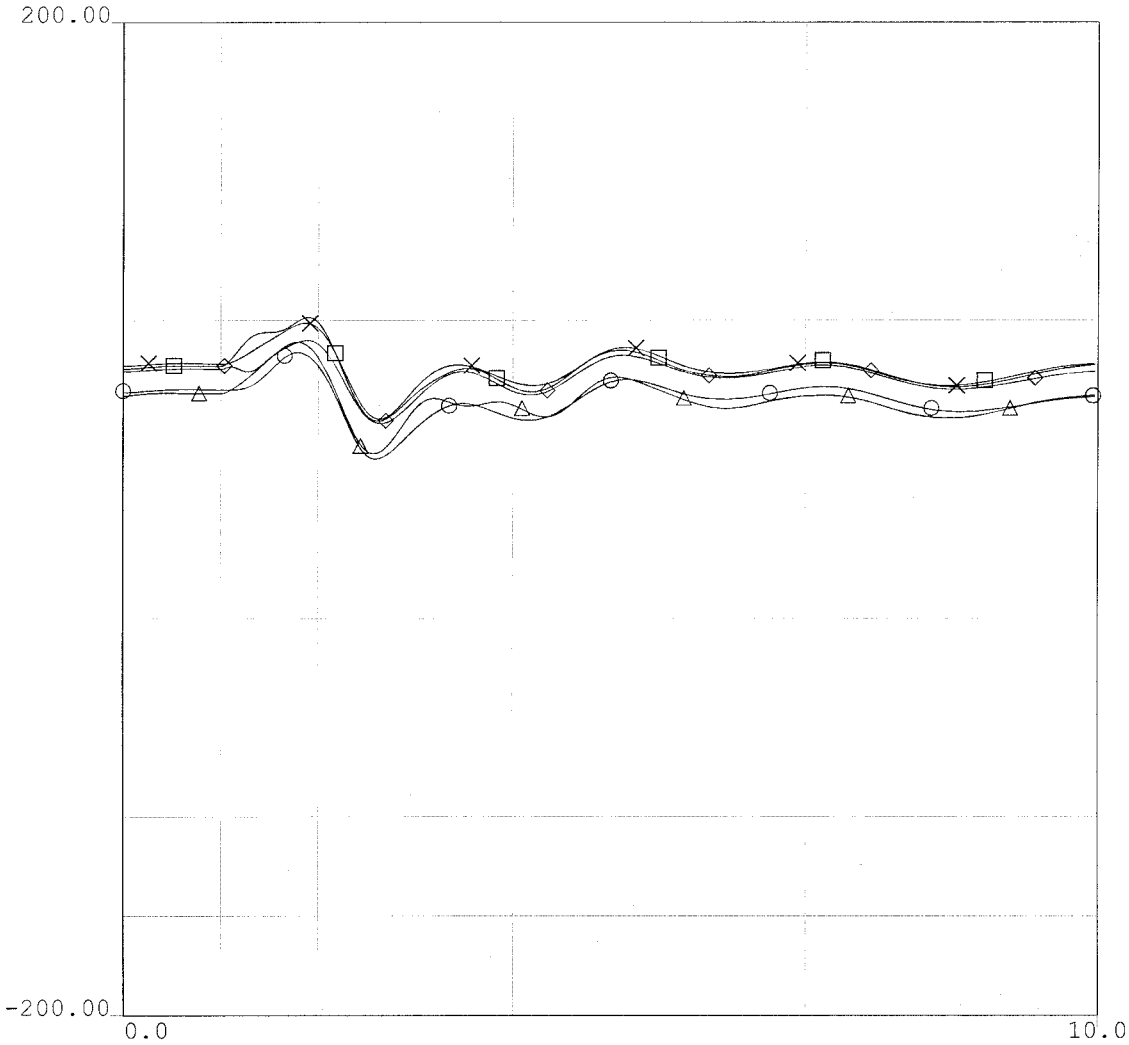
2014HS-TS15:THREE PHASE FAULT PV BUS&LOSS OF PV-WWG#1&PVRUDD 500kV LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

SYSTEM_Rotorangles



2014HS-TS15:THREE PHASE FAULT PV BUS&LOSS OF PV-WWG#1&PVRUDD 500kV LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

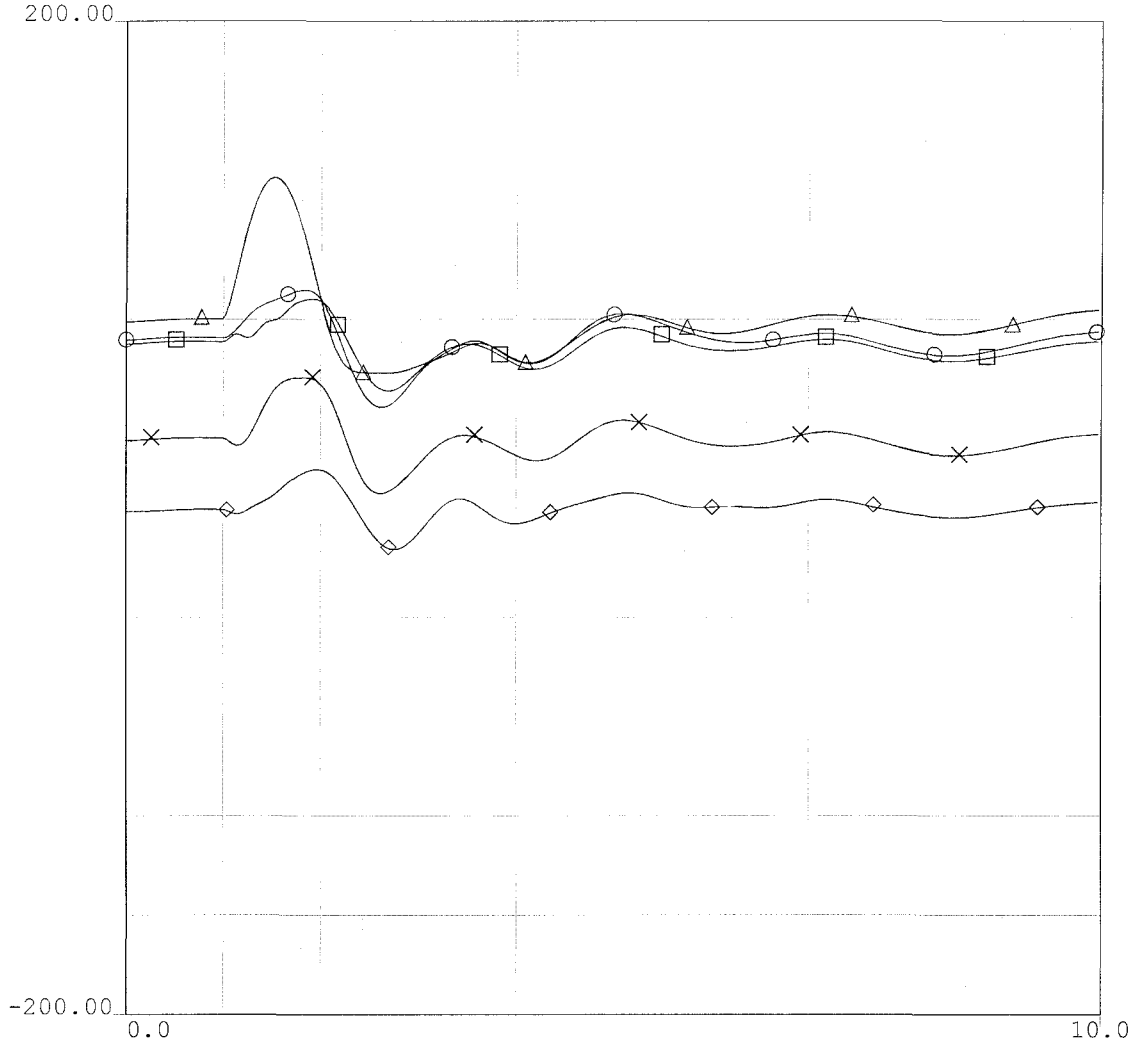
SYSTEM_Rotorangles



-200.0000 ang	15140	DBG-CT1	18.0	0	0.0	1	1	200.0000
-200.0000 ang	14945	SAG. CT3	13.8	0	0.0	1	1	200.0000
-200.0000 ang	14902	CHOLLA3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	15921	SANTAN 1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	14903	CHOLLA4	22.0	0	0.0	1	1	200.0000

2014HS-TS15:THREE PHASE FAULT PV BUS&LOSS OF PV-WWG#1&PVRUDD 500kV LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

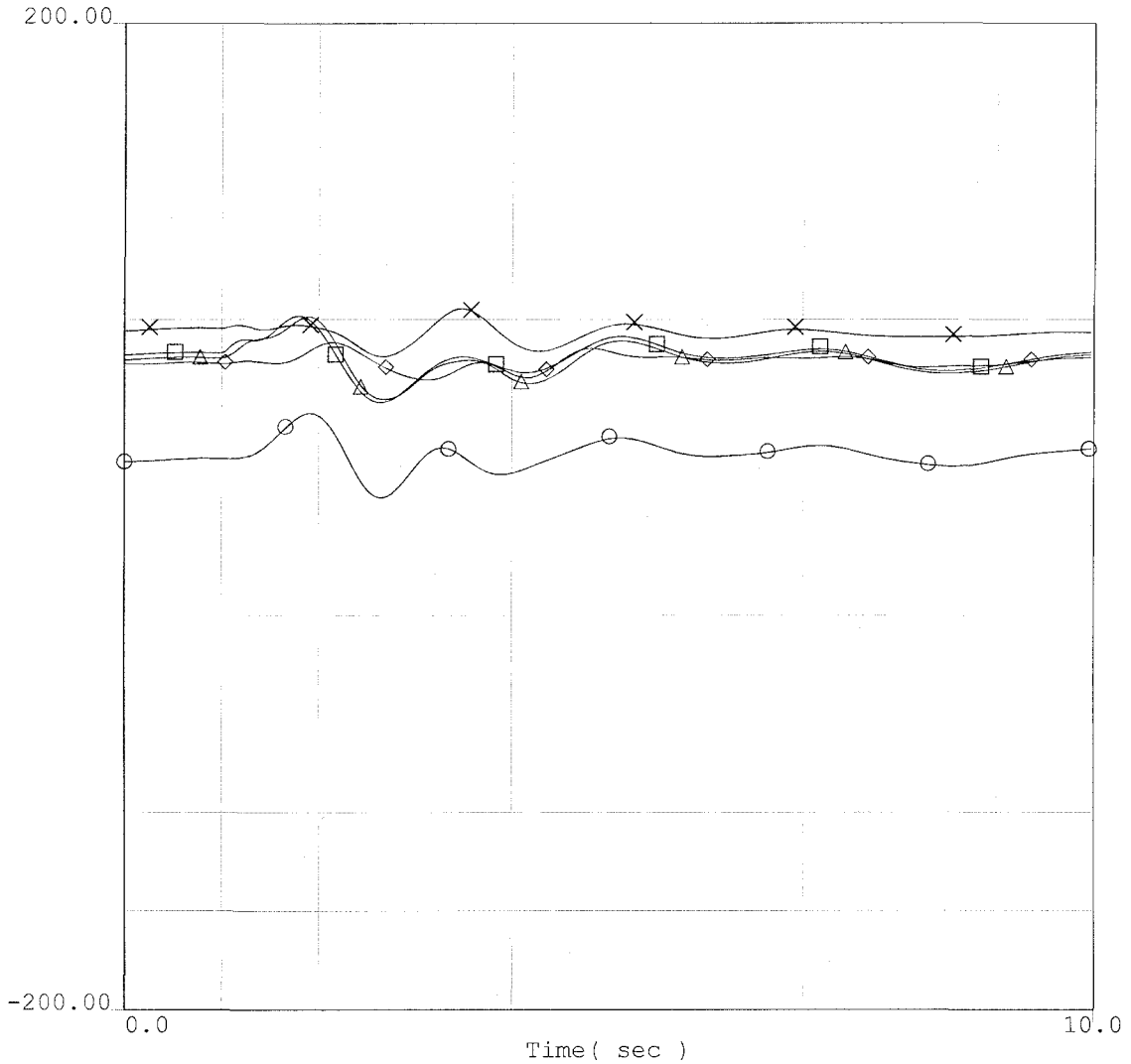
SYSTEM_Rotorangles



-200.0000 ang	16518	SPR GEN3	21.0	0	0.0	1	1	200.0000
-200.0000 ang	16503	SUNDTGE4	18.0	0	0.0	1	1	200.0000
-200.0000 ang	14914	FCNGN4CC	22.0	0	0.0	H	1	200.0000
-200.0000 ang	14931	PALOVRD1	24.0	0	0.0	1	1	200.0000
-200.0000 ang	24004	ALAMT4 G	18.0	0	0.0	H	1	200.0000

2014HS-TS15:THREE PHASE FAULT PV BUS&LOSS OF PV-WWG#1&PVRUDD 500kV LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

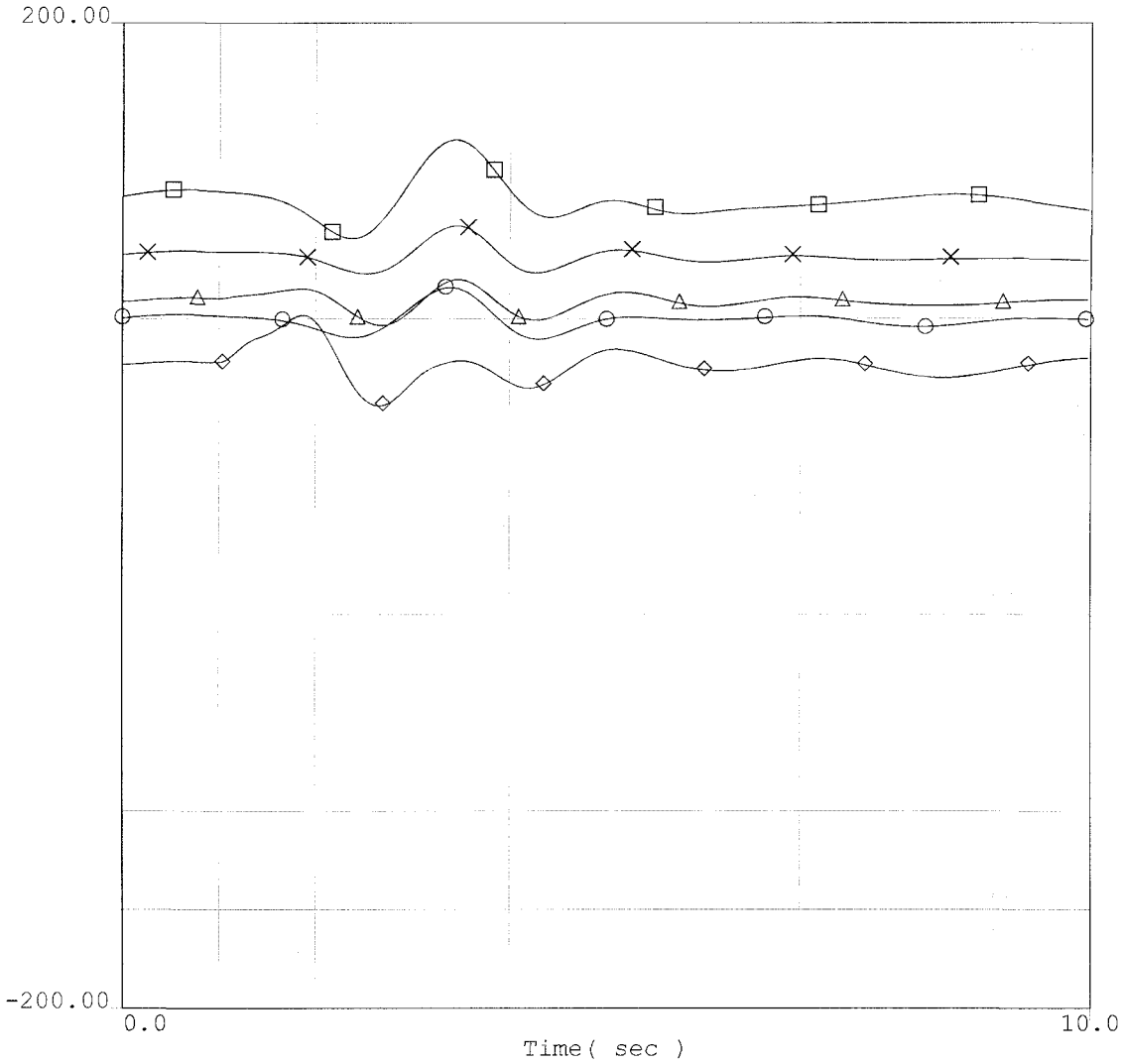
SYSTEM_Rotorangles



-200.0000 ang	24129	S.ONOFR2	22.0	0	0.0	1	1	200.0000
-200.0000 ang	26039	INTERM1G	26.0	0	0.0	1	1	200.0000
-200.0000 ang	15981	NAVAJO 1	26.0	0	0.0	1	1	200.0000
-200.0000 ang	10318	SJUAN_G1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	36411	DIABLO 1	25.0	0	0.0	1	1	200.0000

2014HS-TS15:THREE PHASE FAULT PV BUS&LOSS OF PV-WWG#1&PVRUDD 500kV LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

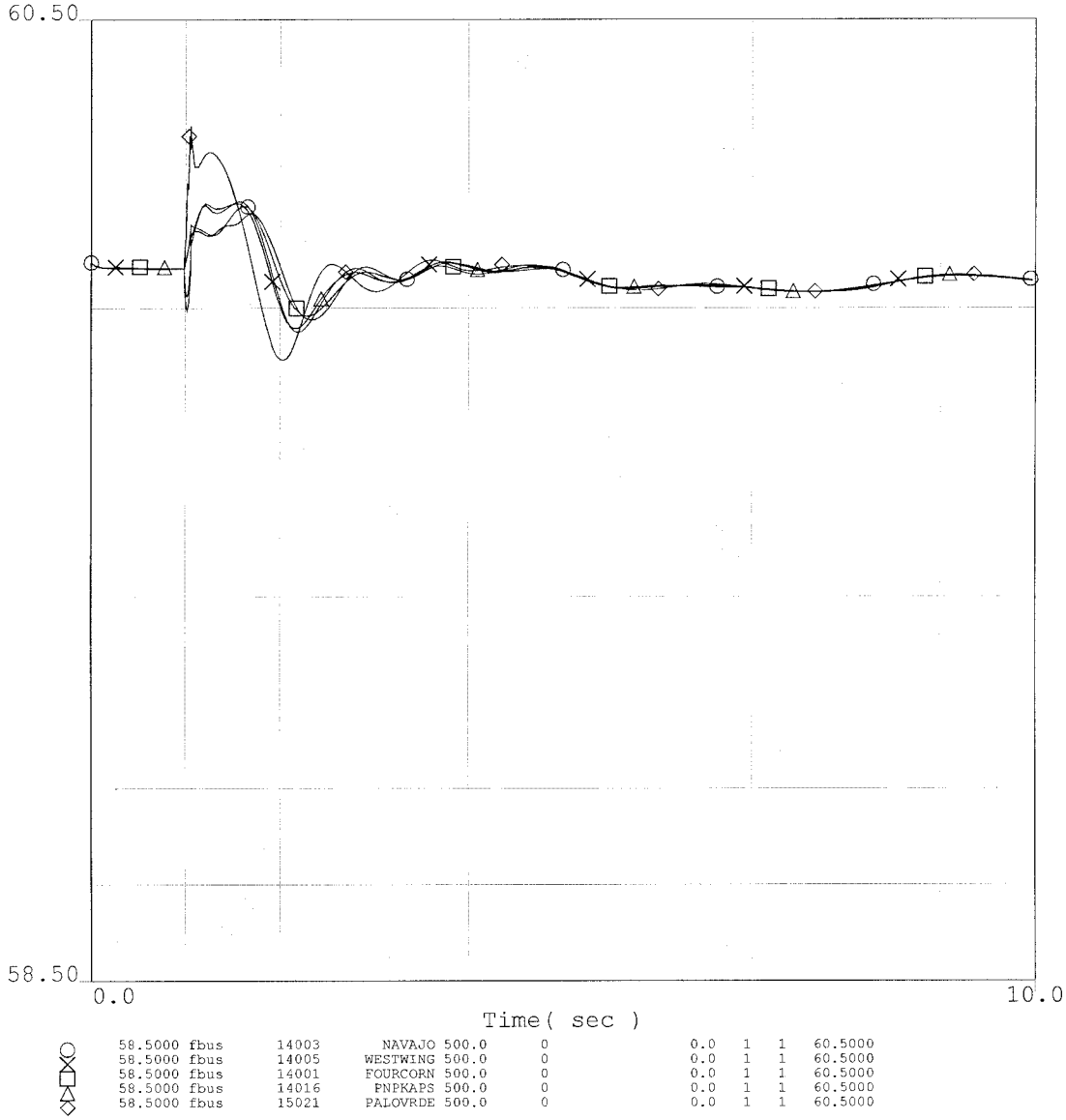
SYSTEM_Rotorangles



-200.0000 ang	73129	MBPP-1	24.0	0	0.0	1	1	200.0000
-200.0000 ang	60086	BRIDGER1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	62050	COLSTP 1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	65500	EHUNTR 3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	10321	SJUAN_G4	22.0	0	0.0	1	1	200.0000

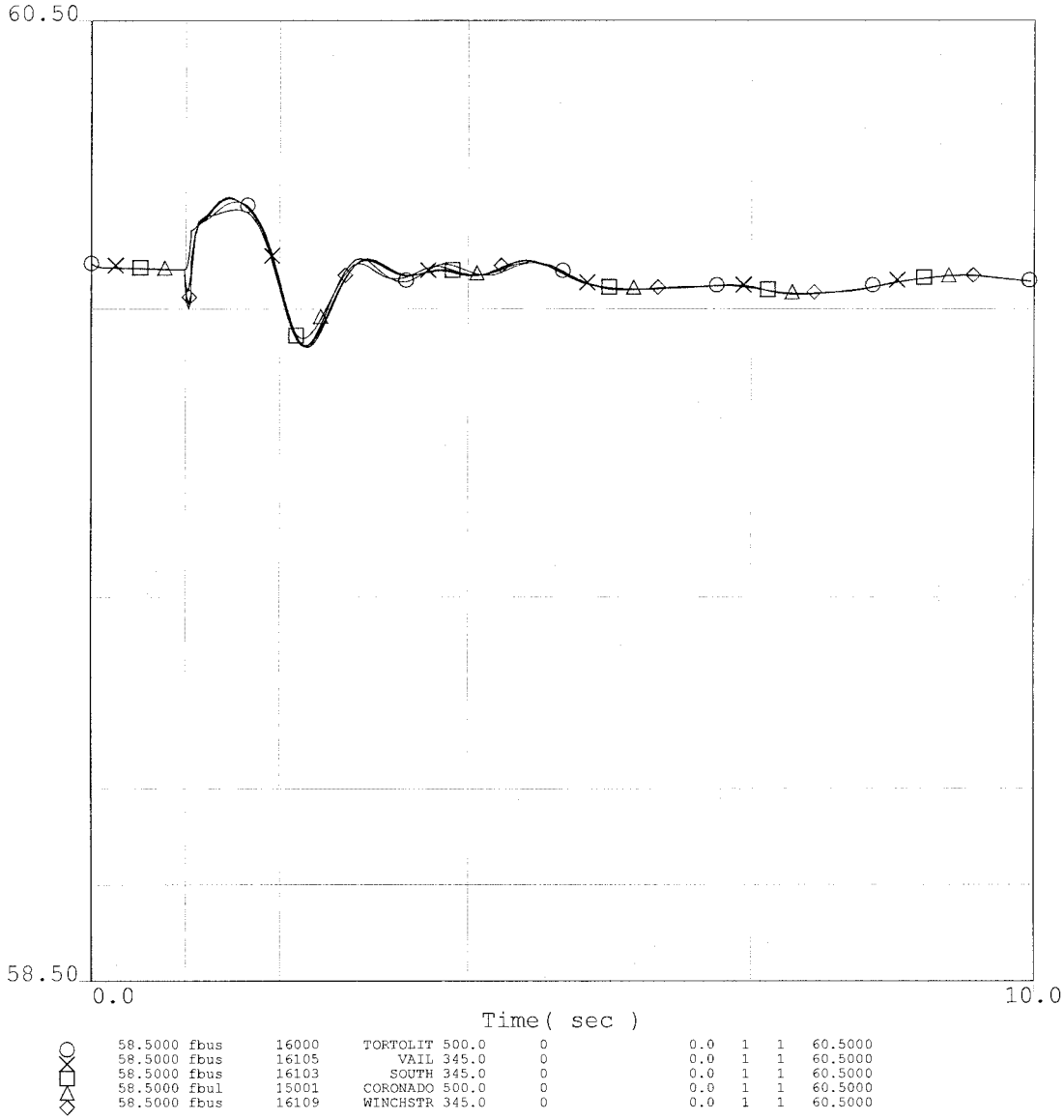
2014HS-TS15:THREE PHASE FAULT PV BUS&LOSS OF PV-WWG#1&PVRUDD 500kV LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

Frequencies:



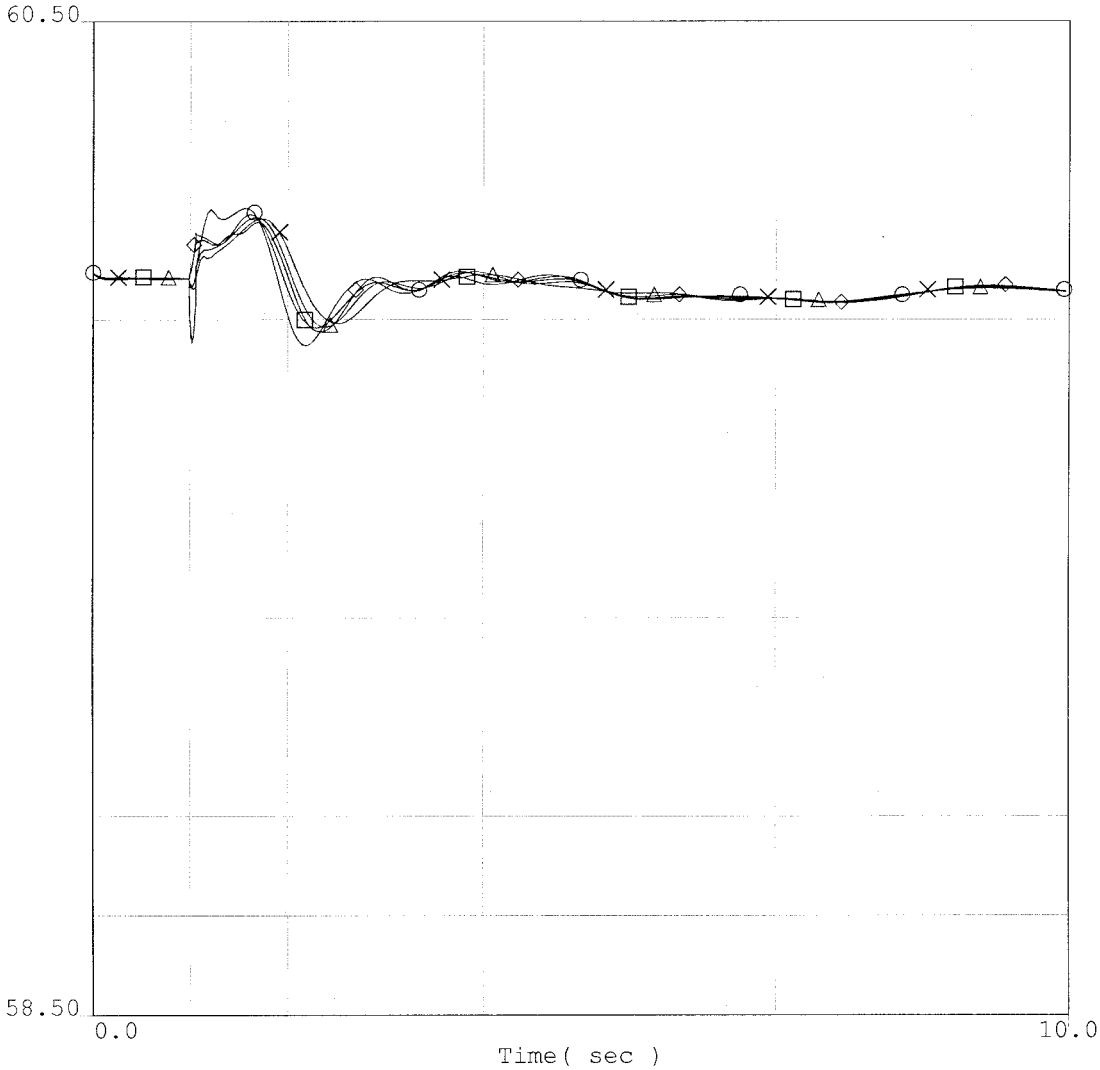
2014HS-TS15:THREE PHASE FAULT PV BUS&LOSS OF PV-WWG#1&PVRUDD 500kV LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

Frequencies:



2014HS-TS15:THREE PHASE FAULT PV BUS&LOSS OF PV-WWG#1&PVRUDD 500kV LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

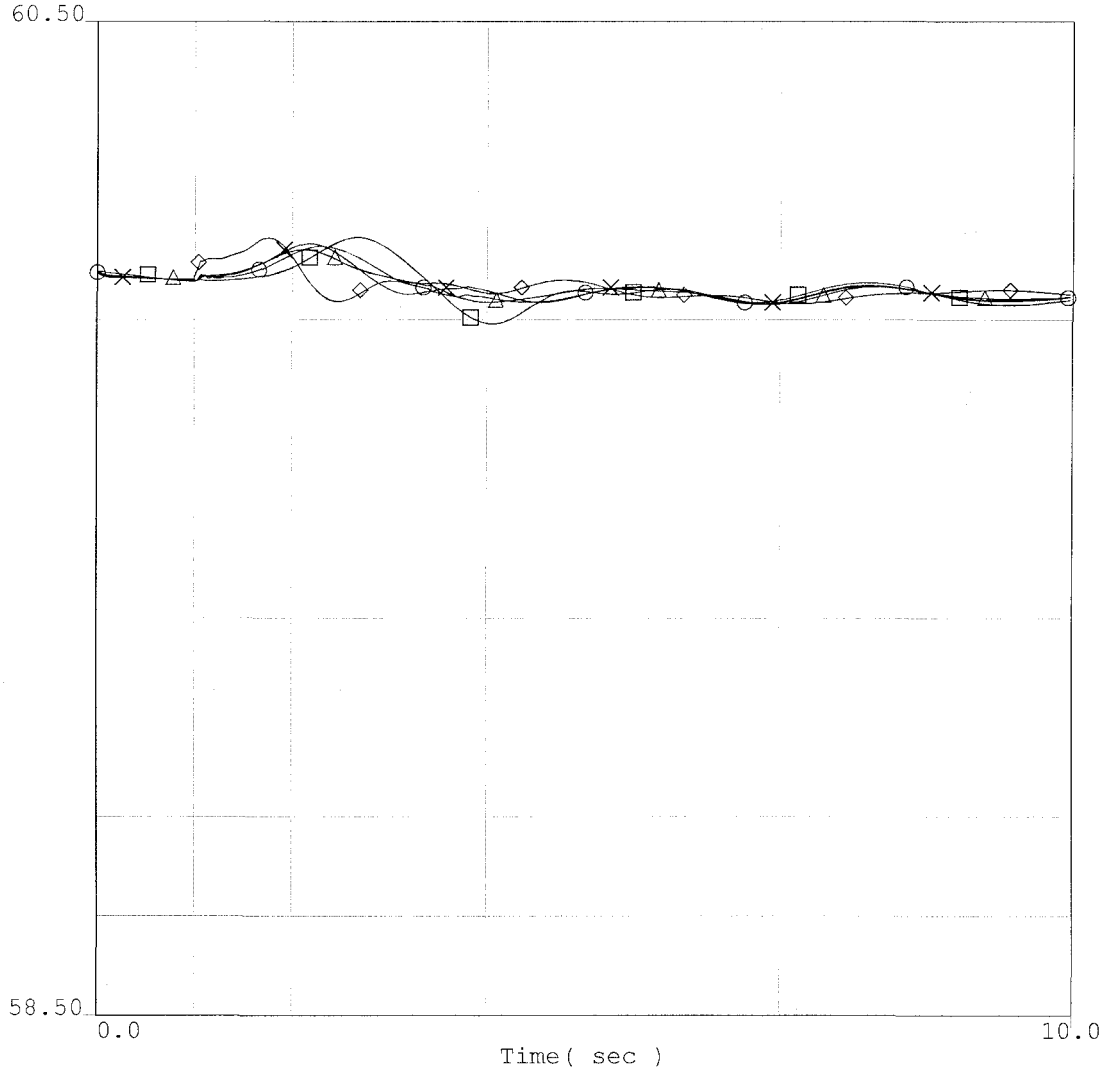
Frequencies:



58.5000	fbul	14231	WESTWNGW 230.0	0	0.0	1	1	60.5000
58.5000	fbus	26003	ADELANTO 500.0	0	0.0	1	1	60.5000
58.5000	fbus	14001	FOURCORN 500.0	0	0.0	1	1	60.5000
58.5000	fbus	26048	MCCULLGH 500.0	0	0.0	1	1	60.5000
58.5000	fbus	14003	NAVAJO 500.0	0	0.0	1	1	60.5000

2014HS-TS15:THREE PHASE FAULT PV BUS&LOSS OF PV-WWG#1&PVRUDD 500kV LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

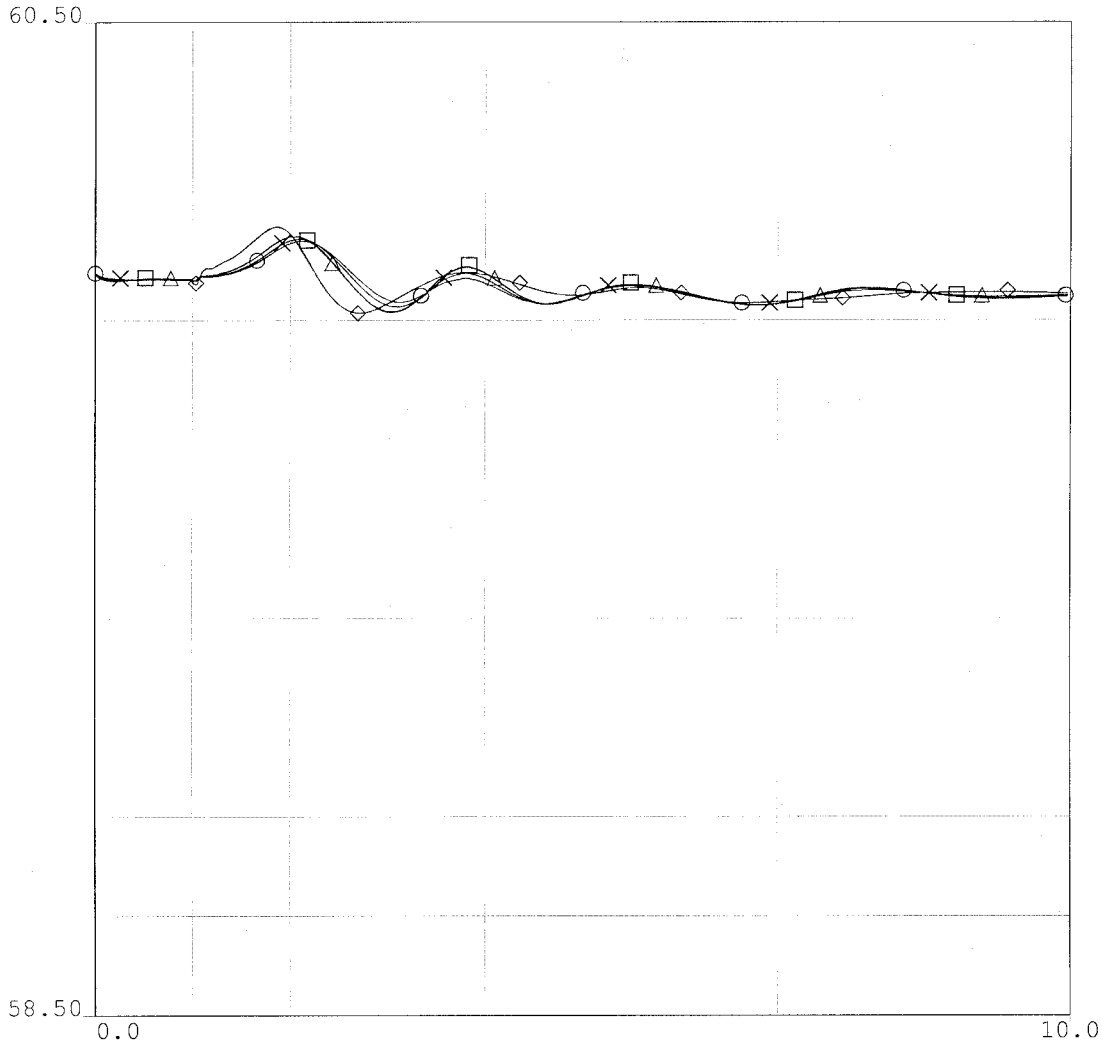
Frequencies:



58.5000 fbus	40489	GRIZZLY 500.0	0	0.0	1	1	60.5000
58.5000 fbus	40687	MALIN 500.0	0	0.0	1	1	60.5000
58.5000 fbus	40459	GARRISON 500.0	0	0.0	1	1	60.5000
58.5000 fbus	60235	MIDPOINT 345.0	0	0.0	1	1	60.5000
58.5000 fbus	66230	PINTO 138.0	0	0.0	1	1	60.5000

2014HS-TS15:THREE PHASE FAULT PV BUS&LOSS OF PV-WWG#1&PVRUDD 500kV LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

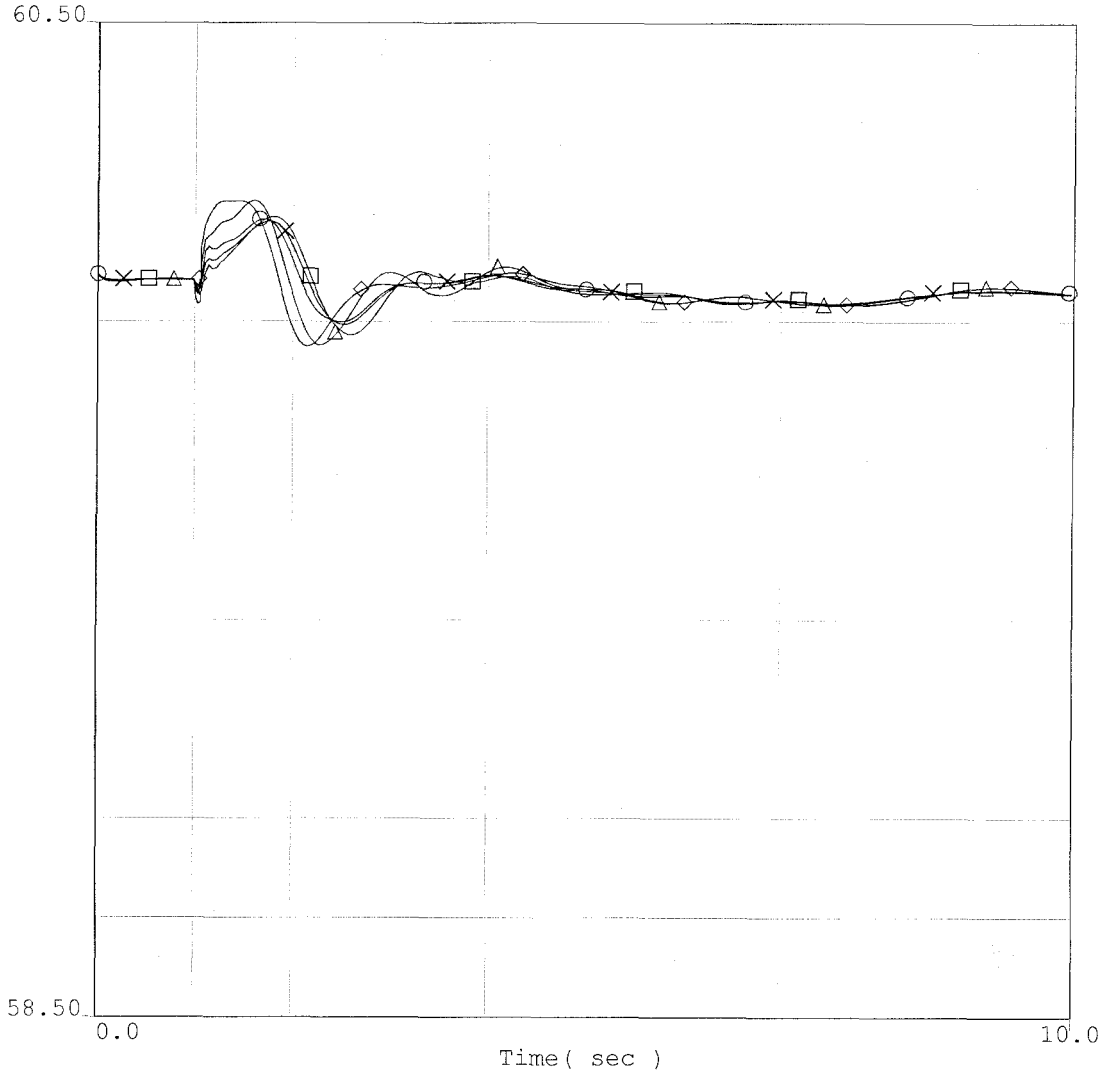
Frequencies:



58.5000 fbus	30005	ROUND MT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30015	TABLE MT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30035	TRACY 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30040	TESLA 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30060	MIDWAY 500.0	0	0.0	1	1	60.5000

2014HS-TS15:THREE PHASE FAULT PV BUS&LOSS OF PV-WWG#1&PVRUDD 500kV LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

Frequencies:



58.5000	fbus	24801	DEVERS 500.0	0	0.0	1	1	60.5000
58.5000	fbus	24086	LUGO 500.0	0	0.0	1	1	60.5000
58.5000	fbus	26094	SYLMARLA 230.0	0	0.0	1	1	60.5000
58.5000	fbus	22468	MIGUEL 500.0	0	0.0	1	1	60.5000
58.5000	fbus	22536	N.GILA 500.0	0	0.0	1	1	60.5000

2014HS-TS15:THREE PHASE FAULT PV BUS&LOSS OF PV-WWG#1&PVRUDD 500kV LINES
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

HIGHEST VOLTAGE DIP

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct	@time
14	GILABEND	230	vbul	1.016	0.791	22.1	1.525
14	PINAL_W	500	vbus	1.066	0.809	24.1	1.525
24	DEVRSVC1	500	vbug	1.06	0.95	10.3	1.525

VOLTAGE CRITERIA VIOLATIONS

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct	@time

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
14	WHITETNK	69	fbul	59.527	1.046
14	Q1COL1	34.5	fbus	59.368	1.021
14	GIL-ST1	18	fbug	59.706	2.05

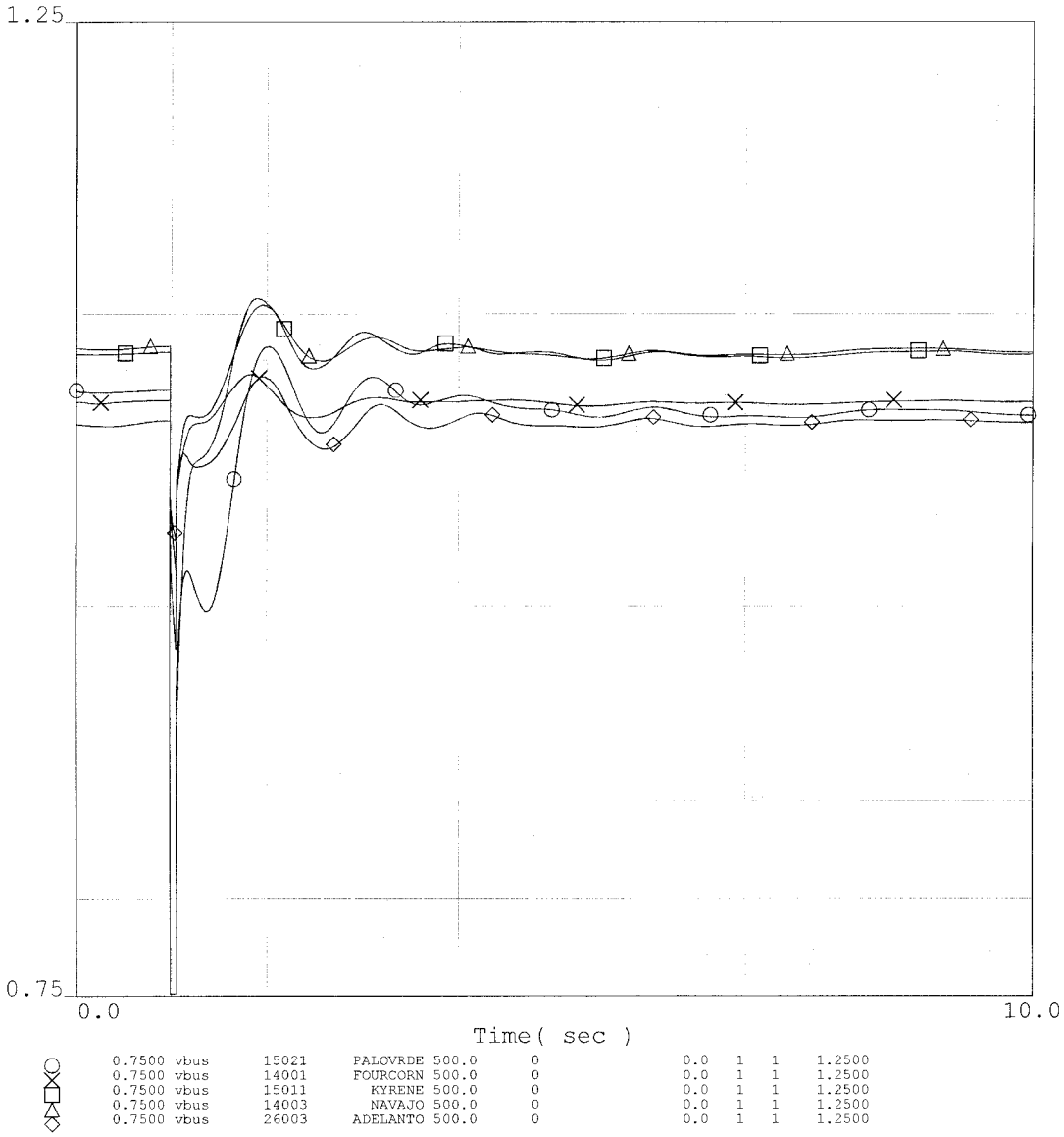
FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

There were 0 violations of MORC criteria 1 (25% Voltage Dip) !
There were 0 violations of MORC criteria 2 (20% Voltage Dip for 20 Cycles)!
There were 0 violations of MORC criteria 3 (59.6 HZ for 6 Cycles)!

Cycles From

ARIZONA_voltages:



2014HS-TS16:THREE PHASE FAULT JOJOBA W/ JOA-KYR & HAA-PINAL W OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

14hs_q3_jo-ky-pw.chf

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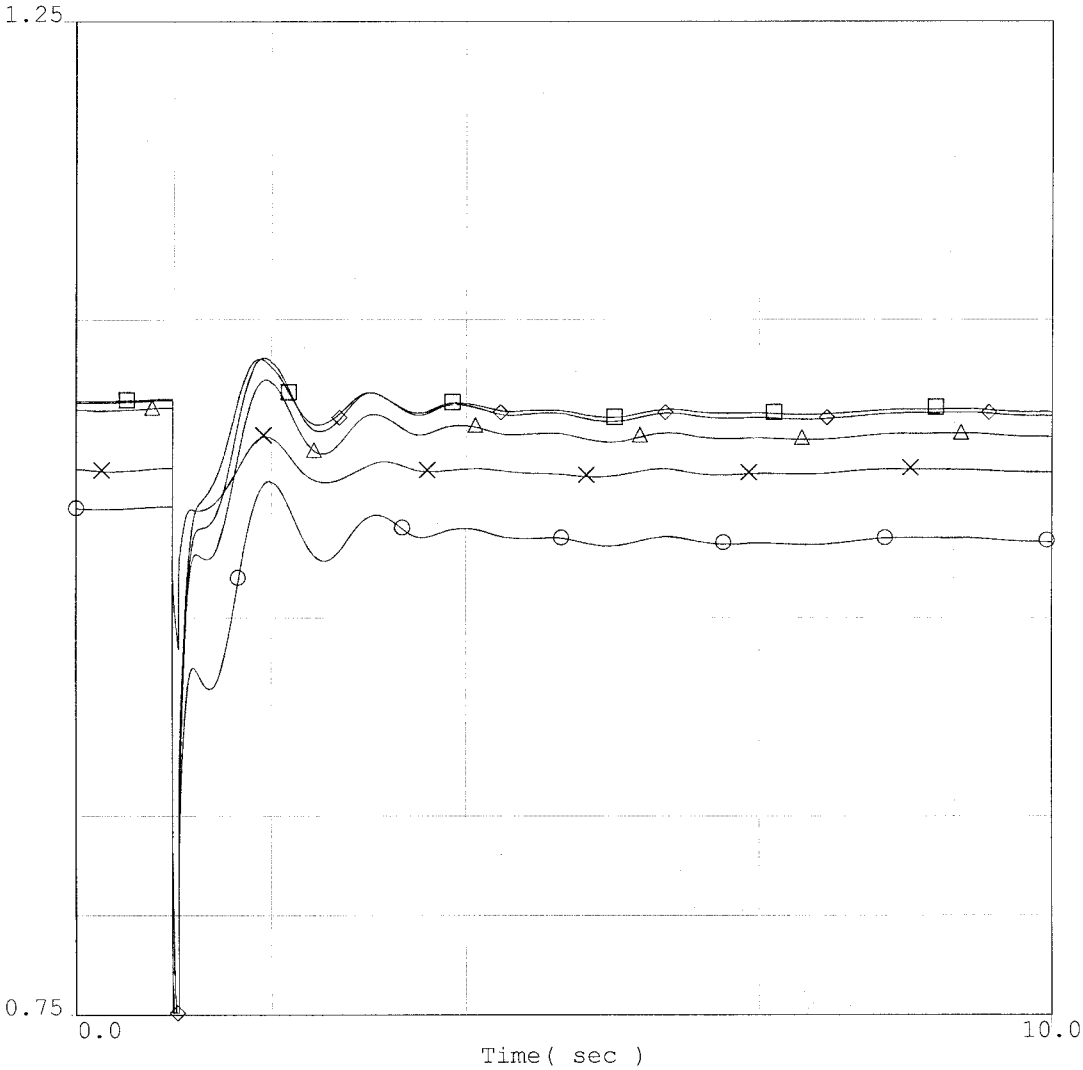
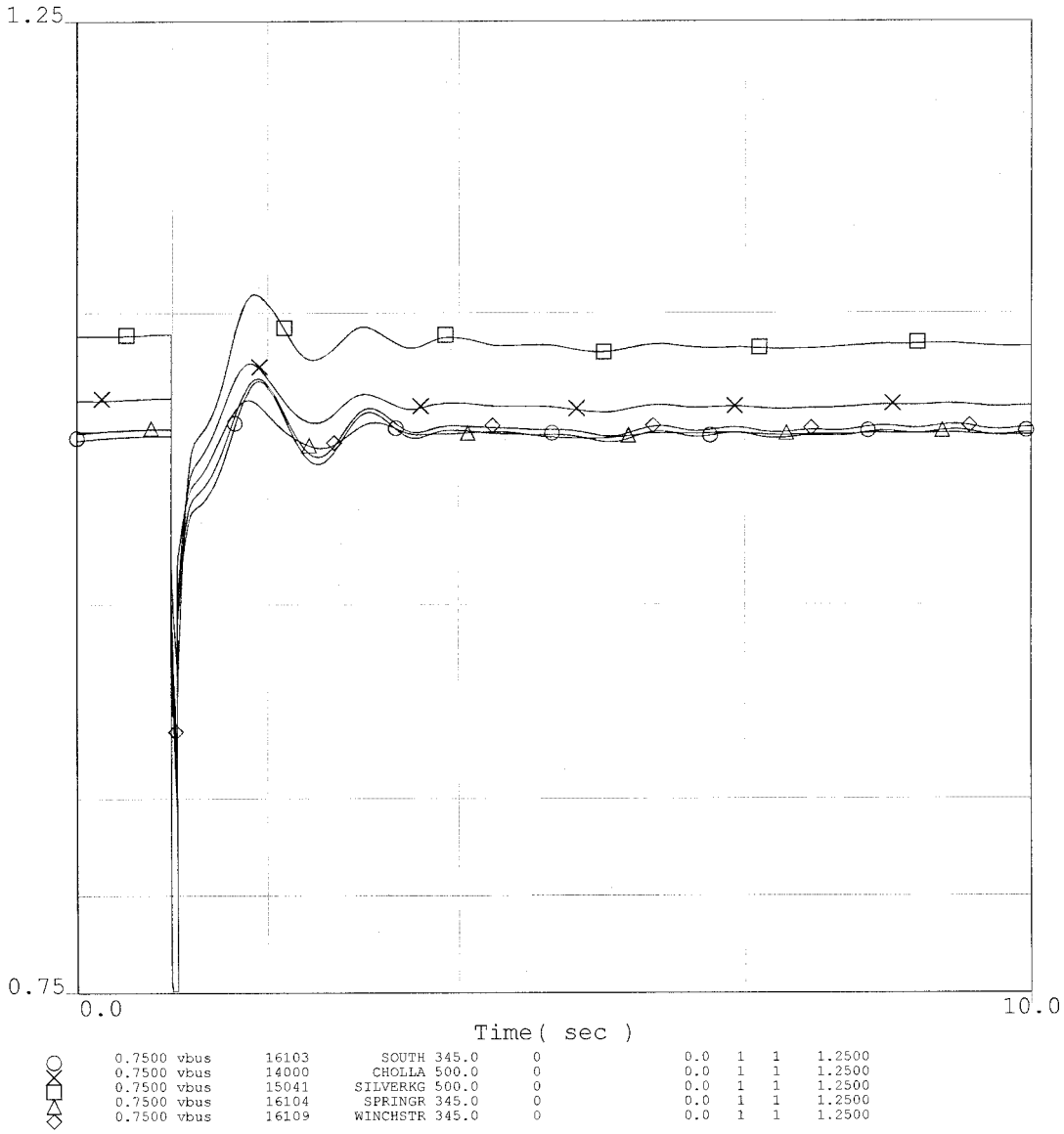
ARIZONA_voltages:



○	0.7500 vbul	14231	WESTWNGW 230.0	0	0.0	1	1	1.2500
⊠	0.7500 vbus	19011	MEAD N 230.0	0	0.0	1	1	1.2500
□	0.7500 vbus	15215	SILVERKG 230.0	0	0.0	1	1	1.2500
△	0.7500 vbul	14221	PPAPS W 230.0	0	0.0	1	1	1.2500
◇	0.7500 vbus	15207	KYRENE 230.0	0	0.0	1	1	1.2500

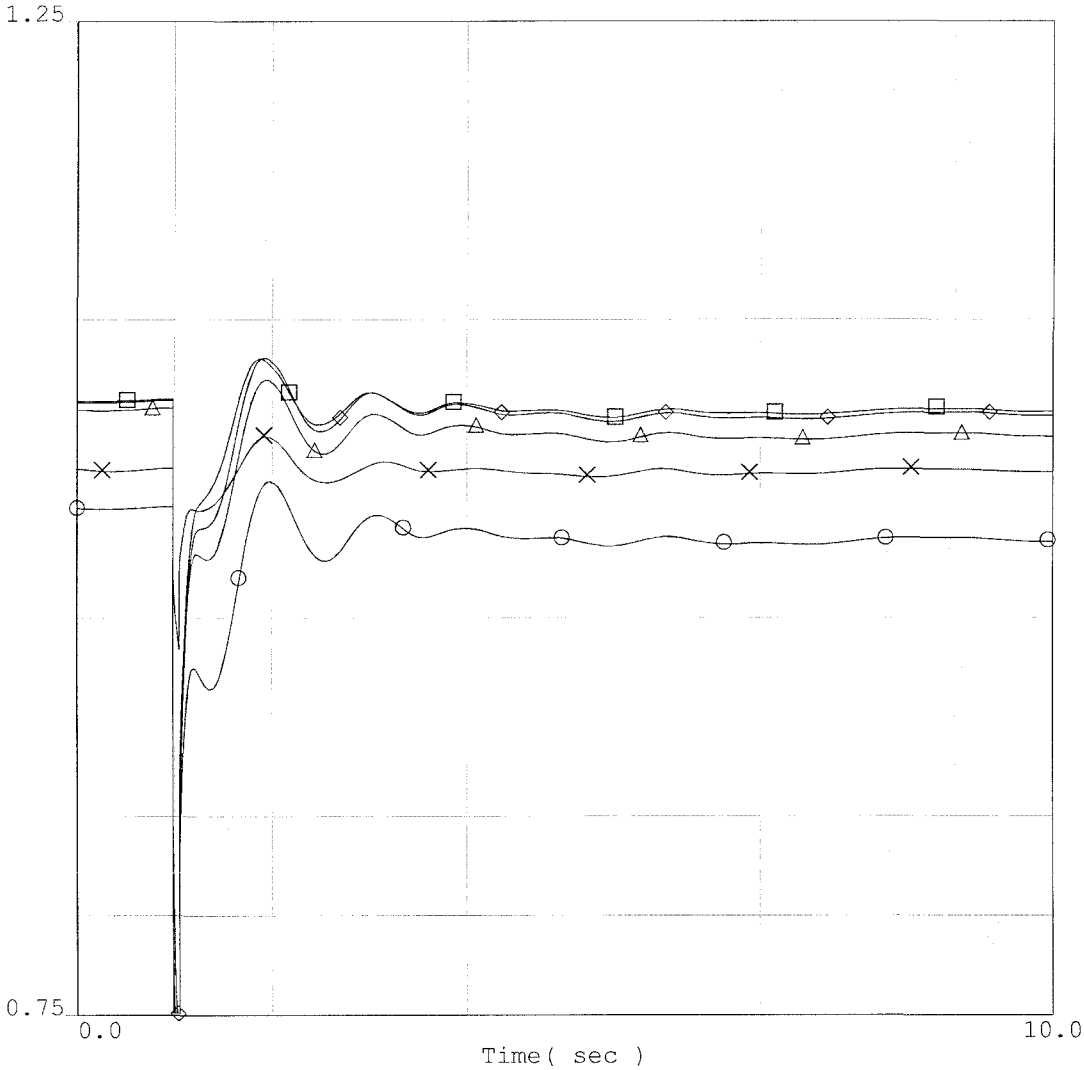
2014HS-TS16:THREE PHASE FAULT JOJOBA W/ JOA-KYR & HAA-PINAL W OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

ARIZONA_voltages:



2014HS-TS16:THREE PHASE FAULT JOJOBA W/ JOA-KYR & HAA-PINAL W OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

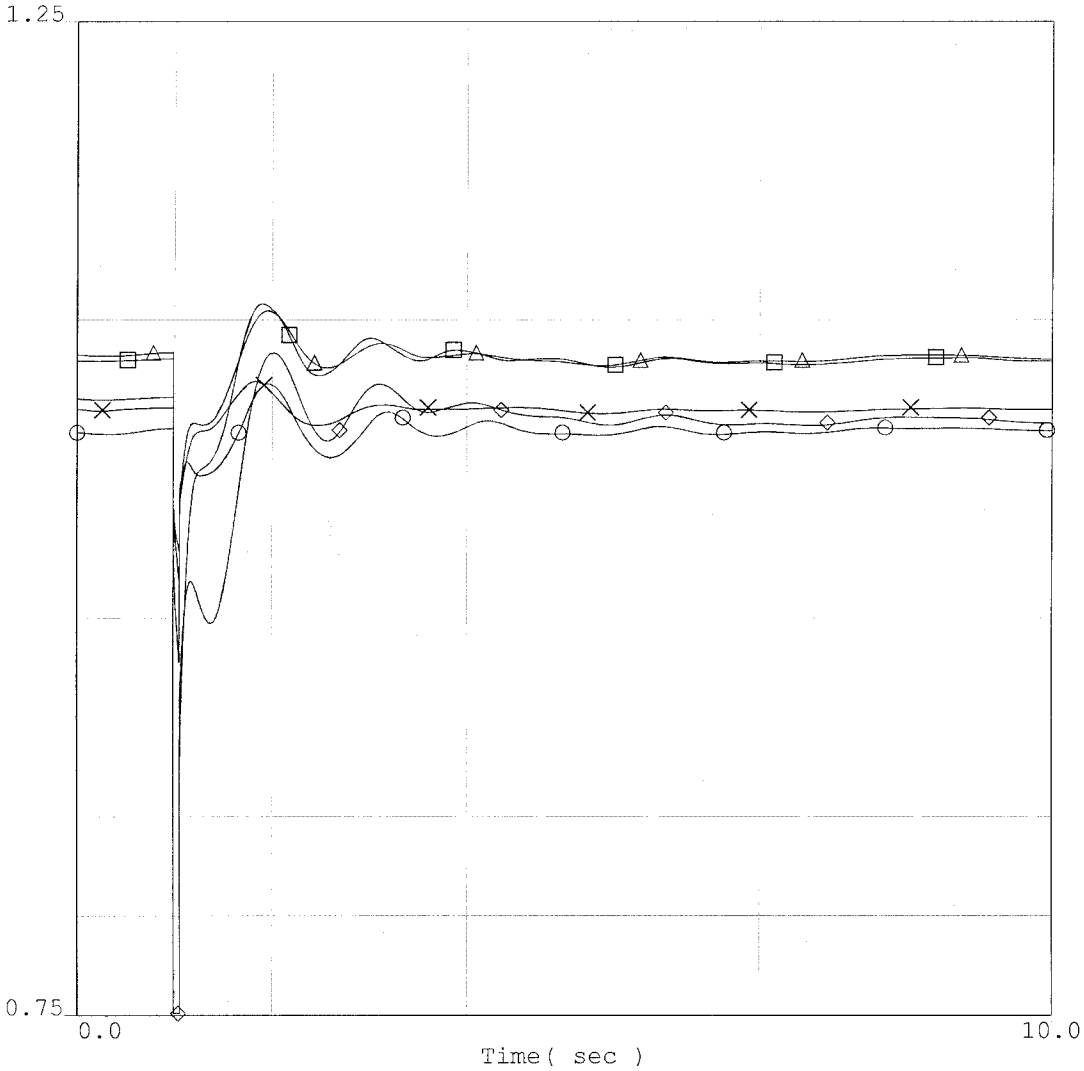
ARIZONA_voltages:



○	0.7500 vbul	14231	WESTWNGW 230.0	0	0.0	1	1	1.2500
⊠	0.7500 vbus	19011	MEAD N 230.0	0	0.0	1	1	1.2500
□	0.7500 vbus	15215	SILVERKG 230.0	0	0.0	1	1	1.2500
△	0.7500 vbul	14221	PPAPS W 230.0	0	0.0	1	1	1.2500
◇	0.7500 vbus	15207	KYRENE 230.0	0	0.0	1	1	1.2500

2014HS-TS16:THREE PHASE FAULT JOJOBA W/ JOA-KYR & HAA-PINAL W OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

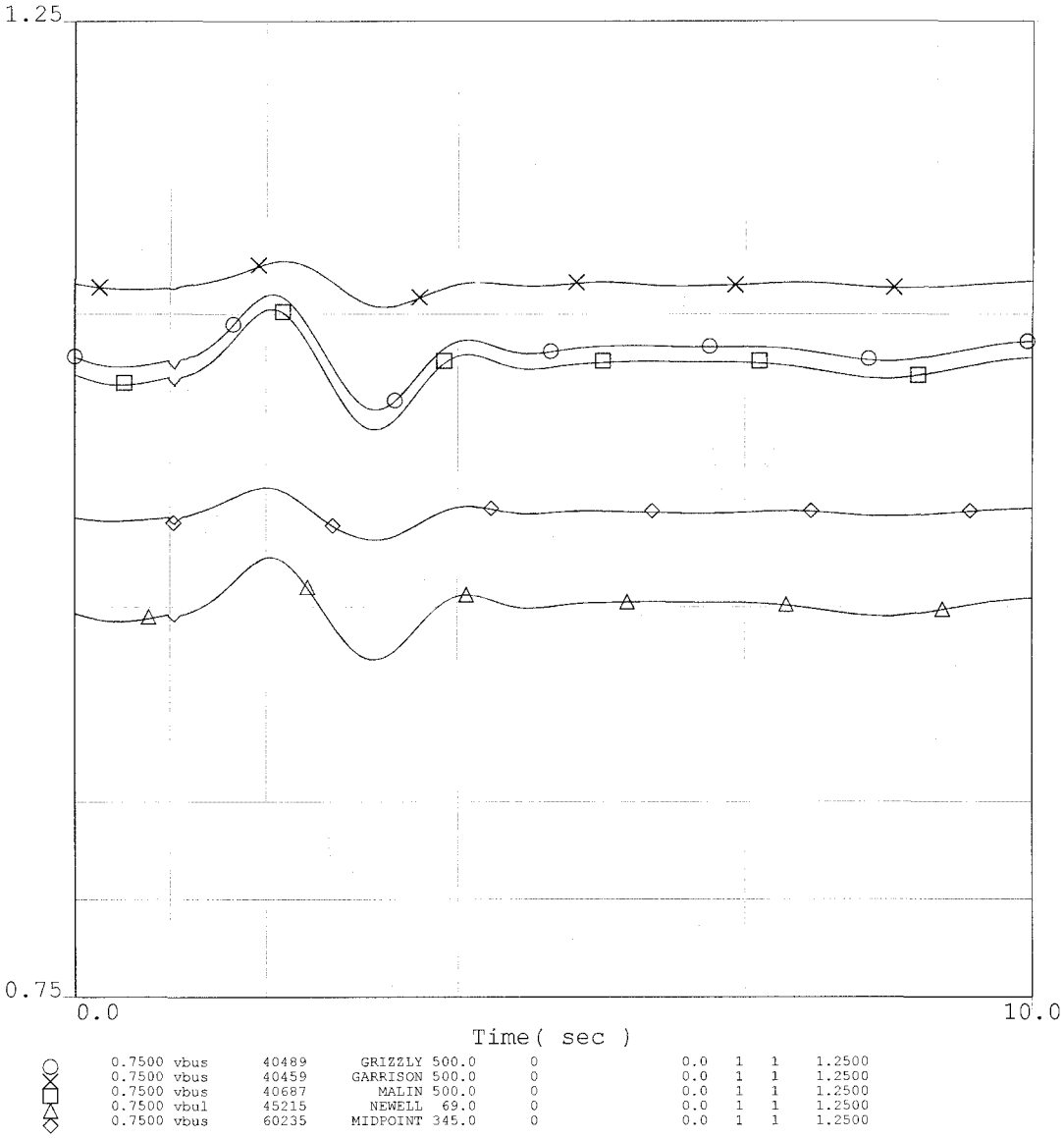
ARIZONA_voltages:



0.7500 vbus	26003	ADELANTO 500.0	0	0.0	1	1	1.2500
0.7500 vbus	14001	FOURCORN 500.0	0	0.0	1	1	1.2500
0.7500 vbus	15011	KYRENE 500.0	0	0.0	1	1	1.2500
0.7500 vbus	14003	NAVAJO 500.0	0	0.0	1	1	1.2500
0.7500 vbus	15021	PALOVRDE 500.0	0	0.0	1	1	1.2500

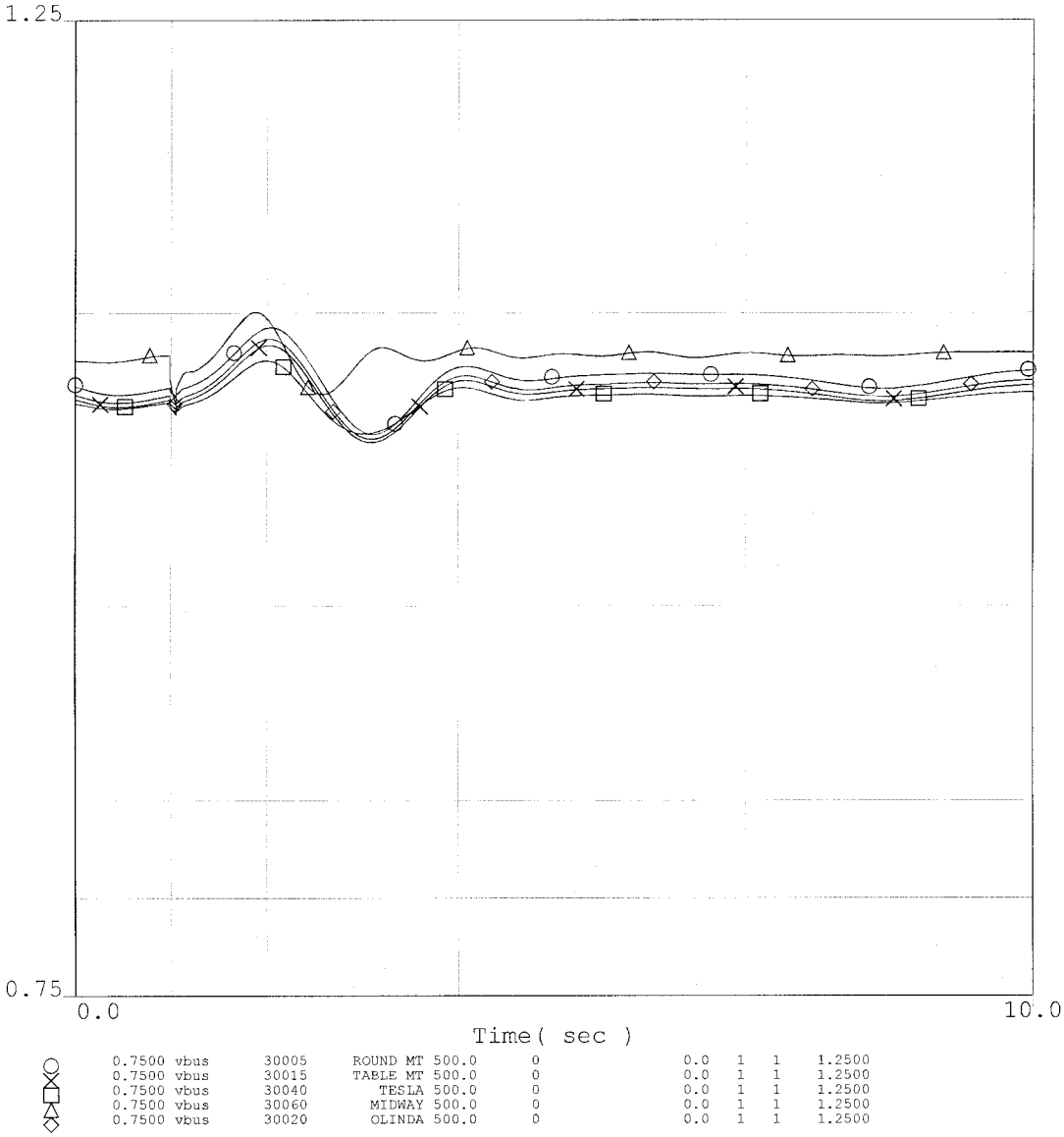
2014HS-TS16:THREE PHASE FAULT JOJOBA W/ JOA-KYR & HAA-PINAL W OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

NORTHWEST_voltages:



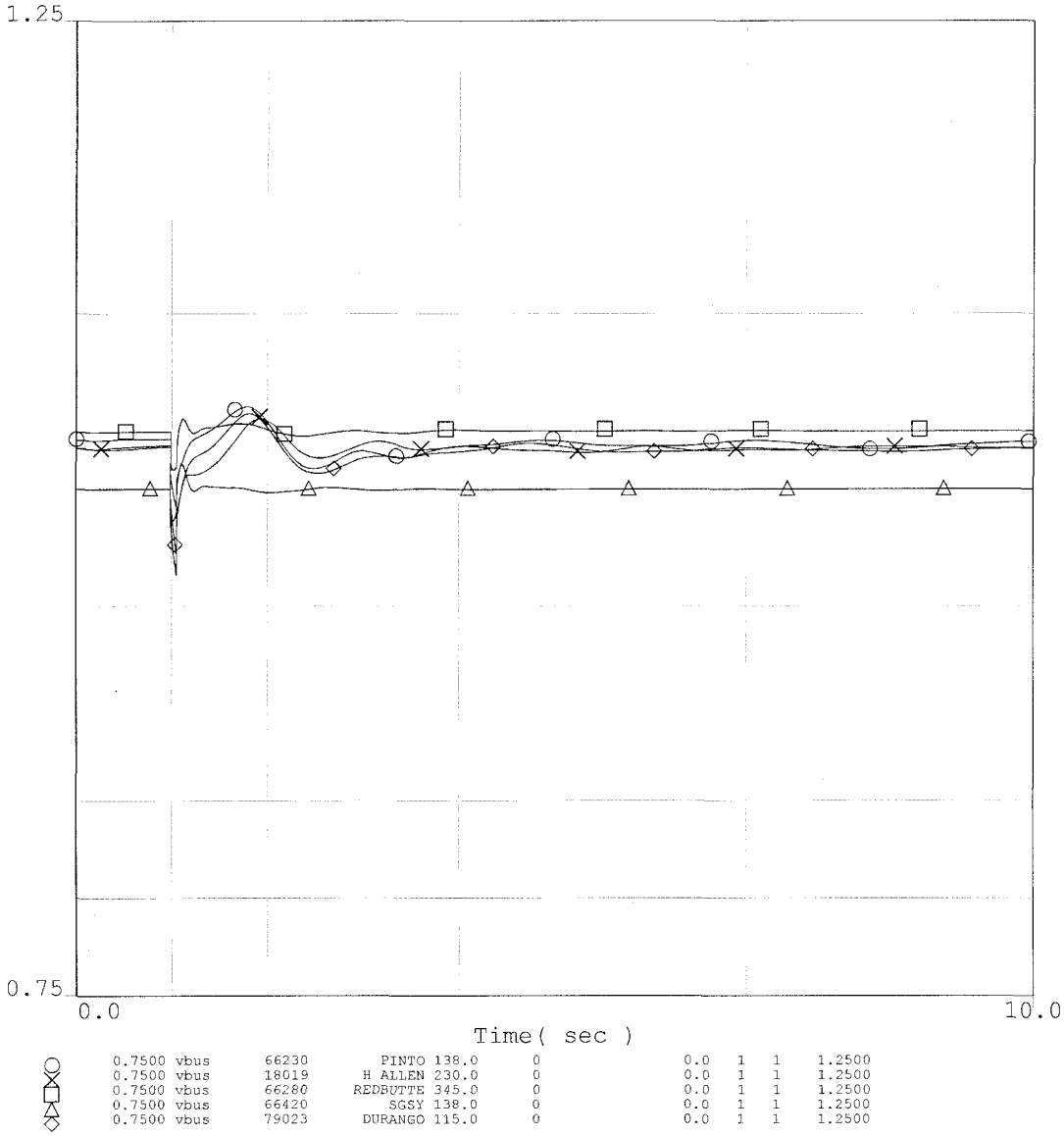
2014HS-TS16:THREE PHASE FAULT JOJOBA W/ JOA-KYR & HAA-PINAL W OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

CALIFORNIA_voltages:



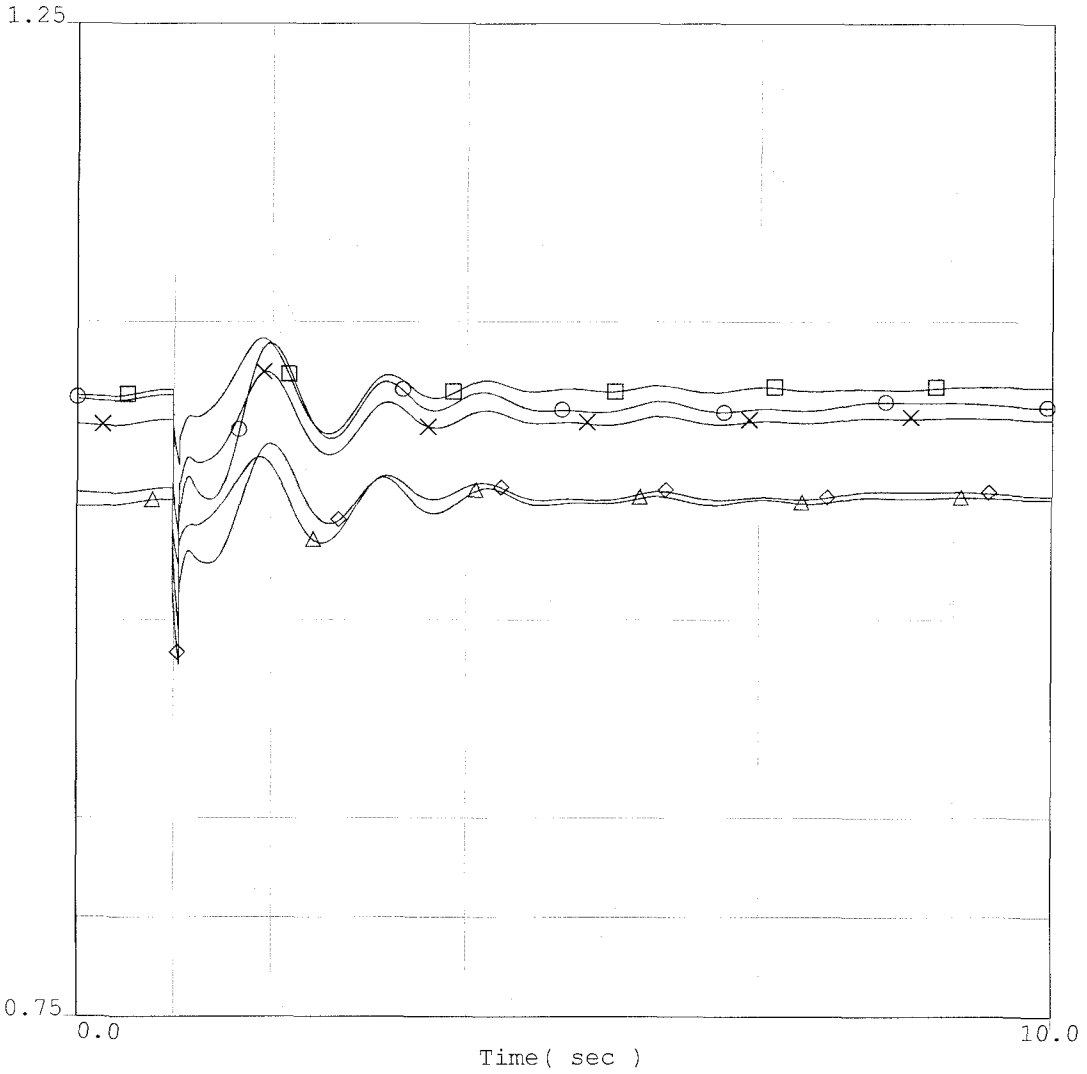
2014HS-TS16:THREE PHASE FAULT JOJOBA W/ JOA-KYR & HAA-PINAL W OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

UTAH_voltages:



2014HS-TS16:THREE PHASE FAULT JOJOBA W/ JOA-KYR & HAA-PINAL W OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

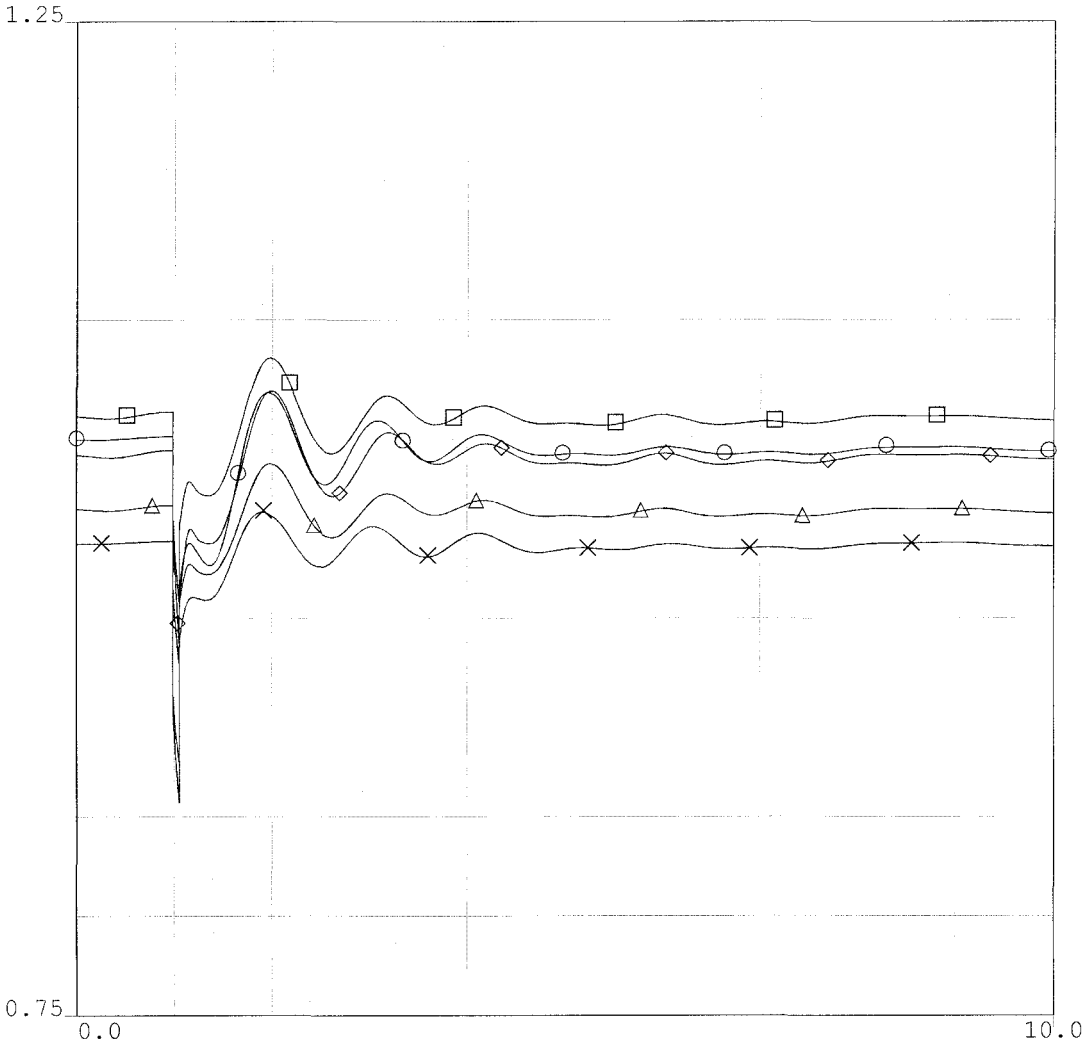
CALIFORNIA_voltages:



0.7500 vbus	24801	DEVERS 500.0	0	0.0	1	1	1.2500
0.7500 vbus	24086	LUGO 500.0	0	0.0	1	1	1.2500
0.7500 vbus	24156	VINCENT 500.0	0	0.0	1	1	1.2500
0.7500 vbus	26094	SYLMARLA 230.0	0	0.0	1	1	1.2500
0.7500 vbus	24804	DEVERS 230.0	0	0.0	1	1	1.2500

2014HS-TS16:THREE PHASE FAULT JOJOBA W/ JOA-KYR & HAA-PINAL W OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

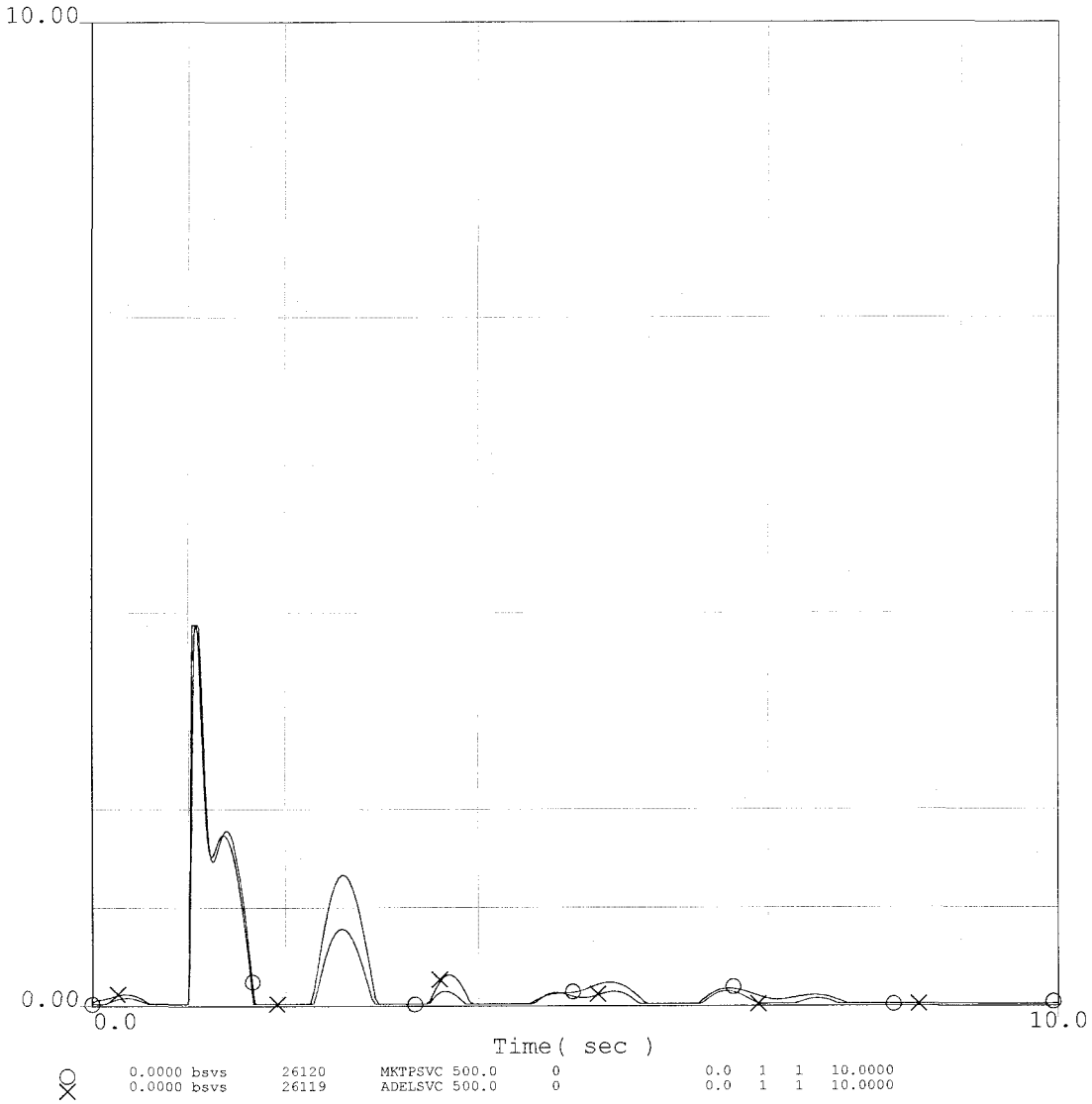
CALIFORNIA_voltages:



0.7500 vbus	22360	IMPRLVLY 500.0	0	0.0	1	1	1.2500
0.7500 vbug	22356	IMPRLVLY 230.0	0	0.0	1	1	1.2500
0.7500 vbus	24151	VALLEYSC 500.0	0	0.0	1	1	1.2500
0.7500 vbus	24805	DEVERS 115.0	0	0.0	1	1	1.2500
0.7500 vbul	24229	VALLEY-S 115.0	0	0.0	1	1	1.2500

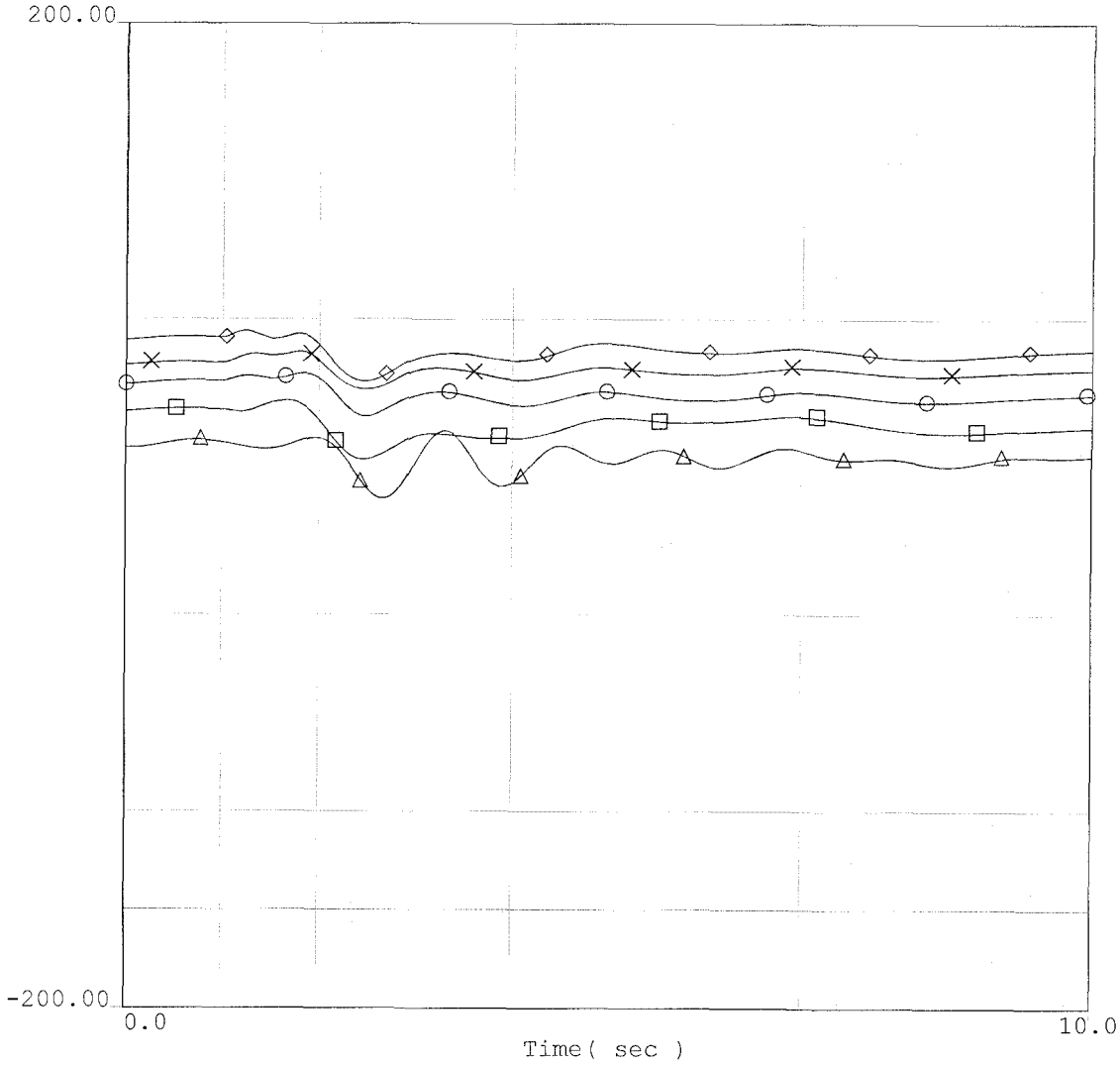
2014HS-TS16:THREE PHASE FAULT JOJOBA W/ JOA-KYR & HAA-PINAL W OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

SVC_output



2014HS-TS16:THREE PHASE FAULT JOJOBA W/ JOA-KYR & HAA-PINAL W OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

SYSTEM_Rotorangles



-200.0000 ang	16500	SPR GEN1	19.0	0	0.0	1	1	200.0000
-200.0000 ang	10321	SJUAN_G4	22.0	0	0.0	1	1	200.0000
-200.0000 ang	14942	SAGUARO2	15.5	0	0.0	1	1	200.0000
-200.0000 ang	17024	APACHCT1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	16518	SPR GEN3	21.0	0	0.0	1	1	200.0000

2014HS-TS16:THREE PHASE FAULT JOJOBA W/ JOA-KYR & HAA-PINAL W OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

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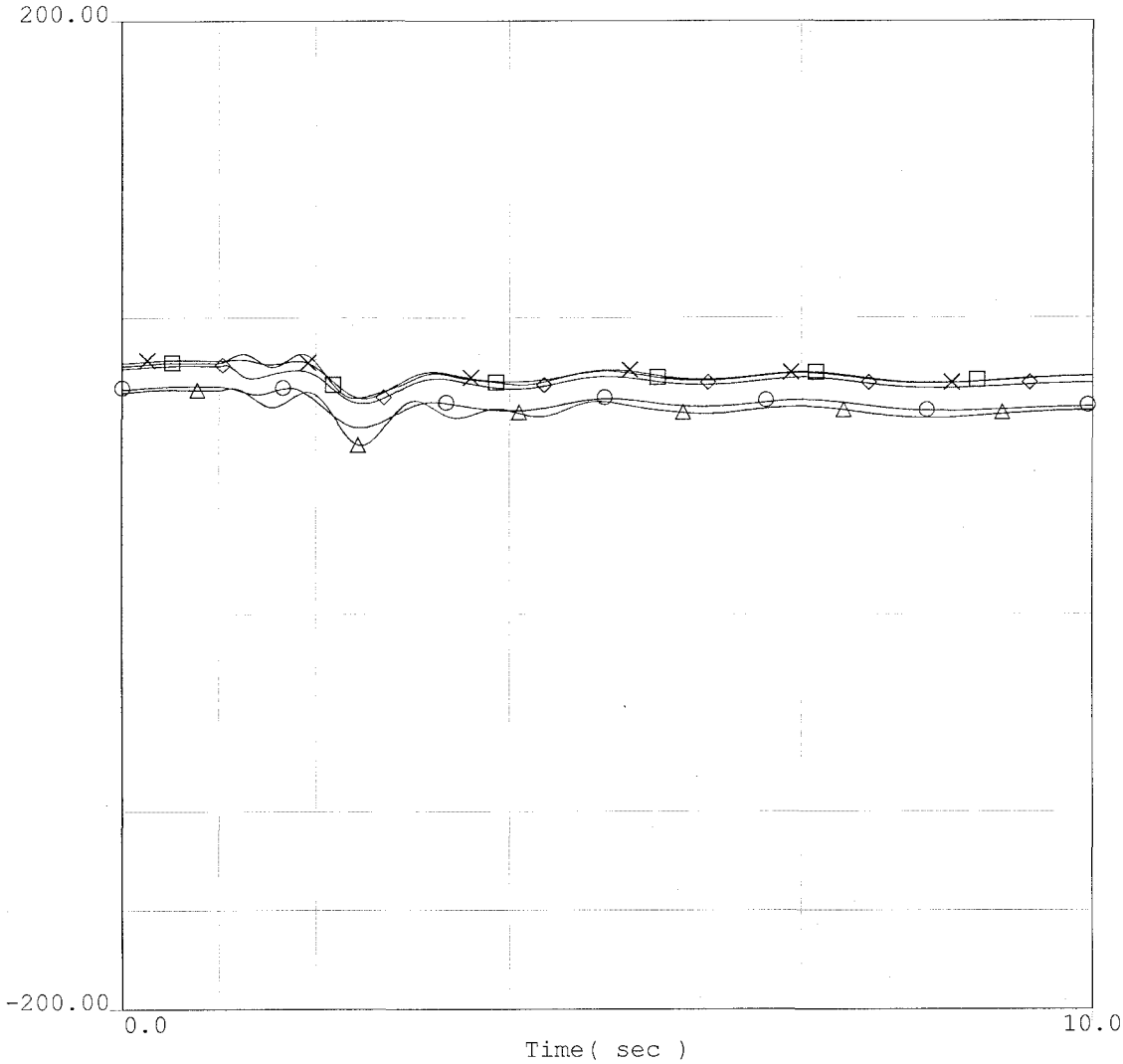
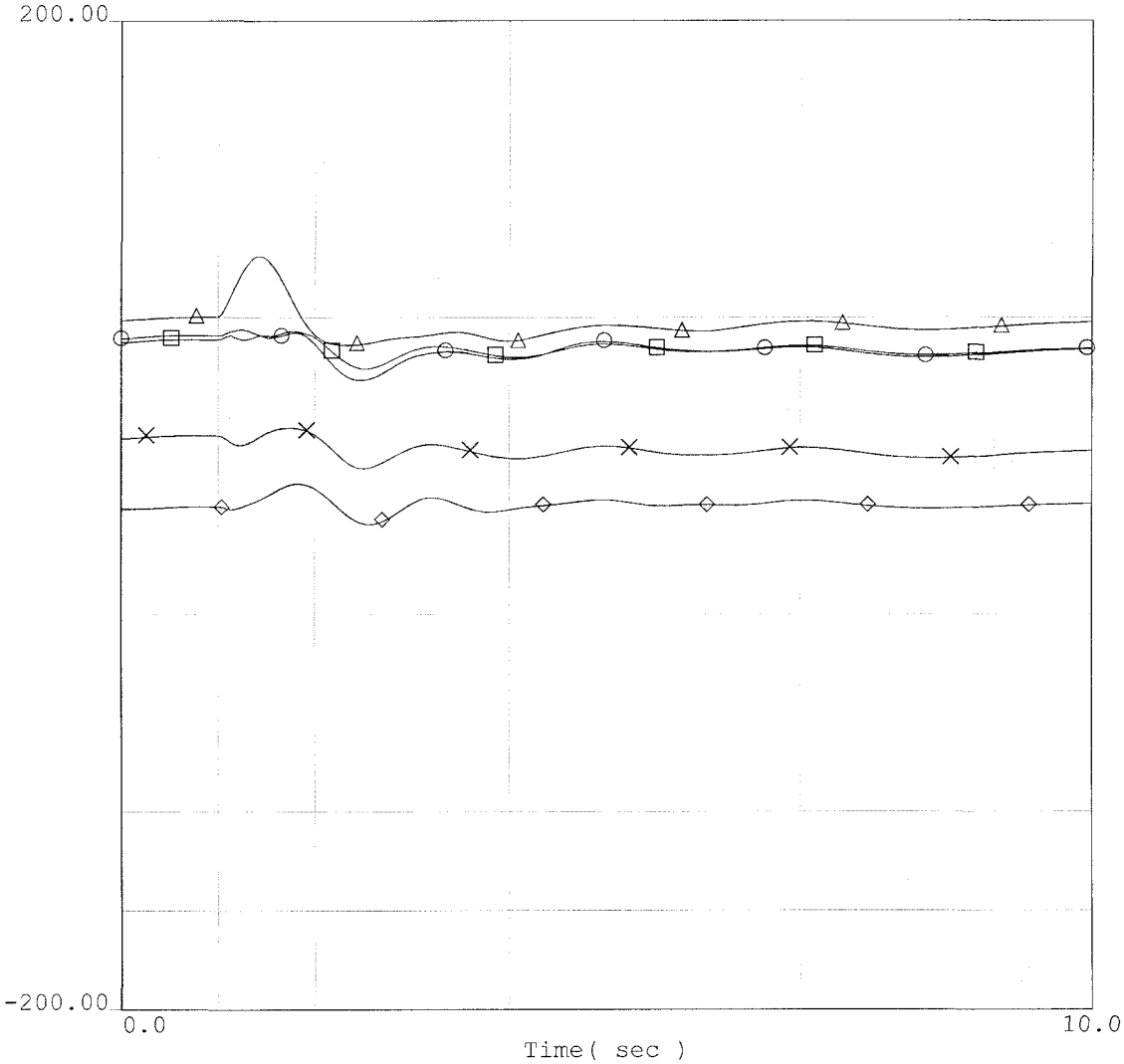
SYSTEM_Rotorangles



-200.0000 ang	15140	DBG-CT1	18.0	0	0.0	1	1	200.0000
-200.0000 ang	14945	SAG. CT3	13.8	0	0.0	1	1	200.0000
-200.0000 ang	14902	CHOLLA3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	15921	SANTAN 1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	14903	CHOLLA4	22.0	0	0.0	1	1	200.0000

2014HS-TS16:THREE PHASE FAULT JOJOBA W/ JOA-KYR & HAA-PINAL W OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

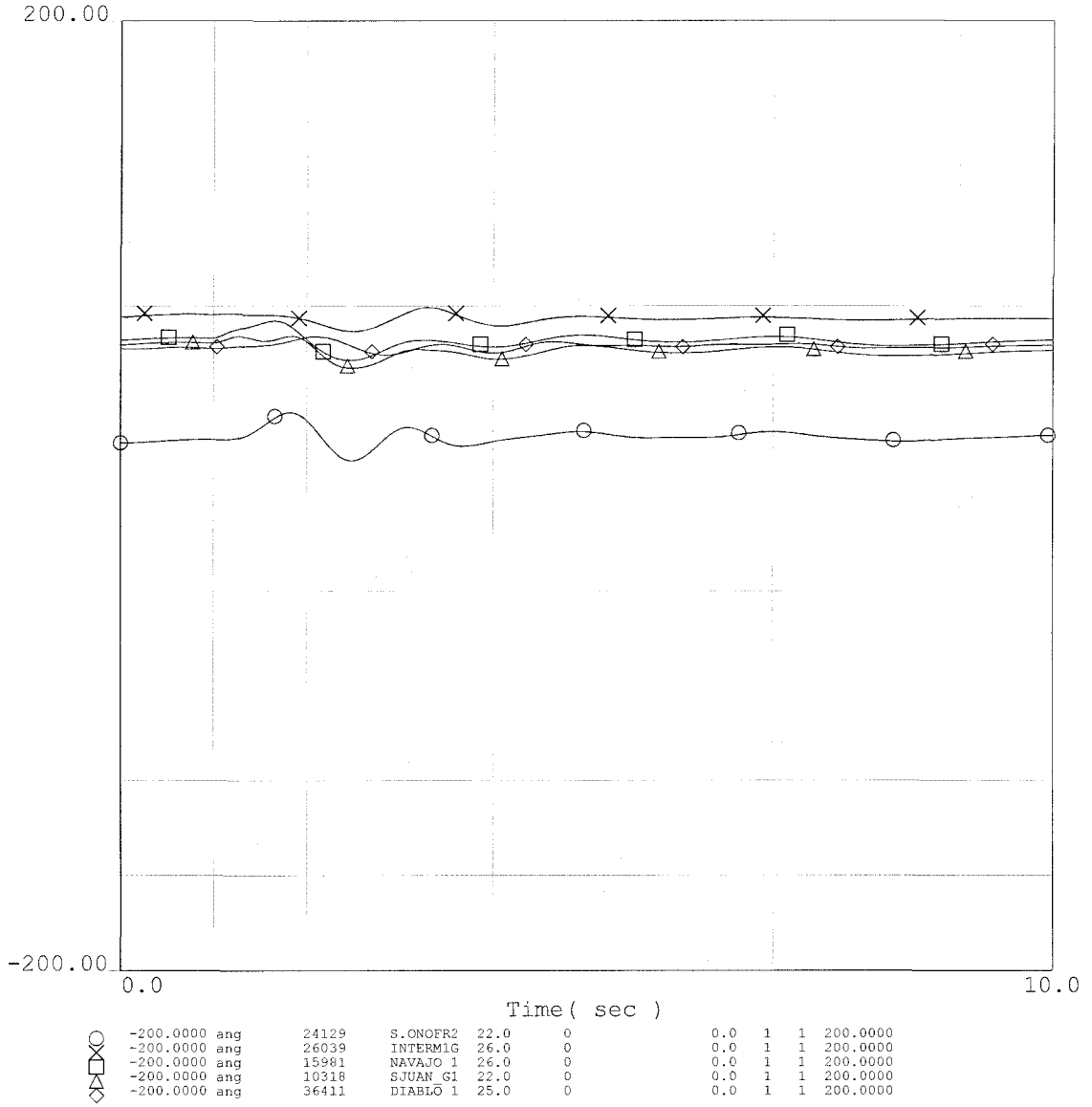
SYSTEM_Rotorangles



-200.0000 ang	16518	SPR GEN3	21.0	0	0.0	1	1	200.0000
-200.0000 ang	16503	SUNDTGE4	18.0	0	0.0	1	1	200.0000
-200.0000 ang	14914	FCNGN4CC	22.0	0	0.0	H	1	200.0000
-200.0000 ang	14931	PALOVRD1	24.0	0	0.0	1	1	200.0000
-200.0000 ang	24004	ALAMT4 G	18.0	0	0.0	H	1	200.0000

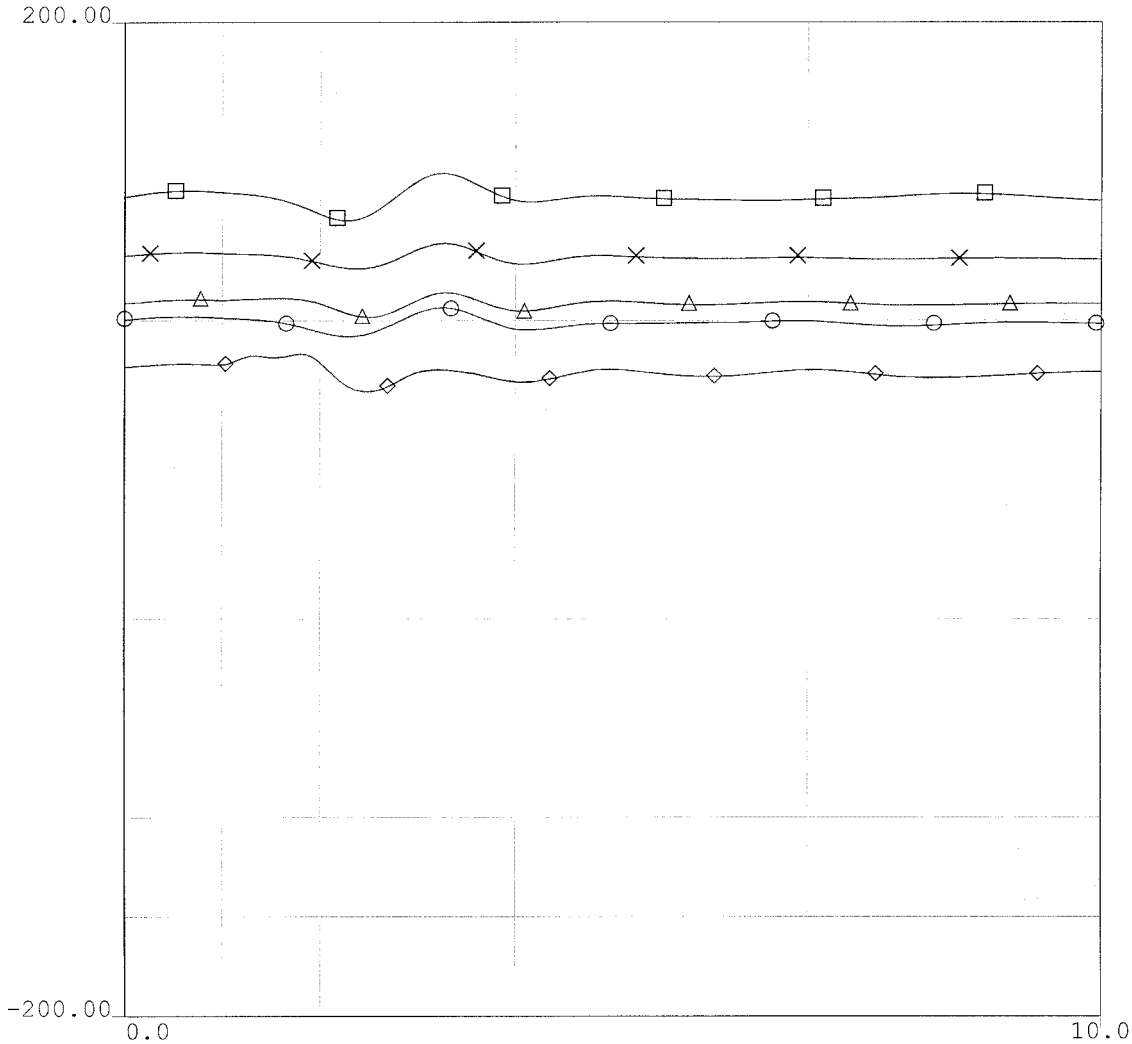
2014HS-TS16:THREE PHASE FAULT JOJOBA W/ JOA-KYR & HAA-PINAL W OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

SYSTEM_Rotorangles



2014HS-TS16:THREE PHASE FAULT JOJOBA W/ JOA-KYR & HAA-PINAL W OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

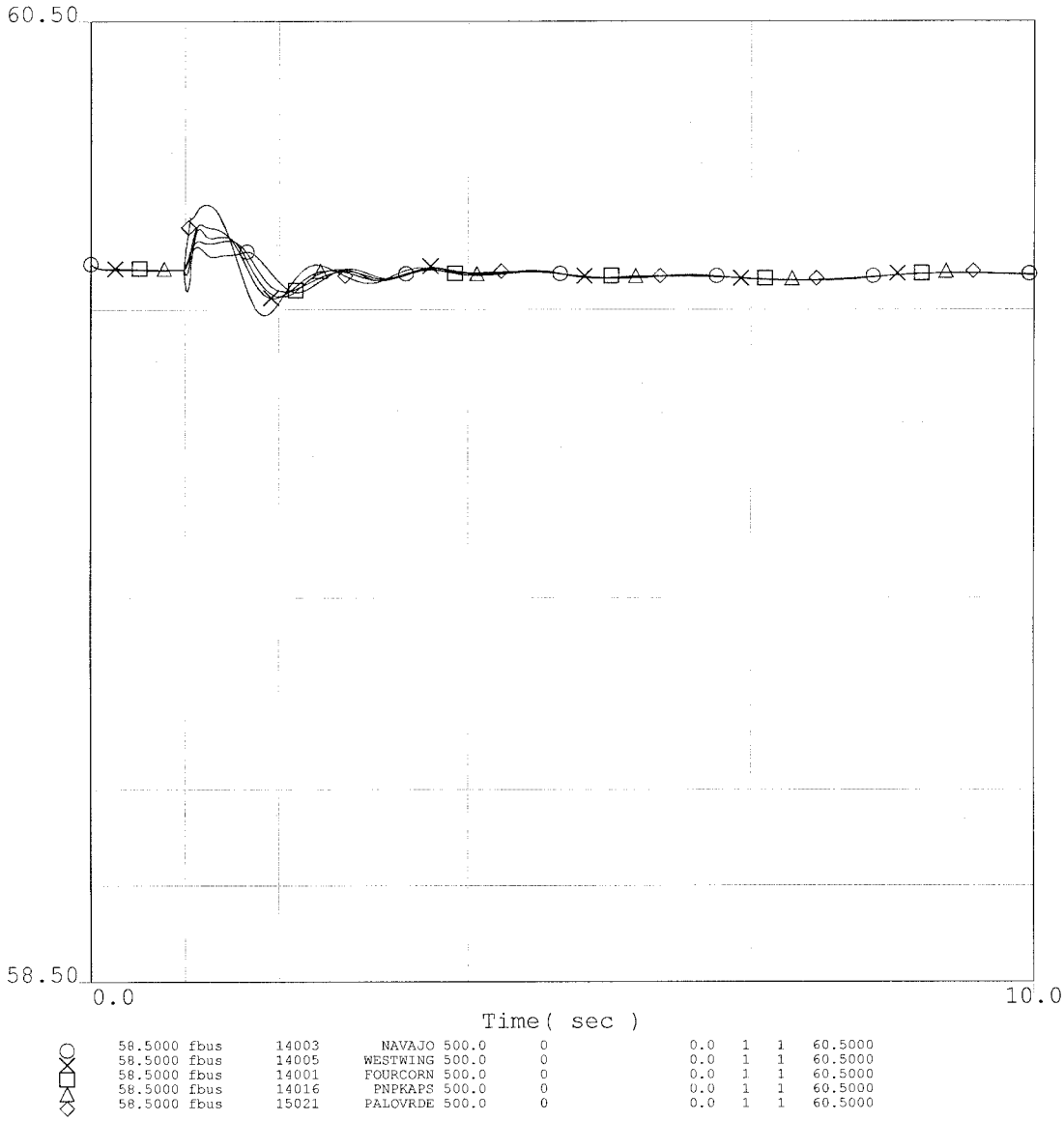
SYSTEM_Rotorangles



-200.0000 ang	73129	MBPP-1	24.0	0	0.0	1	1	200.0000
-200.0000 ang	60086	BRIDGER1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	62050	COLSTP 1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	65500	EHUNTR 3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	10321	SJUAN_G4	22.0	0	0.0	1	1	200.0000

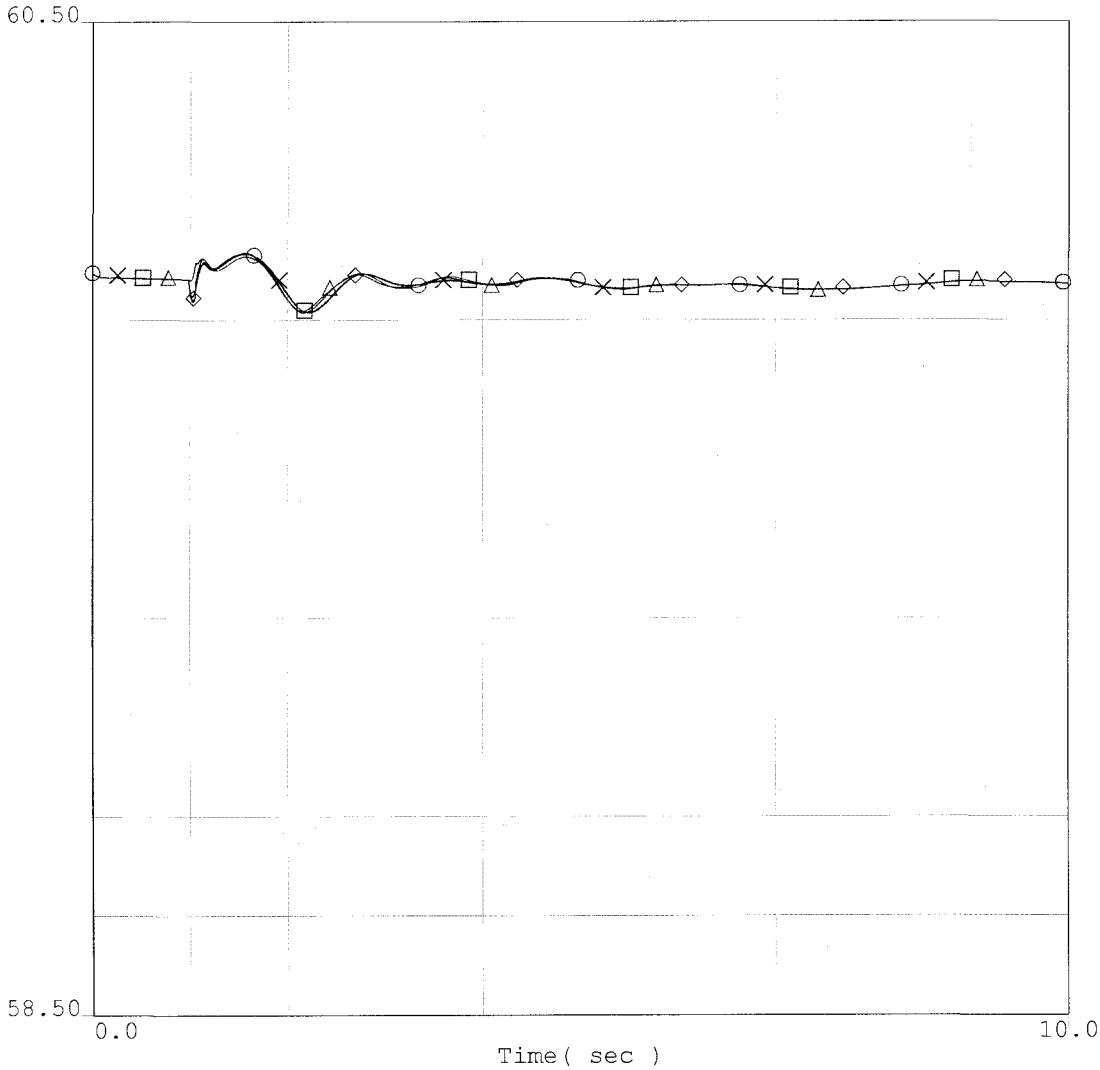
2014HS-TS16:THREE PHASE FAULT JOJOBA W/ JOA-KYR & HAA-PINAL W OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

Frequencies:



2014HS-TS16:THREE PHASE FAULT JOJOBA W/ JOA-KYR & HAA-PINAL W OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

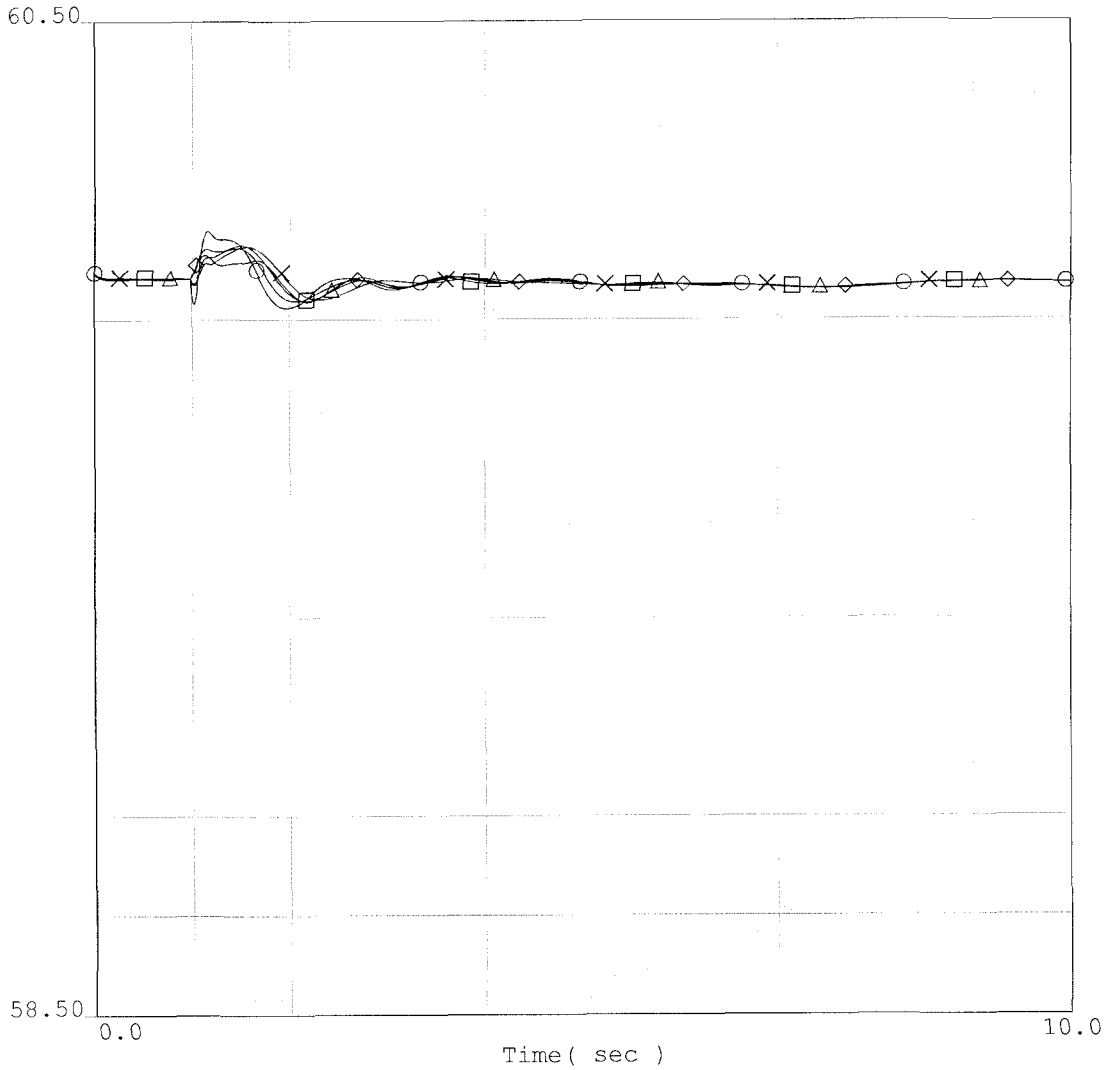
Frequencies:



58.5000	fbus	16000	TORTOLIT 500.0	0	0.0	1	1	60.5000
58.5000	fbus	16105	VAIL 345.0	0	0.0	1	1	60.5000
58.5000	fbus	16103	SOUTH 345.0	0	0.0	1	1	60.5000
58.5000	fbul	15001	CORONADO 500.0	0	0.0	1	1	60.5000
58.5000	fbus	16109	WINCHSTR 345.0	0	0.0	1	1	60.5000

2014HS-TS16:THREE PHASE FAULT JOJOBA W/ JOA-KYR & HAA-PINAL W OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

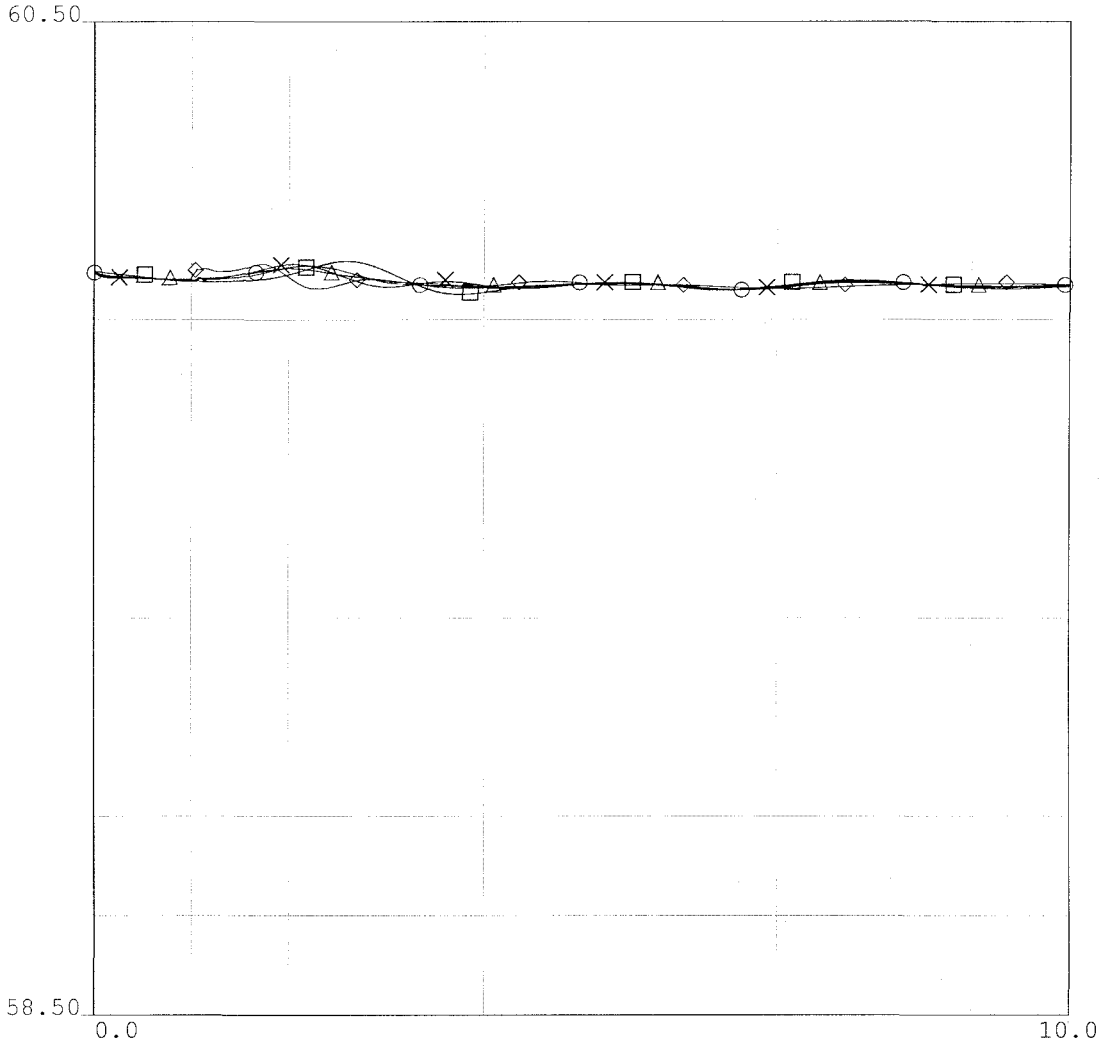
Frequencies:



58.5000 fbul	14231	WESTWNGW	230.0	0	0.0	1	1	60.5000
58.5000 fbus	26003	ADELANTO	500.0	0	0.0	1	1	60.5000
58.5000 fbus	14001	FOURCORN	500.0	0	0.0	1	1	60.5000
58.5000 fbus	26048	MCCULLGH	500.0	0	0.0	1	1	60.5000
58.5000 fbus	14003	NAVAJO	500.0	0	0.0	1	1	60.5000

2014HS-TS16:THREE PHASE FAULT JOJOBA W/ JOA-KYR & HAA-PINAL W OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

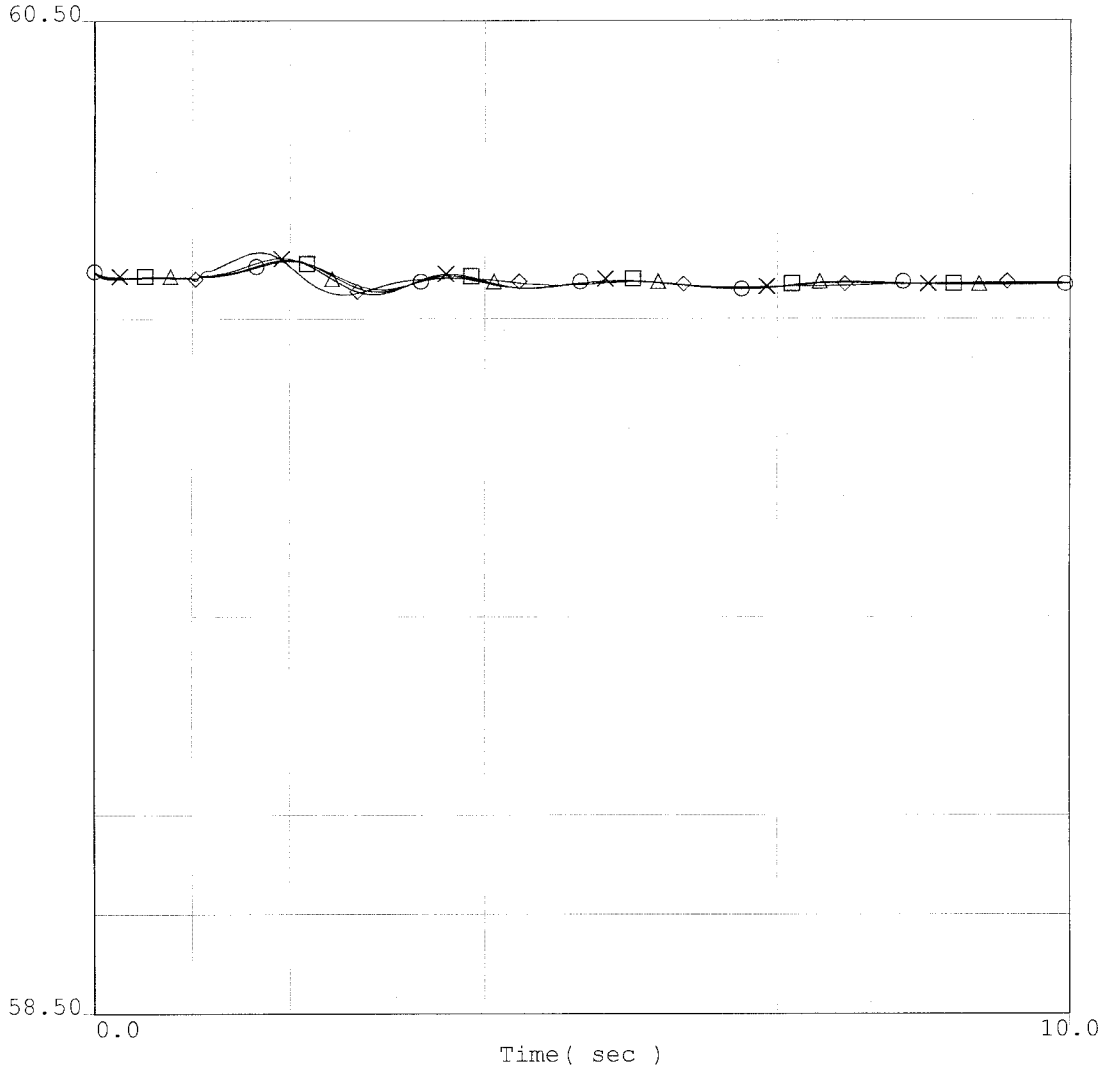
Frequencies:



58.5000 fbus	40489	GRIZZLY 500.0	0	0.0	1	1	60.5000
58.5000 fbus	40687	MALIN 500.0	0	0.0	1	1	60.5000
58.5000 fbus	40459	GARRISON 500.0	0	0.0	1	1	60.5000
58.5000 fbus	60235	MIDPOINT 345.0	0	0.0	1	1	60.5000
58.5000 fbus	66230	PINTO 138.0	0	0.0	1	1	60.5000

2014HS-TS16:THREE PHASE FAULT JOJOBA W/ JOA-KYR & HAA-PINAL W OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

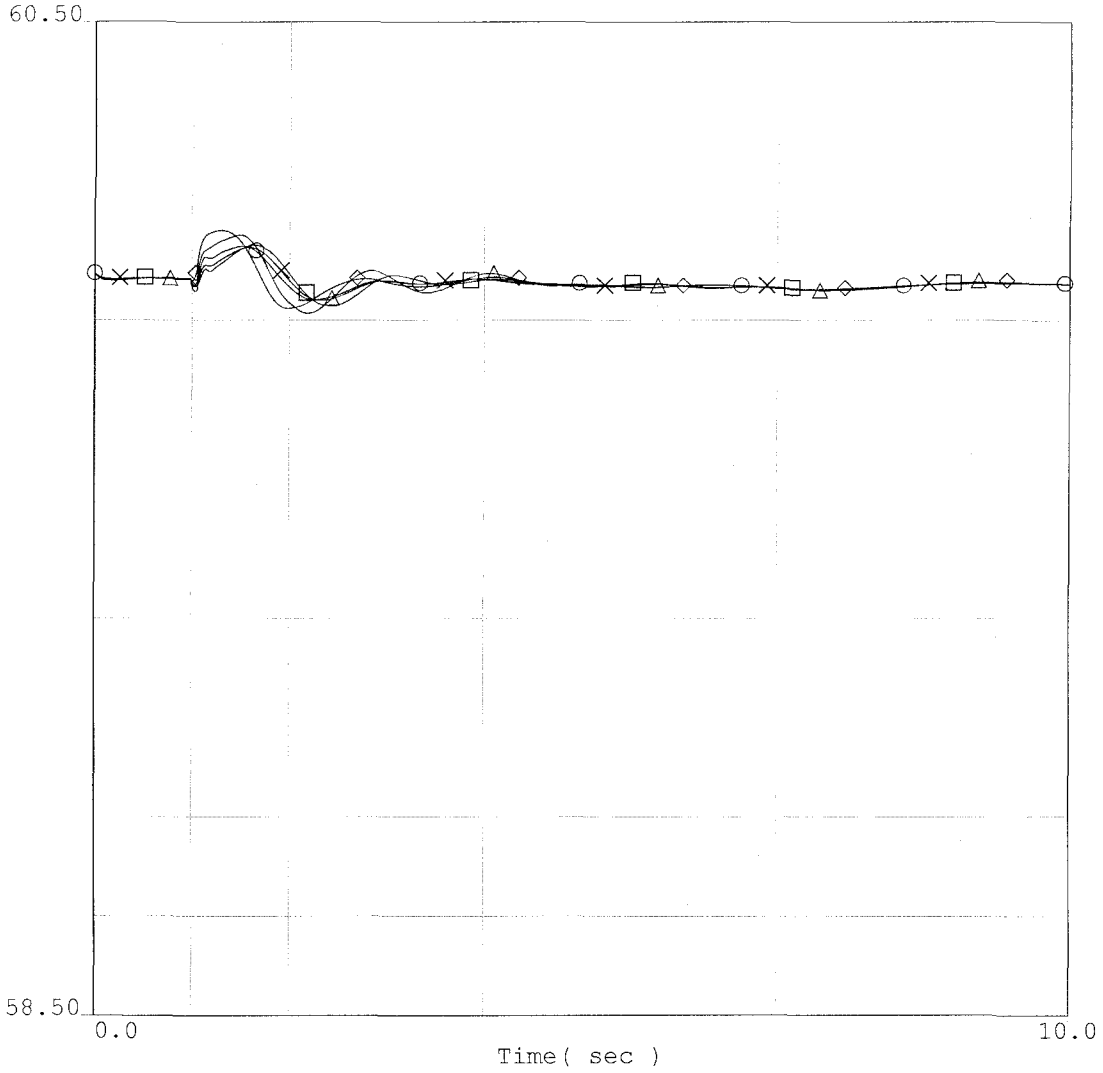
Frequencies:



58.5000 fbus	30005	ROUND MT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30015	TABLE MT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30035	TRACY 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30040	TESLA 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30060	MIDWAY 500.0	0	0.0	1	1	60.5000

2014HS-TS16:THREE PHASE FAULT JOJOBA W/ JOA-KYR & HAA-PINAL W OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

Frequencies:



58.5000 fbus	24801	DEVERS 500.0	0	0.0	1	1	60.5000
58.5000 fbus	24086	LUGO 500.0	0	0.0	1	1	60.5000
58.5000 fbus	26094	SYLMARLA 230.0	0	0.0	1	1	60.5000
58.5000 fbus	22468	MIGUEL 500.0	0	0.0	1	1	60.5000
58.5000 fbus	22536	N.GILA 500.0	0	0.0	1	1	60.5000

2014HS-TS16:THREE PHASE FAULT JOJOBA W/ JOA-KYR & HAA-PINAL W OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(3/31/11)

HIGHEST VOLTAGE DIP

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct	@time
14	GILABEND	230	vbul	1.016	0.913	10.3	1.5
14	RUDD	500	vbus	1.059	0.951	10.8	1.5
24	DEVRSVC1	500	vbug	1.06	1.016	4.4	1.5

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
14	KNOX	69	fbul	59.699	1.054
14	AGUAFR56	100	fbus	59.838	1.042
14	CPGS 1	13.8	fbug	59.798	1.275

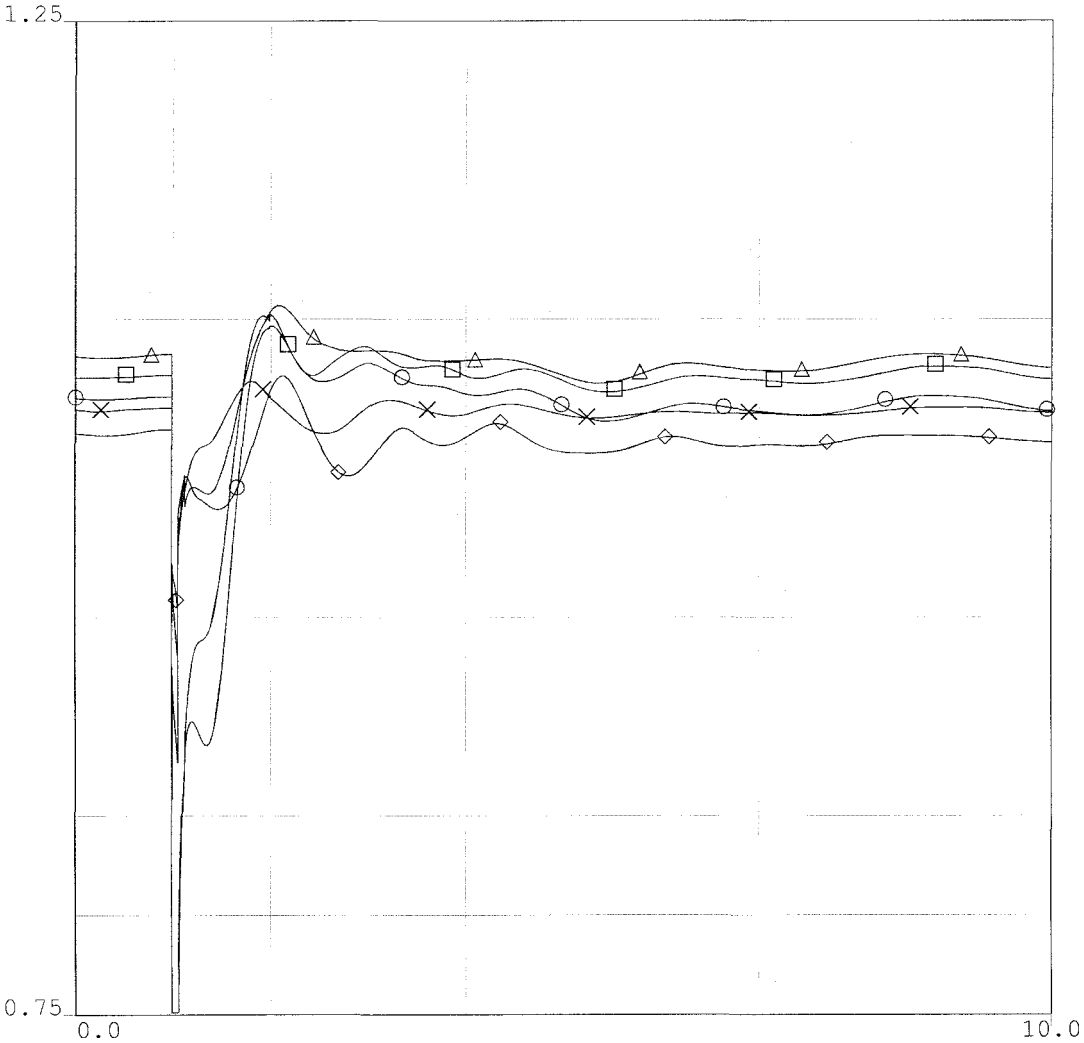
There were 0 violations of MORC criteria 1 (25% Voltage Dip) !
There were 0 violations of MORC criteria 2 (20% Voltage Dip for 20 Cycles)!
There were 0 violations of MORC criteria 3 (59.6 HZ for 6 Cycles)!

Appendix B: Palo Verde Updated Final Safety Analysis Report with SSEP 500 MW
FSAR1_SONORAN_PV
Stability Plots and TAB (FSAR1 thru FSAR5)

FSAR-TABLE 1
SONORAN SOLAR PROJECT INTERCONNECTION IMPACT STUDY
TRANSIENT STABILITY RESULTS FOR PALO VERDE PLANT FINAL SAFETY ANALYSIS
ADDED 7% GENERATION MARGIN TO PALO VERD FOR PLANT STABILITY
WITH PALO VERDE PLANT BUCKING AT 810 MVAR
2014 HEAVY SUMMER OPERATING CONDITIONS (SONORA PHOTOVOLTIC TYPE)

		POWER FLOW (MW)			(MVAR)	STABILITY RESULTS				
CASE NO.	POST-PROJECT CASE DESCRIPTION	PV/HAA TOTAL	PV E TOTAL	PV W TOTAL	PV 500 BUCKING	MAX. TRANSIENT VOLTAGE DIP	TRANSIENT VOLTAGE DIP	TRANSIENT FREQUENCY	DAMPING	CASE RESULTS COMMENTS
14HS-POST-Q3M	BASE CASE	11745	8074	3671	810					
NERC/WECC CATEGORY B (LOSS OF ONE SINGLE ELEMENT) N-1 CONTINGENCY		MITIGATION SCHEME (RAS)								
ST-1	3 PH FLT ON PALO VERDE 500 L/O PALO VERDE-DEVERS 500kV LINE	NONE				15.0% at N.GILA 500kV	<20%—<20cycle	>59.6 Hz<6cycle	Damping>0	STABLE AND WELL DAMPED WITHIN NERC/WECC CRITERIA LIMITS
ST-2	3 PH FLT ON HASSAYAMPA 50 L/O HASSAYAMPA-N.GILA 500kV LINE	NONE				17.7% at COLO R 500kV	<20%—<20cycle	>59.6 Hz<6cycle	Damping>0	STABLE AND WELL DAMPED WITHIN NERC/WECC CRITERIA LIMITS
ST-3	LOSS OF ONE PALO VERDE G (1509 MW)	NONE				13.3% at STATELIN69kV	<20%—<20cycle	>59.6 Hz<6cycle	Damping>0	STABLE AND WELL DAMPED WITHIN NERC/WECC CRITERIA LIMITS
ST-4	LOSS OF ONE BIGGEST PUMP (840 MW)	NONE				1.7% at STATELIN69kV	<20%—<20cycle	>59.6 Hz<6cycle	Damping>0	STABLE AND WELL DAMPED WITHIN NERC/WECC CRITERIA LIMITS
ST-5	LOSS OF ONE BIGGEST BUS L (1147 MW)	NONE				1.6% at STATELIN69kV	<20%—<20cycle	>59.6 Hz<6cycle	Damping>0	STABLE AND WELL DAMPED WITHIN NERC/WECC CRITERIA LIMITS

ARIZONA_voltages:



0.7500 vbus	15021	PALOVRDE 500.0	0	0.0	1	1	1.2500
0.7500 vbus	14001	FOURCORN 500.0	0	0.0	1	1	1.2500
0.7500 vbus	15011	KYRENE 500.0	0	0.0	1	1	1.2500
0.7500 vbus	14003	NAVAJO 500.0	0	0.0	1	1	1.2500
0.7500 vbus	26003	ADELANTO 500.0	0	0.0	1	1	1.2500

2014HS-UFSAR01:THREE PHASE FAULT ON THE PALO VERDE-DEVERS 500KV LINE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/3/11)

14hs_q3m_pv-dv.chf

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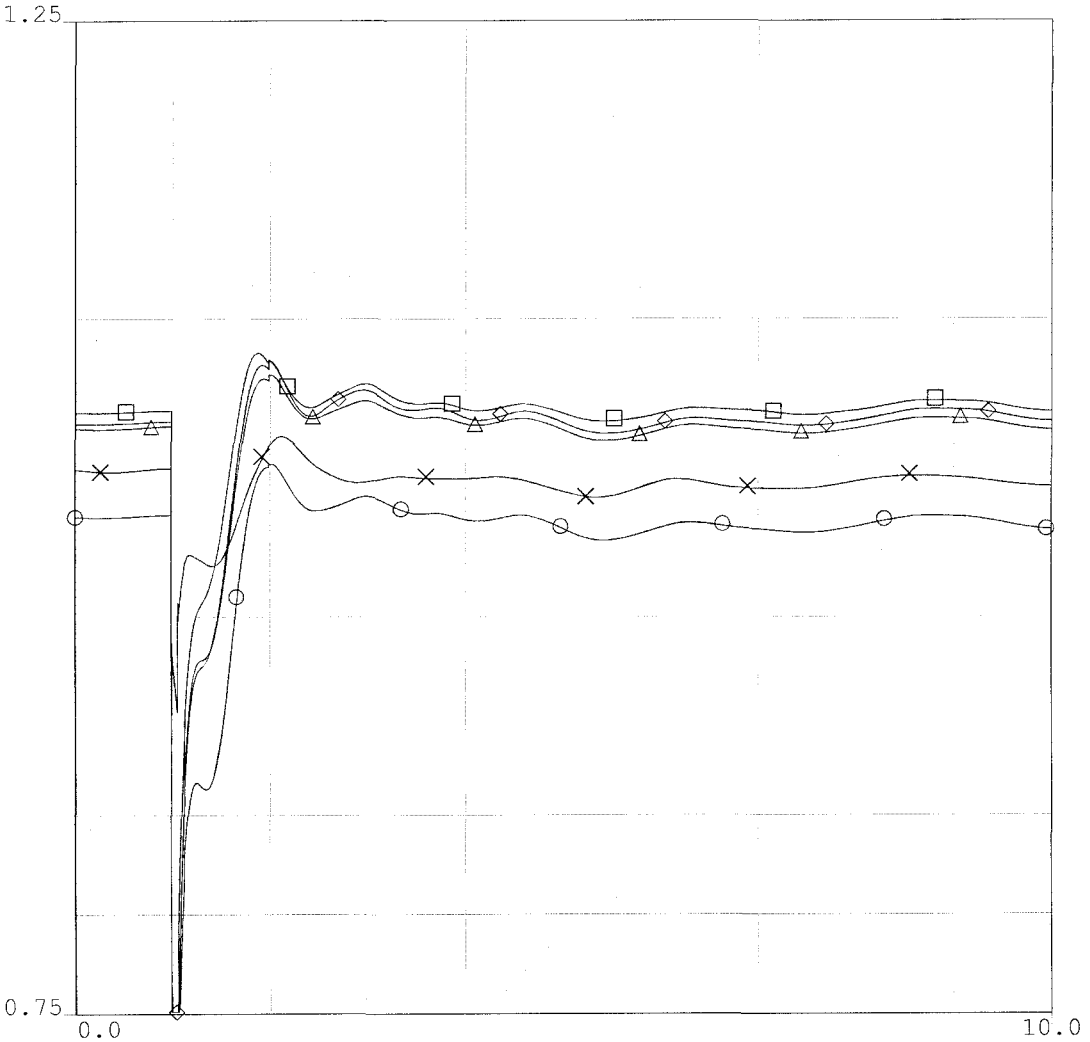

○	0.7500 vbul	14231	WESTWNGW 230.0	0	0.0	1	1	1.2500
⊠	0.7500 vbus	19011	MEAD N 230.0	0	0.0	1	1	1.2500
□	0.7500 vbus	15215	SILVERKG 230.0	0	0.0	1	1	1.2500
△	0.7500 vbul	14221	PPAPS W 230.0	0	0.0	1	1	1.2500
◇	0.7500 vbus	15207	KYRENE 230.0	0	0.0	1	1	1.2500

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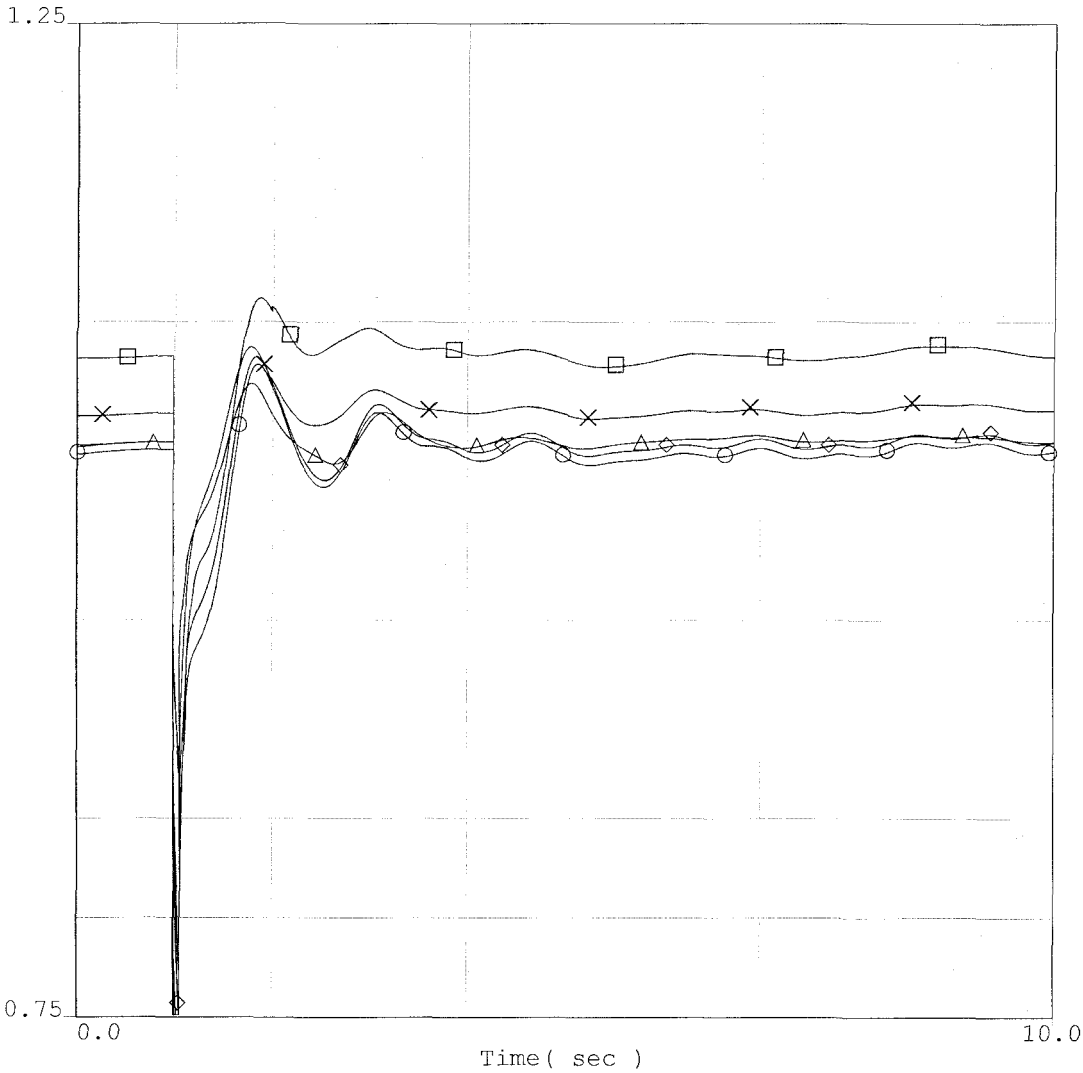
ARIZONA_voltages:



0.7500 vbus	16103	SOUTH 345.0	0	0.0	1	1	1.2500
0.7500 vbus	14000	CHOLLA 500.0	0	0.0	1	1	1.2500
0.7500 vbus	15041	SILVERKG 500.0	0	0.0	1	1	1.2500
0.7500 vbus	16104	SPRINGR 345.0	0	0.0	1	1	1.2500
0.7500 vbus	16109	WINCHSTR 345.0	0	0.0	1	1	1.2500

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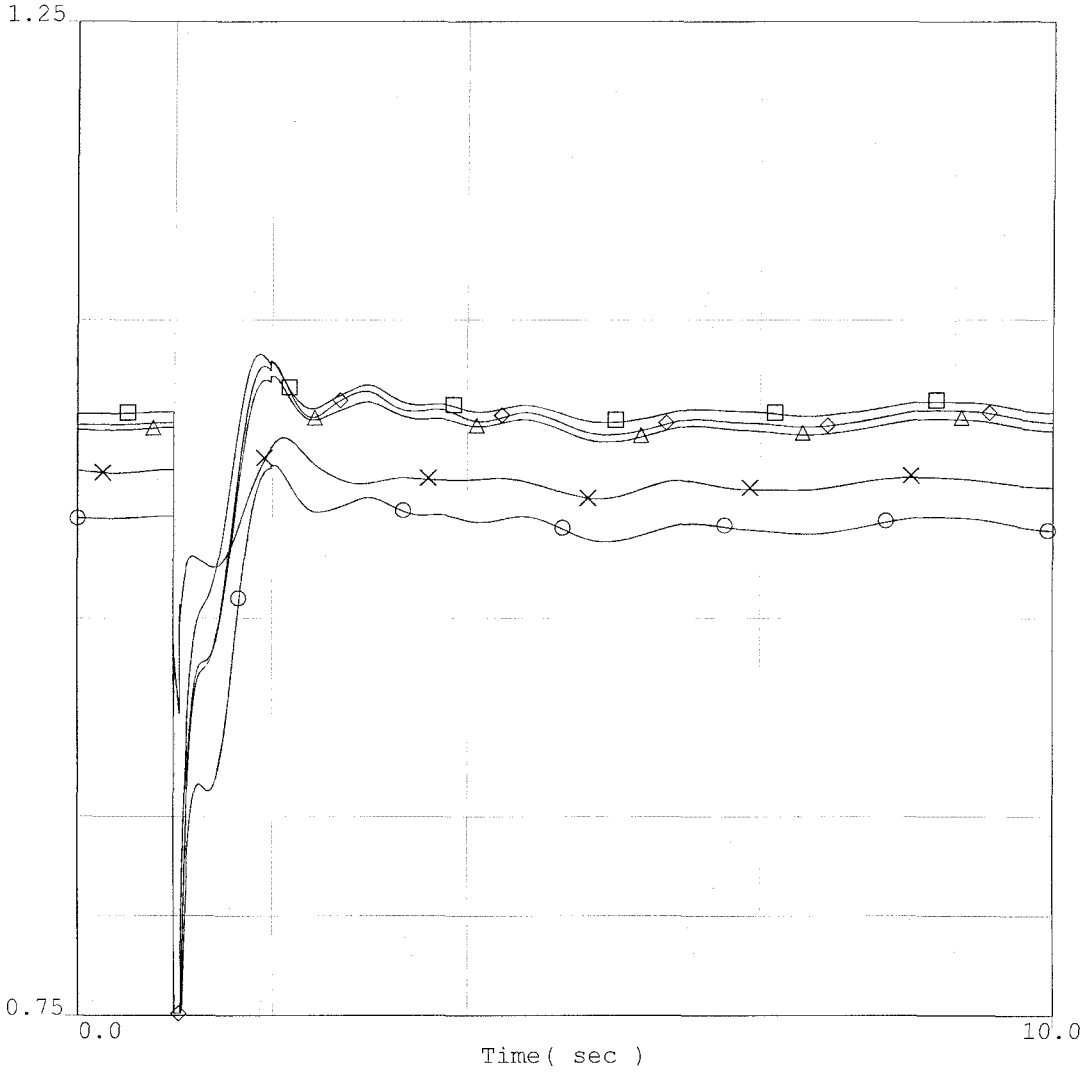
ARIZONA_voltages:



○	0.7500 vbul	14231	WESTWNGW 230.0	0	0.0	1	1	1.2500
×	0.7500 vbus	19011	MEAD N 230.0	0	0.0	1	1	1.2500
□	0.7500 vbus	15215	SILVERKG 230.0	0	0.0	1	1	1.2500
△	0.7500 vbul	14221	PPAPS W 230.0	0	0.0	1	1	1.2500
◇	0.7500 vbus	15207	KYRENE 230.0	0	0.0	1	1	1.2500

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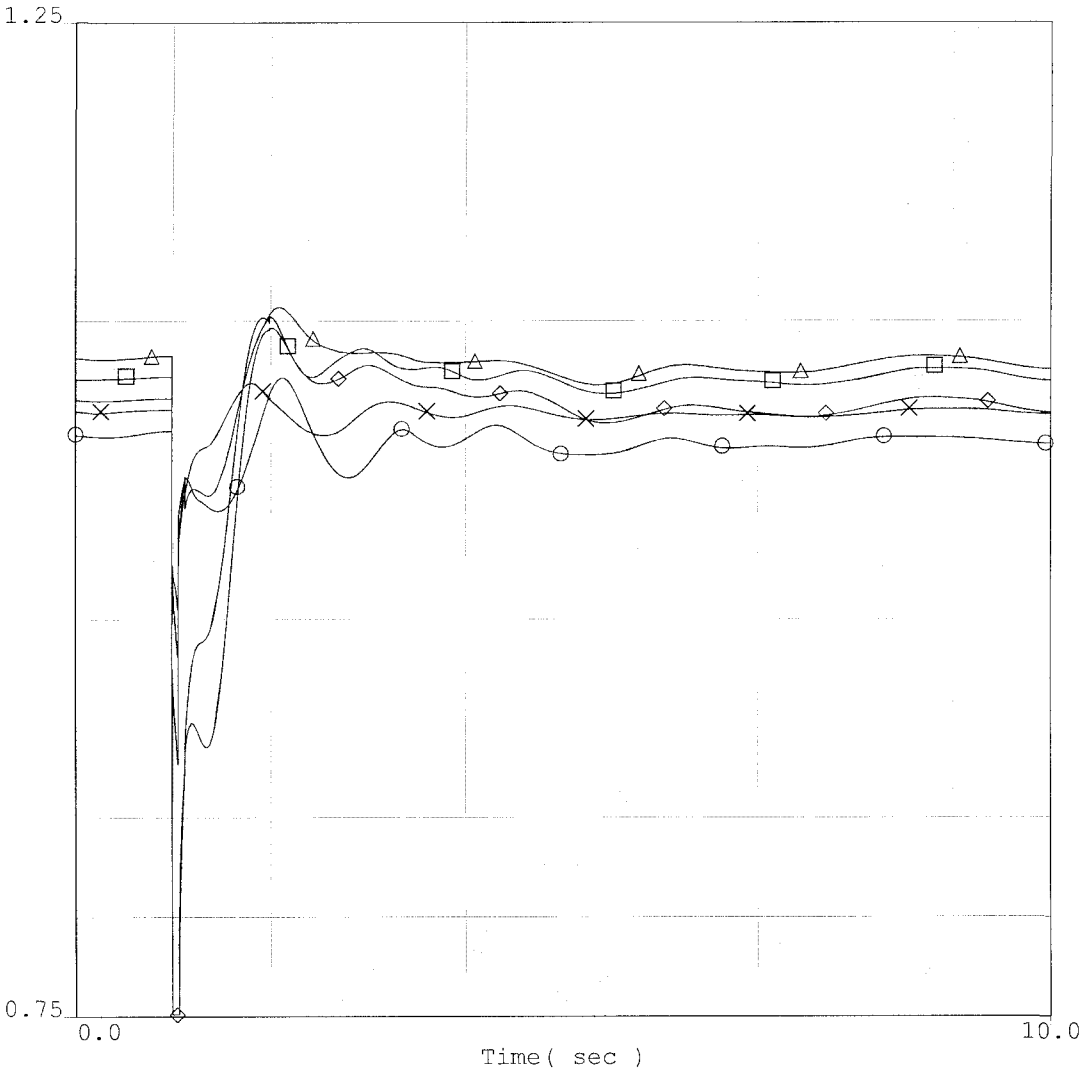
ARIZONA_voltages:



0.7500 vbus	26003	ADELANTO 500.0	0	0.0	1	1	1.2500
0.7500 vbus	14001	FOURCORN 500.0	0	0.0	1	1	1.2500
0.7500 vbus	15011	KYRENE 500.0	0	0.0	1	1	1.2500
0.7500 vbus	14003	NAVAJO 500.0	0	0.0	1	1	1.2500
0.7500 vbus	15021	PALOVRDE 500.0	0	0.0	1	1	1.2500

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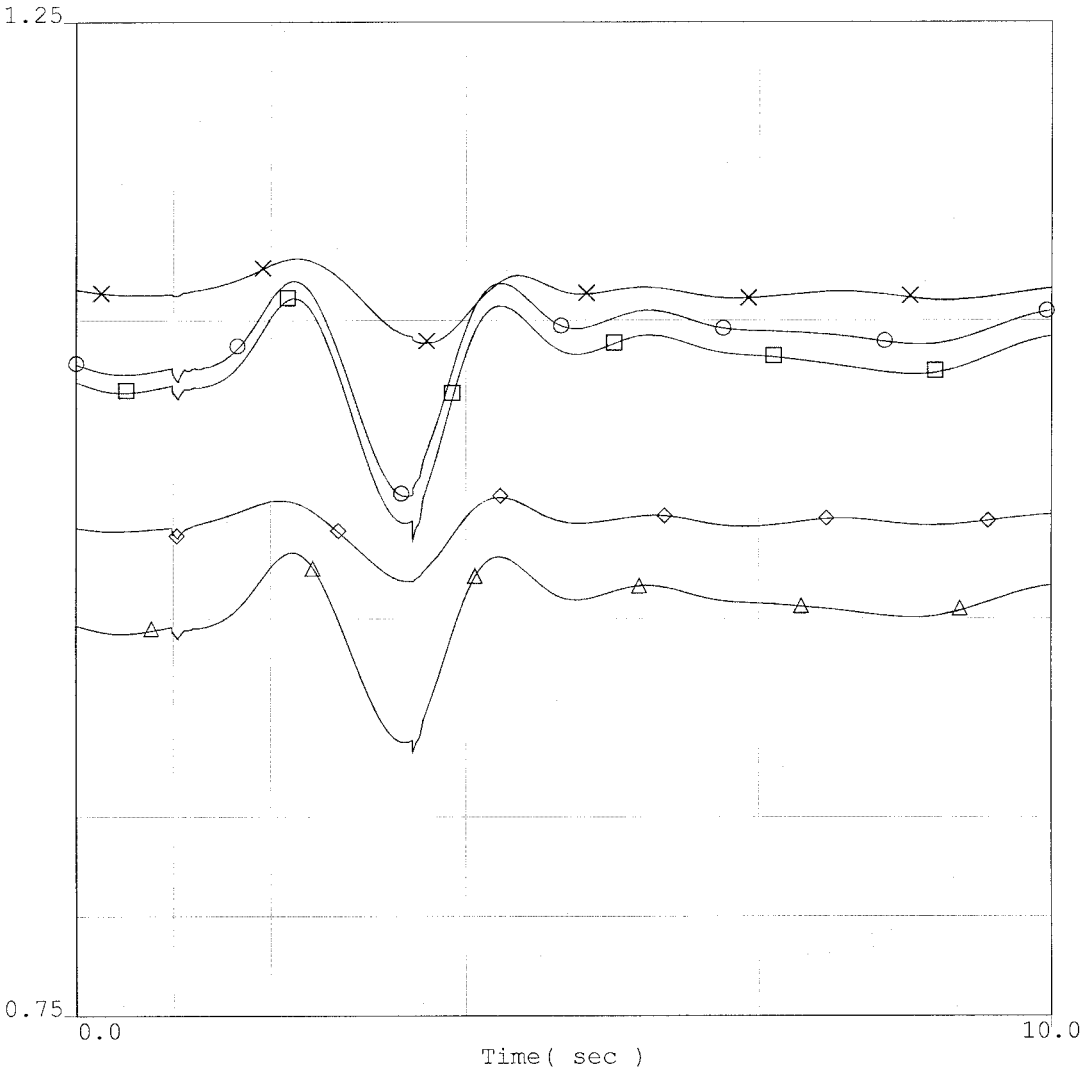

0.7500 vbus	40489	GRIZZLY 500.0	0	0.0	1	1	1.2500
0.7500 vbus	40459	GARRISON 500.0	0	0.0	1	1	1.2500
0.7500 vbus	40687	MALIN 500.0	0	0.0	1	1	1.2500
0.7500 vbul	45215	NEWELL 69.0	0	0.0	1	1	1.2500
0.7500 vbus	60235	MIDPOINT 345.0	0	0.0	1	1	1.2500

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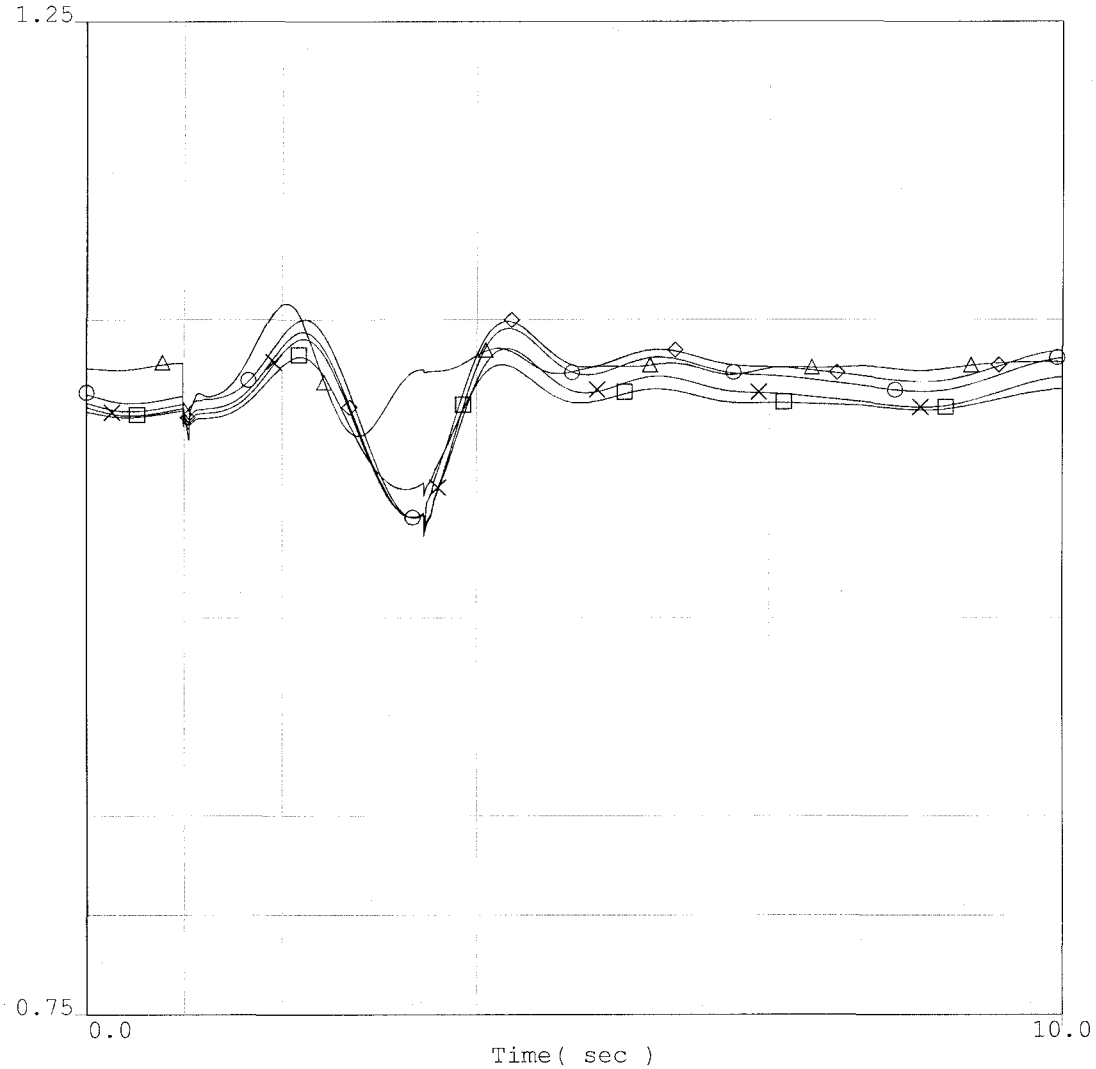
CALIFORNIA_voltages:



0.7500 vbus	30005	ROUND MT 500.0	0	0.0	1	1	1.2500
0.7500 vbus	30015	TABLE MT 500.0	0	0.0	1	1	1.2500
0.7500 vbus	30040	TESLA 500.0	0	0.0	1	1	1.2500
0.7500 vbus	30060	MIDWAY 500.0	0	0.0	1	1	1.2500
0.7500 vbus	30020	OLINDA 500.0	0	0.0	1	1	1.2500

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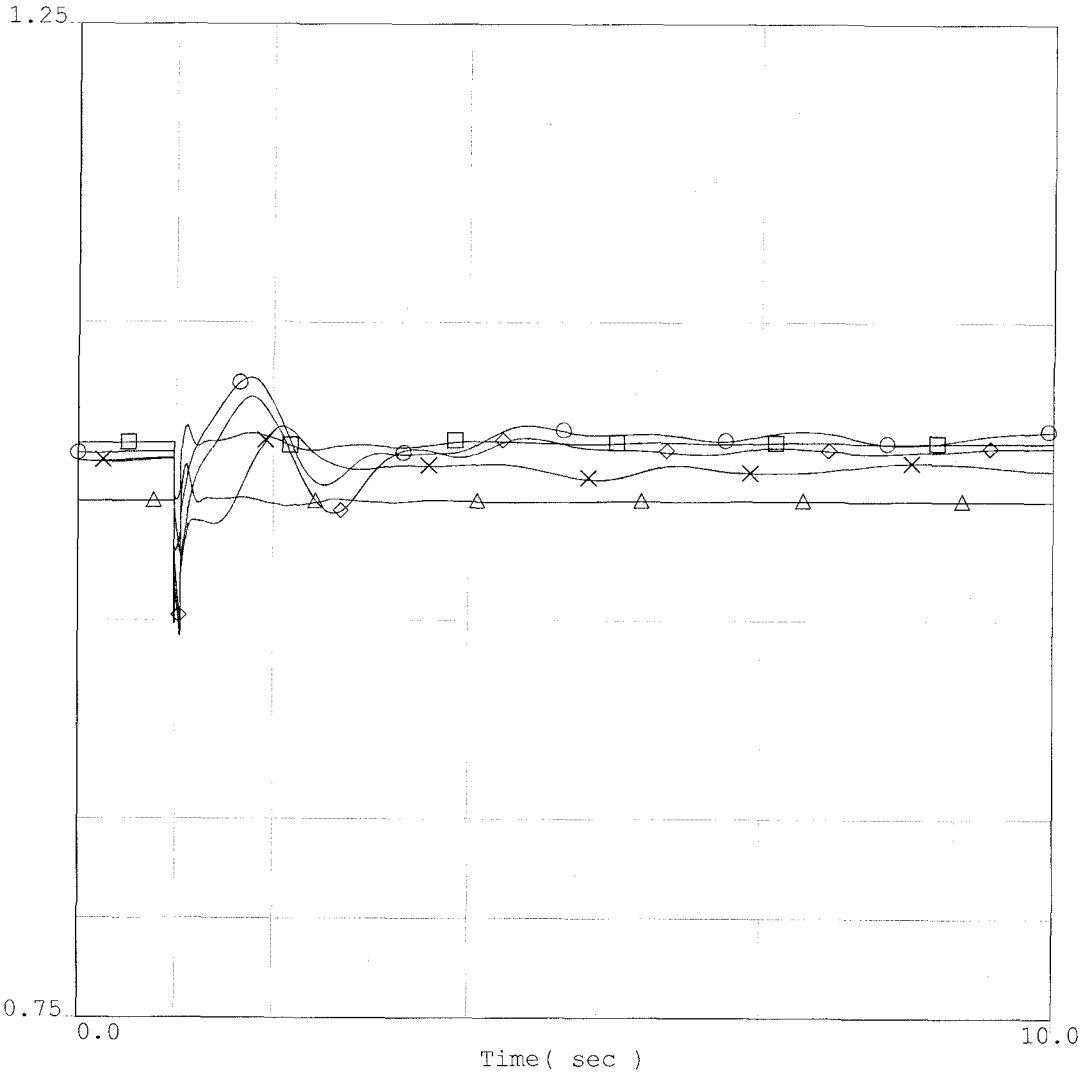
UTAH_voltages:



○	0.7500 vbus	66230	PINTO 138.0	0	0.0	1	1	1.2500
⊗	0.7500 vbus	18019	H ALLEN 230.0	0	0.0	1	1	1.2500
□	0.7500 vbus	66280	REDBUTTE 345.0	0	0.0	1	1	1.2500
△	0.7500 vbus	66420	SGSY 138.0	0	0.0	1	1	1.2500
◇	0.7500 vbus	79023	DURANGO 115.0	0	0.0	1	1	1.2500

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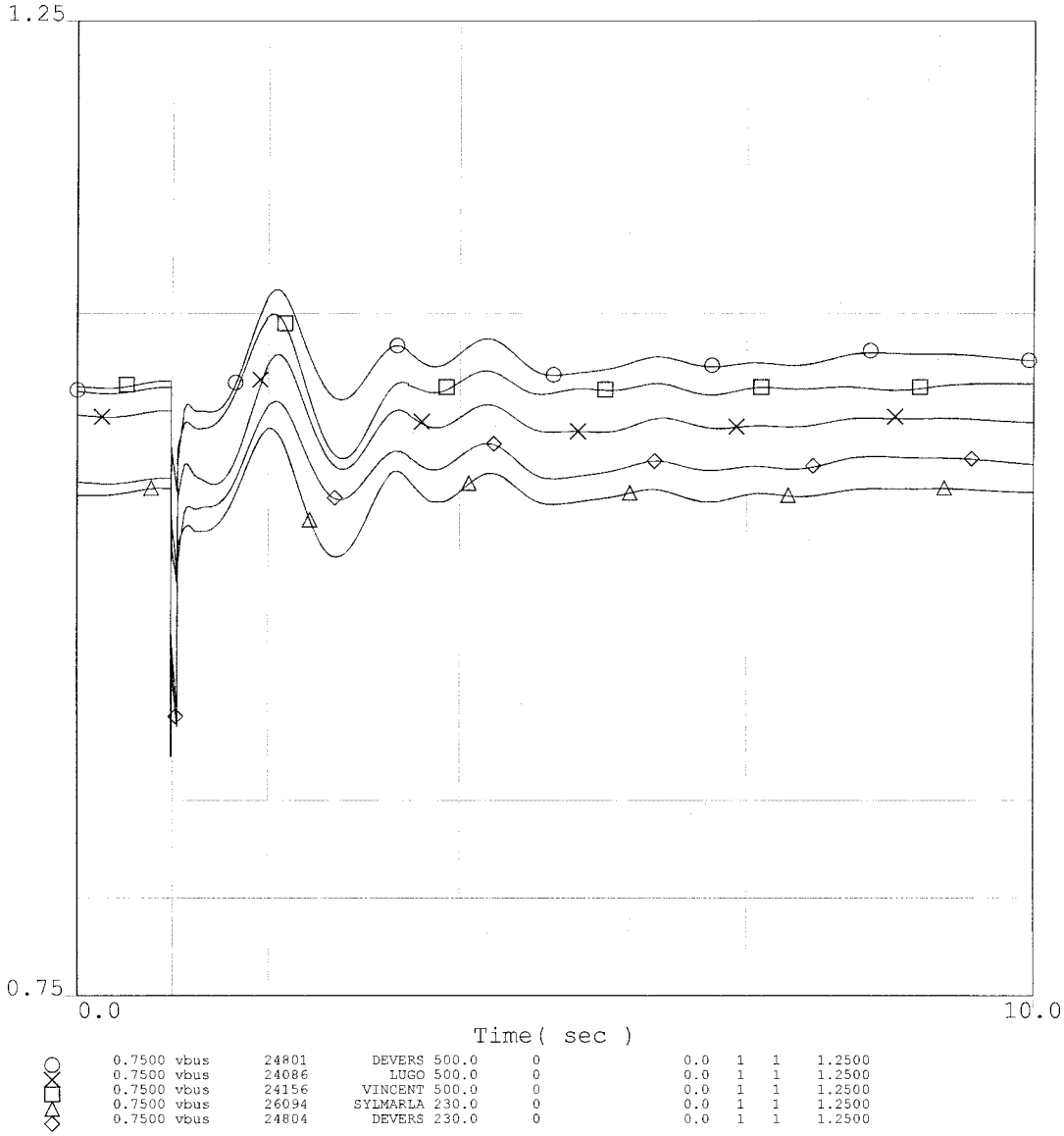
CALIFORNIA_voltages:



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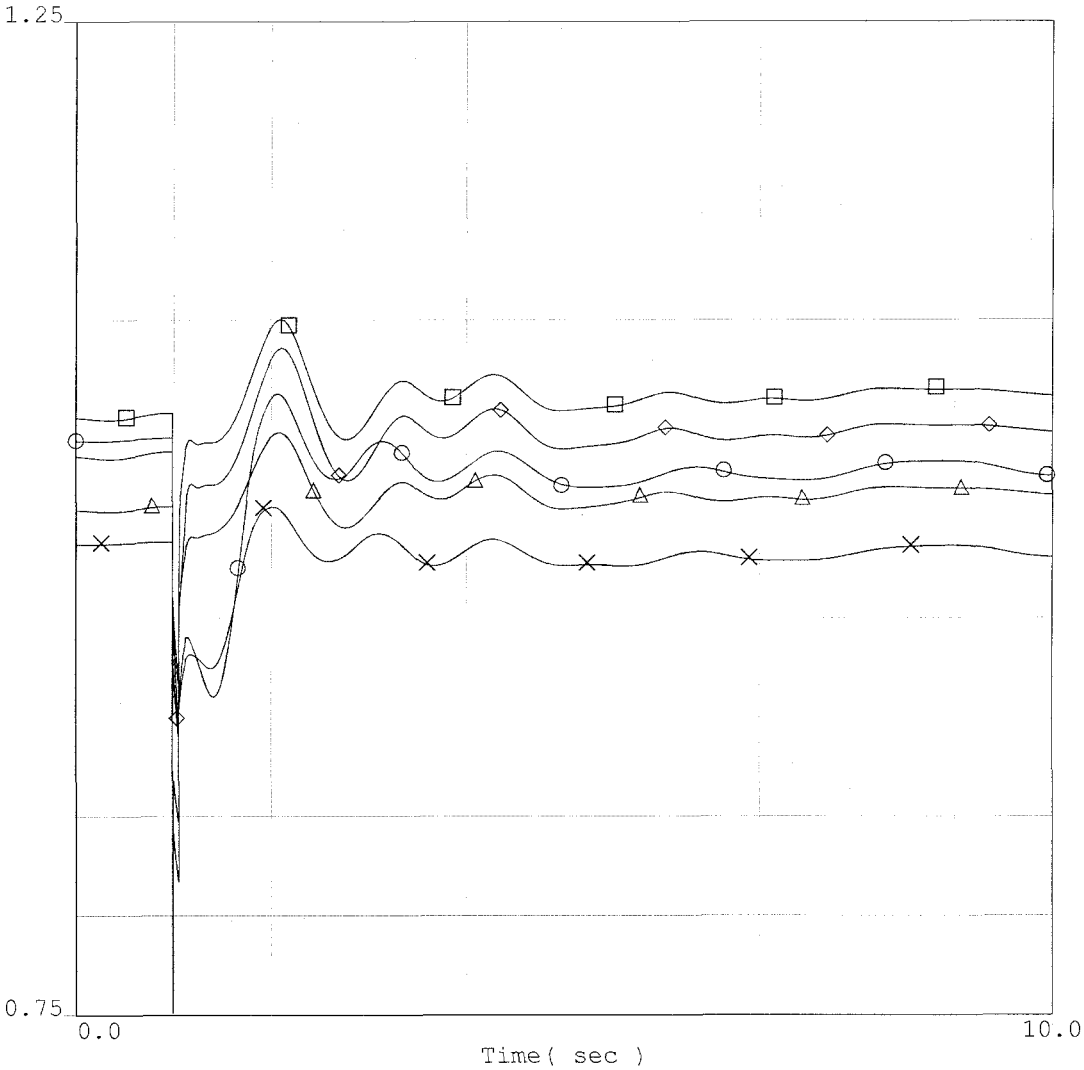
CALIFORNIA_voltages:



0.7500 vbus	22360	IMPRLVLY 500.0	0	0.0	1	1	1.2500
0.7500 vbug	22356	IMPRLVLY 230.0	0	0.0	1	1	1.2500
0.7500 vbus	24151	VALLEYSC 500.0	0	0.0	1	1	1.2500
0.7500 vbus	24805	DEVERS 115.0	0	0.0	1	1	1.2500
0.7500 vbul	24229	VALLEY-S 115.0	0	0.0	1	1	1.2500

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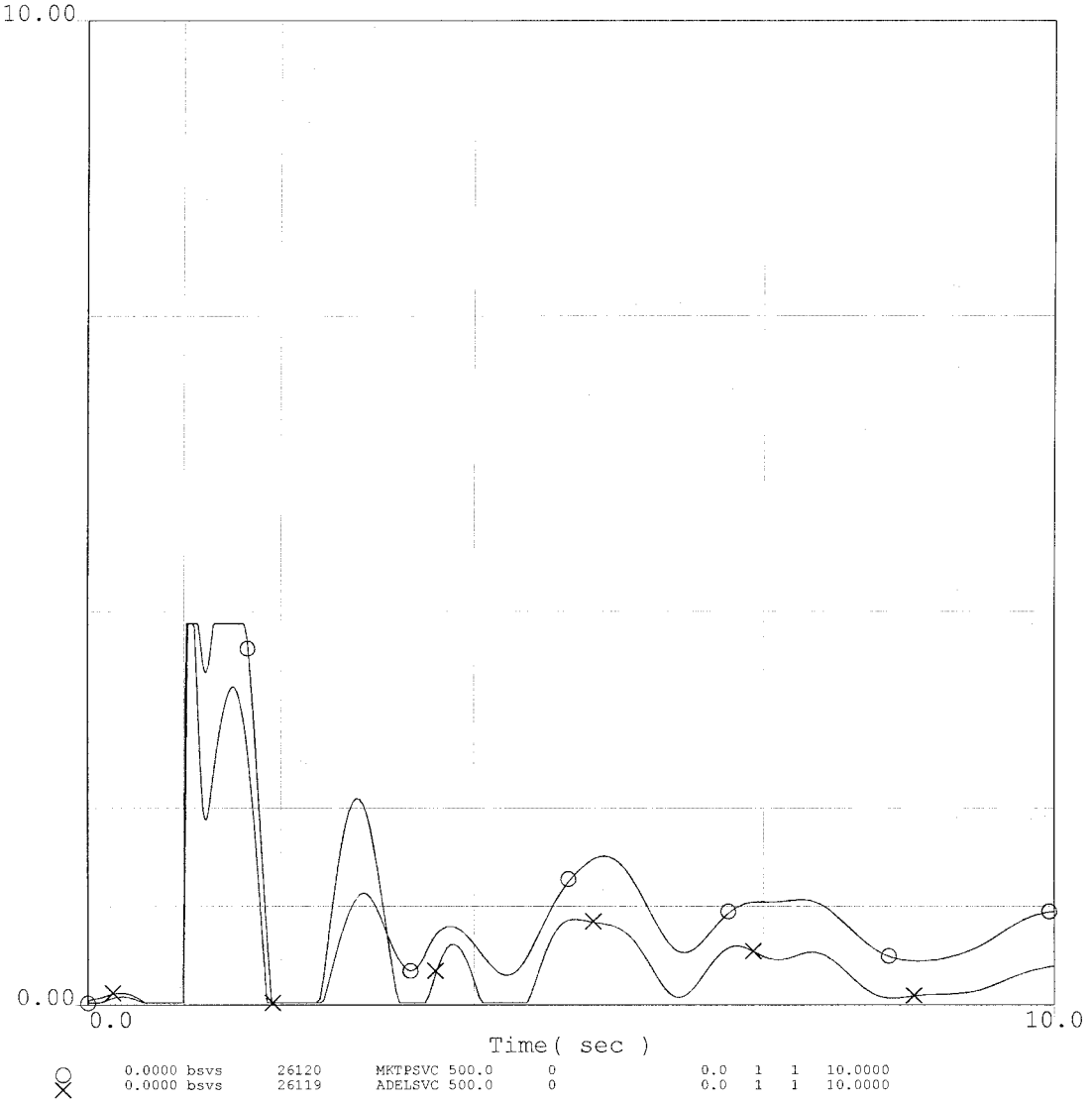
SVC_output



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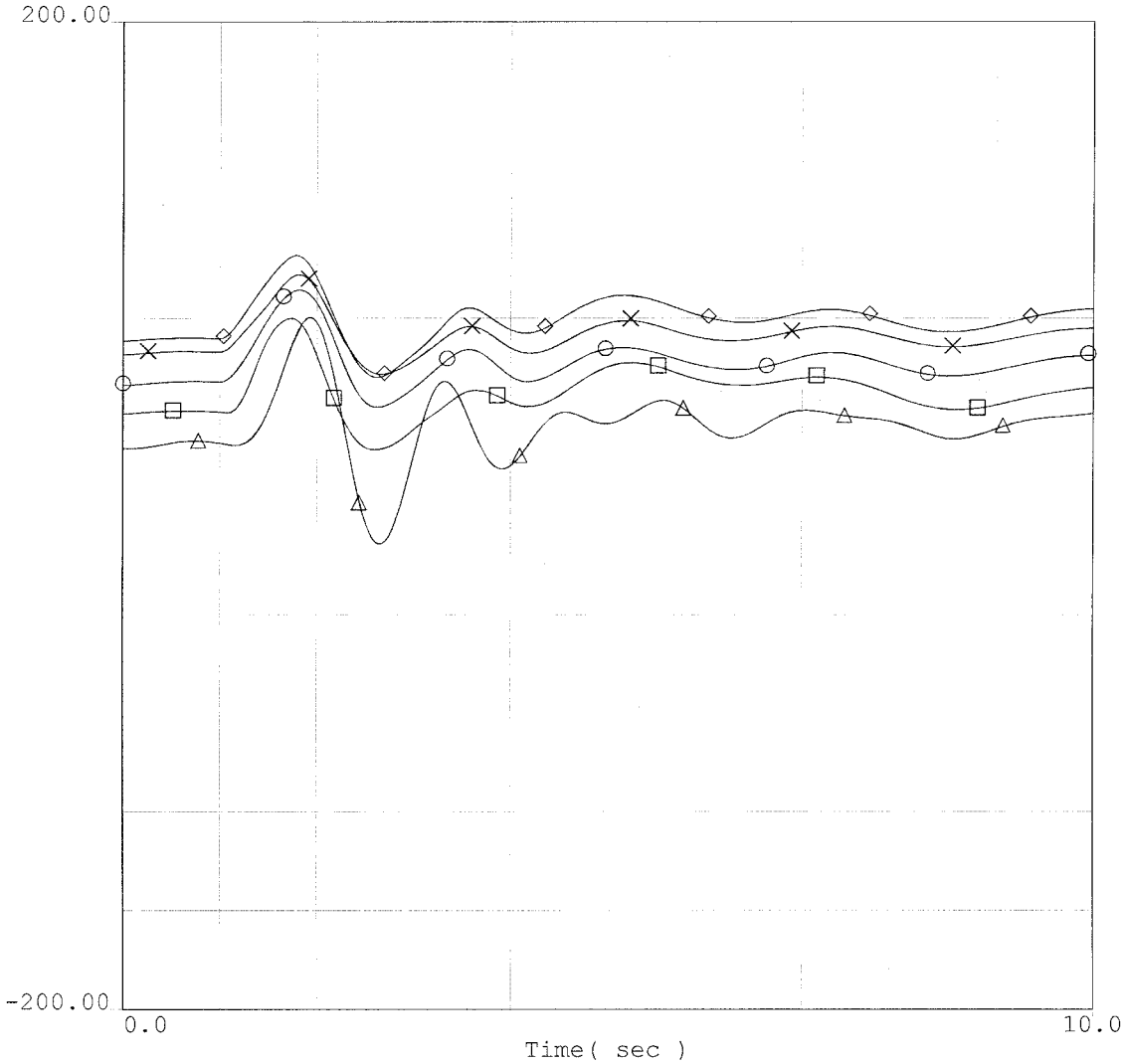
SYSTEM_Rotorangles



-200.0000 ang	16500	SPR GEN1	19.0	0	0.0	1	1	200.0000
-200.0000 ang	10321	SJUAN_G4	22.0	0	0.0	1	1	200.0000
-200.0000 ang	14942	SAGUARO2	15.5	0	0.0	1	1	200.0000
-200.0000 ang	17024	APACHCT1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	16518	SPR GEN3	21.0	0	0.0	1	1	200.0000

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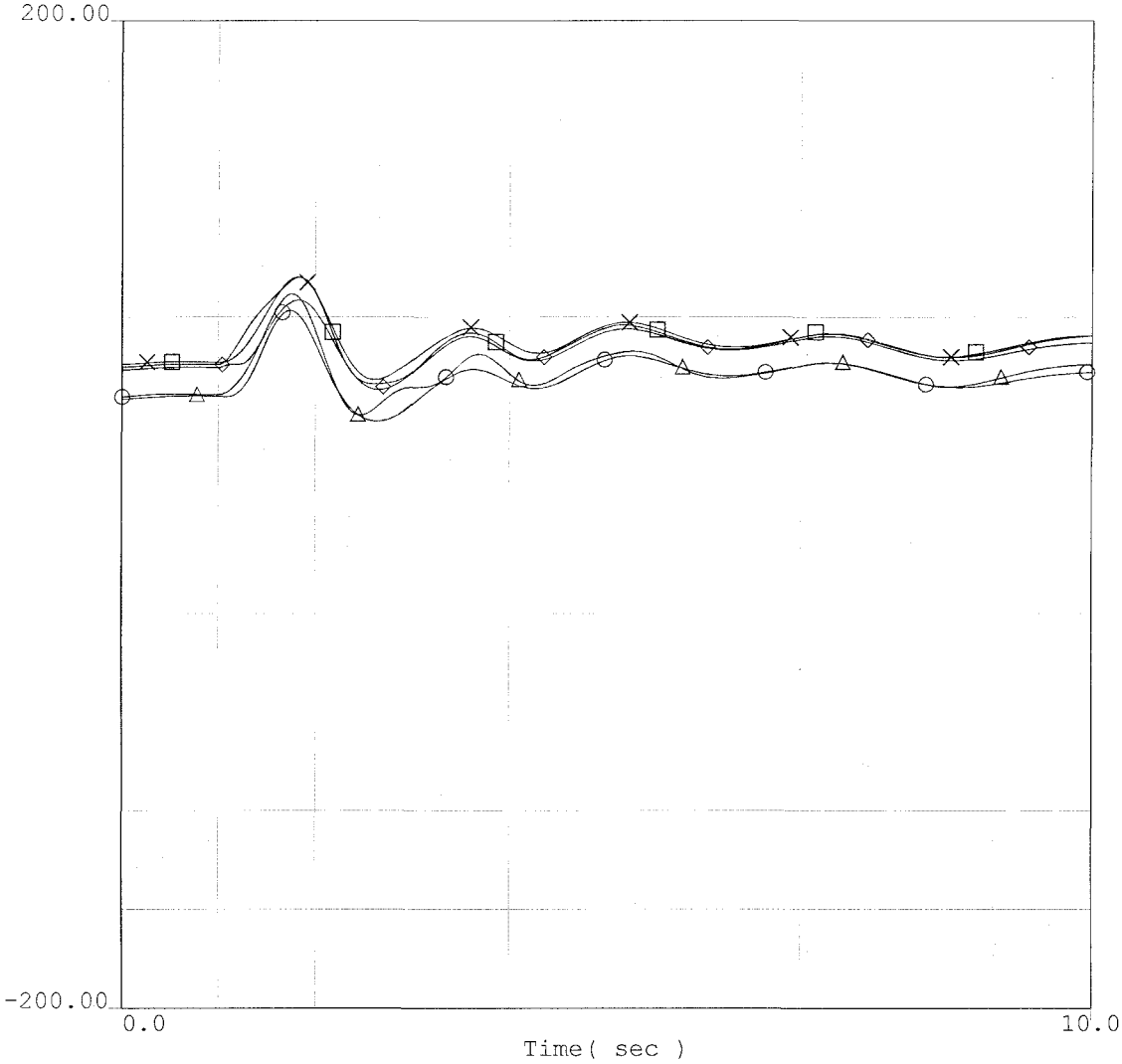
SYSTEM_Rotorangles



-200.0000 ang	15140	DBG-CT1	18.0	0	0.0	1	1	200.0000
-200.0000 ang	14945	SAG. CT3	13.8	0	0.0	1	1	200.0000
-200.0000 ang	14902	CHOLLA3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	15921	SANTAN 1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	14903	CHOLLA4	22.0	0	0.0	1	1	200.0000

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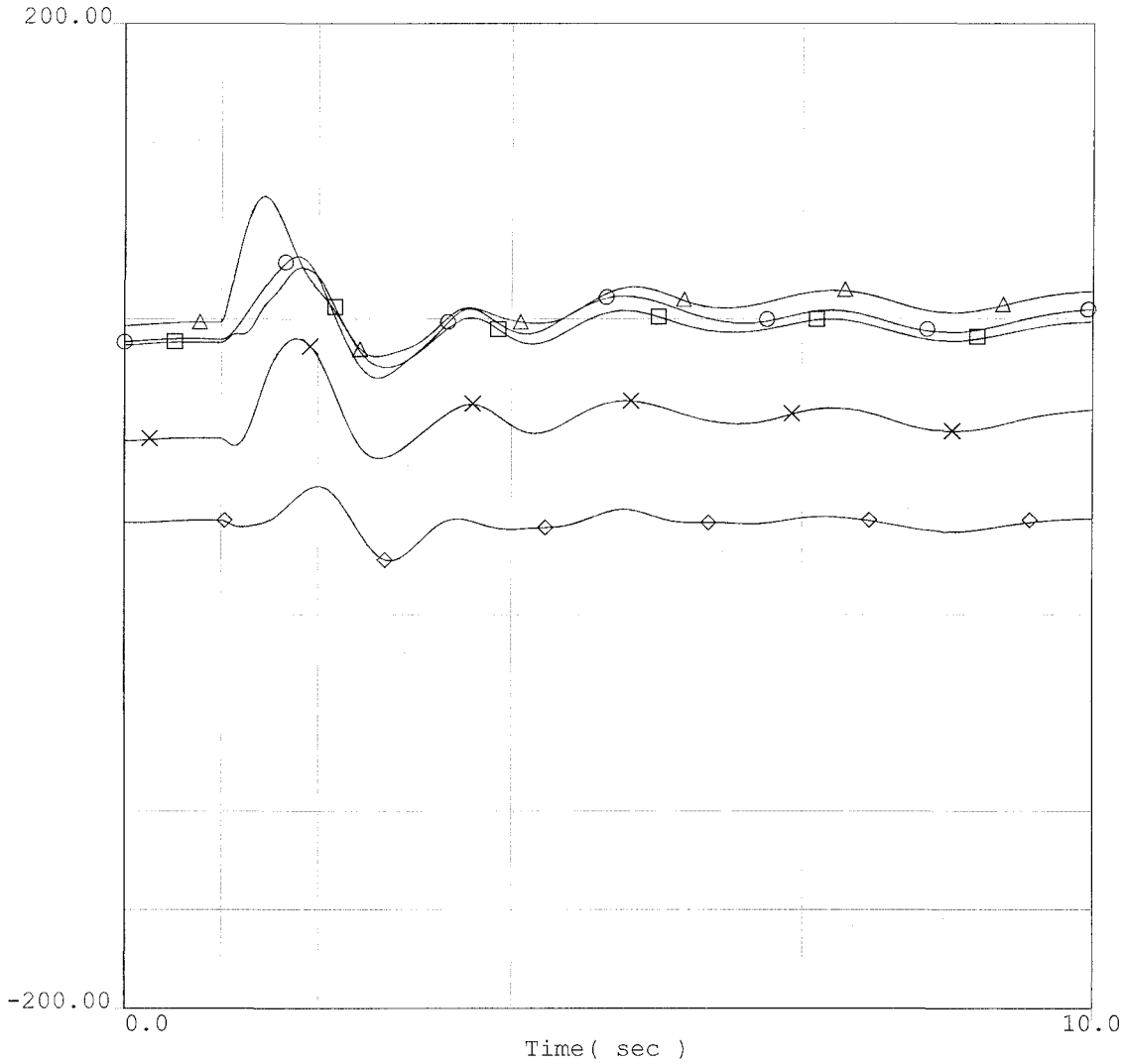
SYSTEM_Rotorangles



-200.0000 ang	16518	SPR GEN3	21.0	0	0.0	1	1	200.0000
-200.0000 ang	16503	SUNDTGE4	18.0	0	0.0	1	1	200.0000
-200.0000 ang	14914	FCNGN4CC	22.0	0	0.0	H	1	200.0000
-200.0000 ang	14931	PALOVRD1	24.0	0	0.0	1	1	200.0000
-200.0000 ang	24004	ALAMT4 G	18.0	0	0.0	H	1	200.0000

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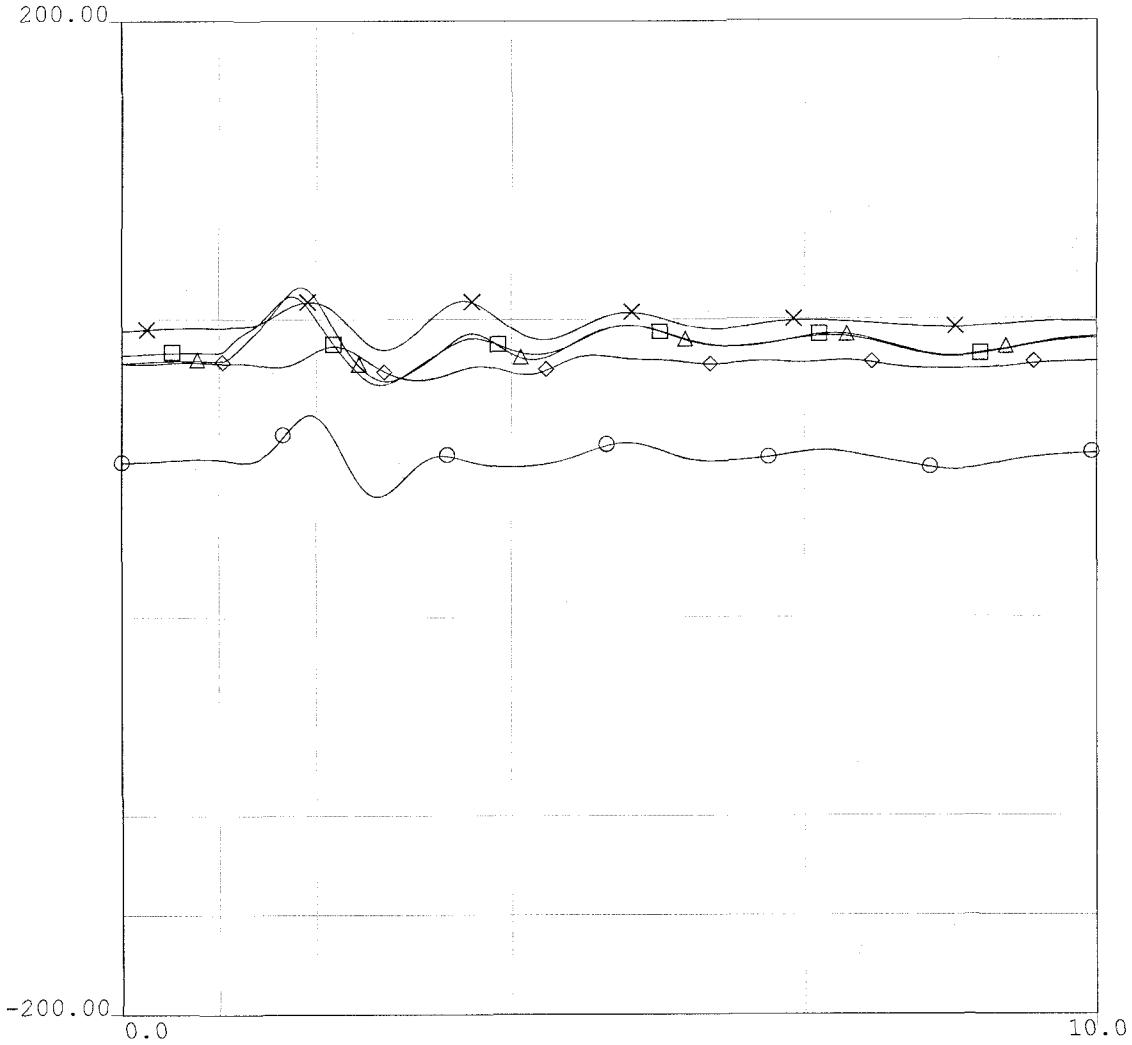
SYSTEM_Rotorangles



-200.0000 ang	24129	S.ONOFR2	22.0	0	0.0	1	1	200.0000
-200.0000 ang	26039	INTERM1G	26.0	0	0.0	1	1	200.0000
-200.0000 ang	15981	NAVAJO 1	26.0	0	0.0	1	1	200.0000
-200.0000 ang	10318	SJUAN_G1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	36411	DIABLO 1	25.0	0	0.0	1	1	200.0000

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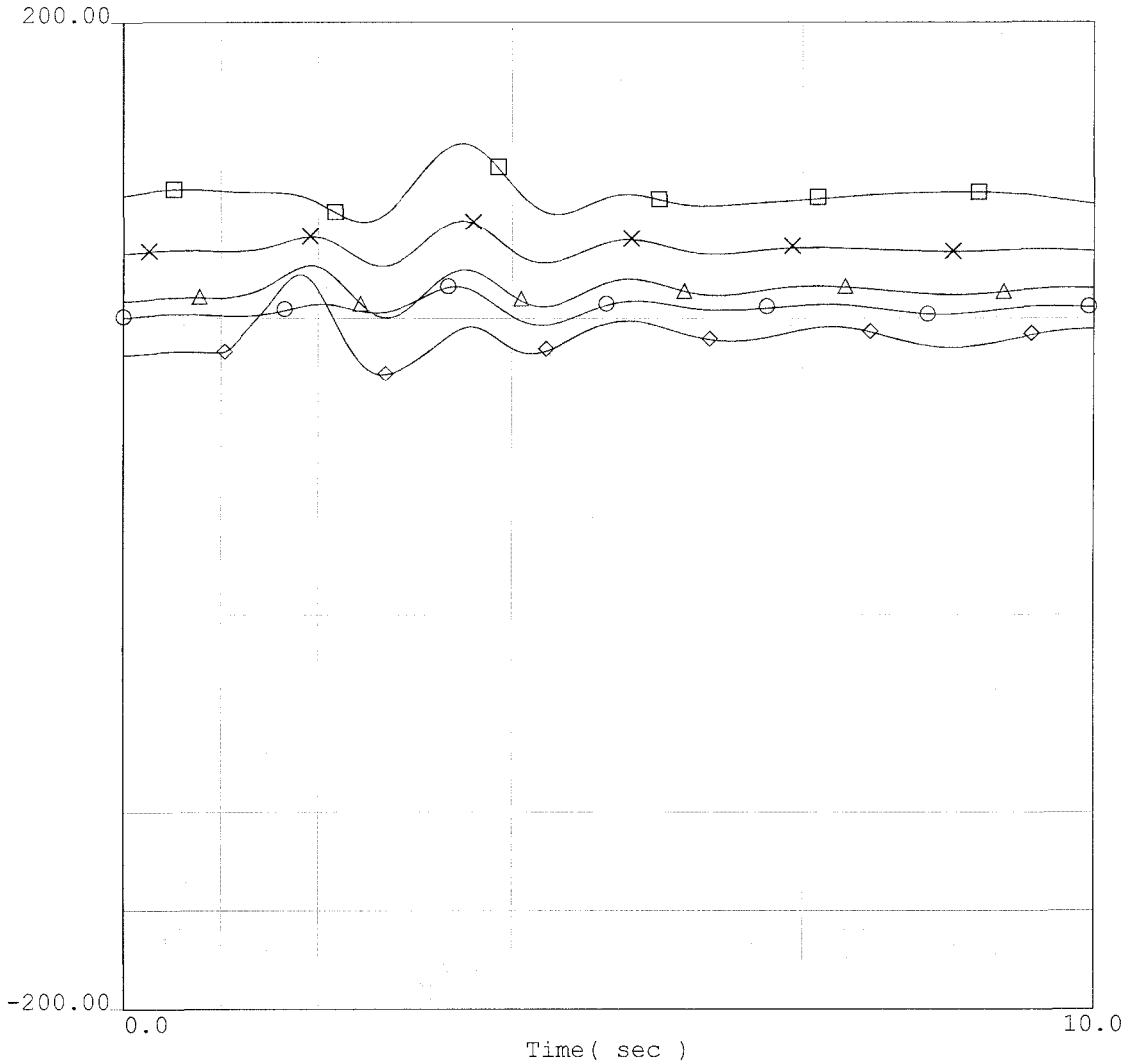
SYSTEM_Rotorangles



-200.0000 ang	73129	MBPP-1	24.0	0	0.0	1	1	200.0000
-200.0000 ang	60086	BRIDGER1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	62050	COLSTP 1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	65500	EHUNTR 3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	10321	SJUAN_G4	22.0	0	0.0	1	1	200.0000

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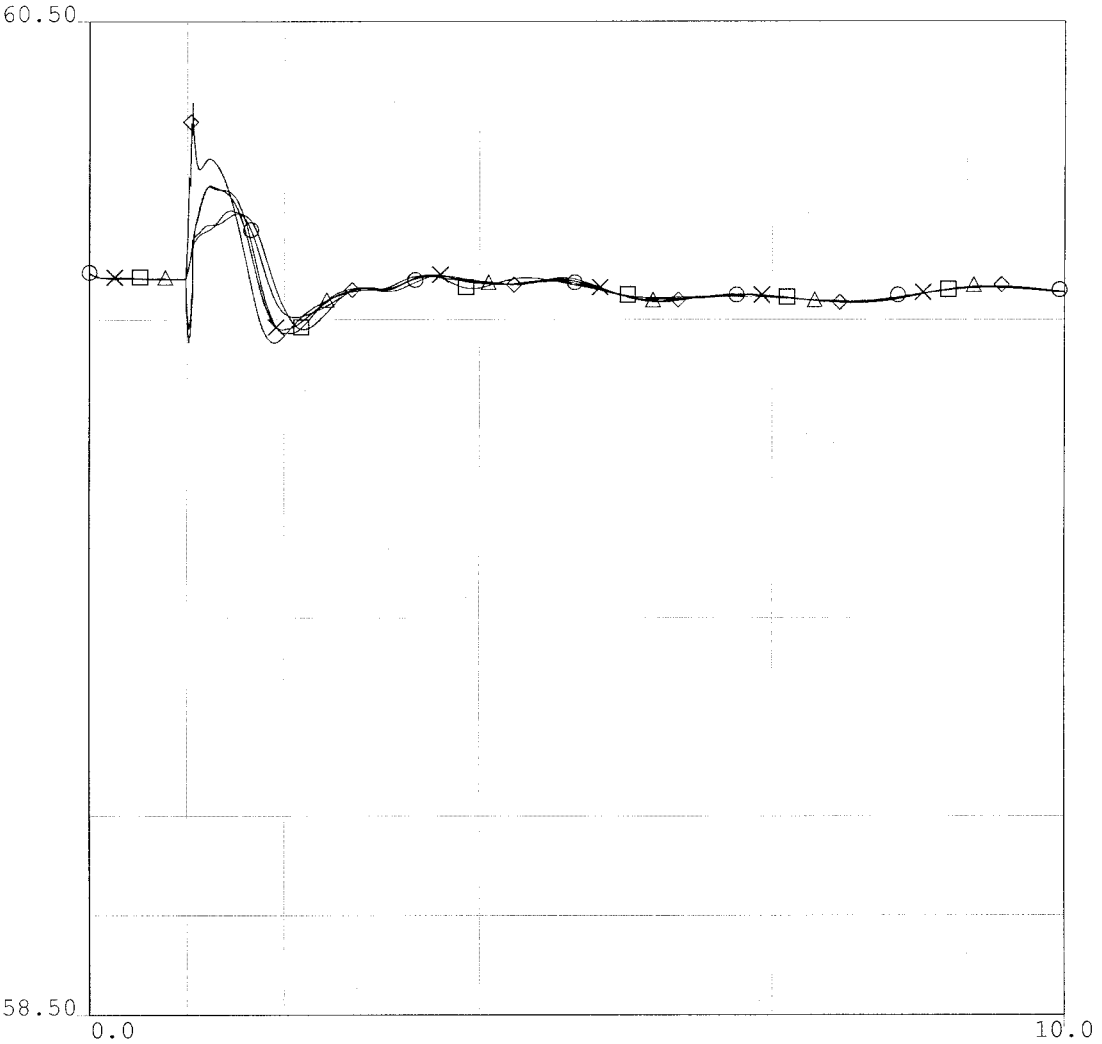
Frequencies:



○	58.5000	fbus	14003	NAVAJO 500.0	0	0.0	1	1	60.5000
⊠	58.5000	fbus	14005	WESTWING 500.0	0	0.0	1	1	60.5000
□	58.5000	fbus	14001	FOURCORN 500.0	0	0.0	1	1	60.5000
△	58.5000	fbus	14016	PNPKAPS 500.0	0	0.0	1	1	60.5000
◇	58.5000	fbus	15021	PALOVRDE 500.0	0	0.0	1	1	60.5000

2014HS-UFSAR01:THREE PHASE FAULT ON THE PALO VERDE-DEVERS 500KV LINE
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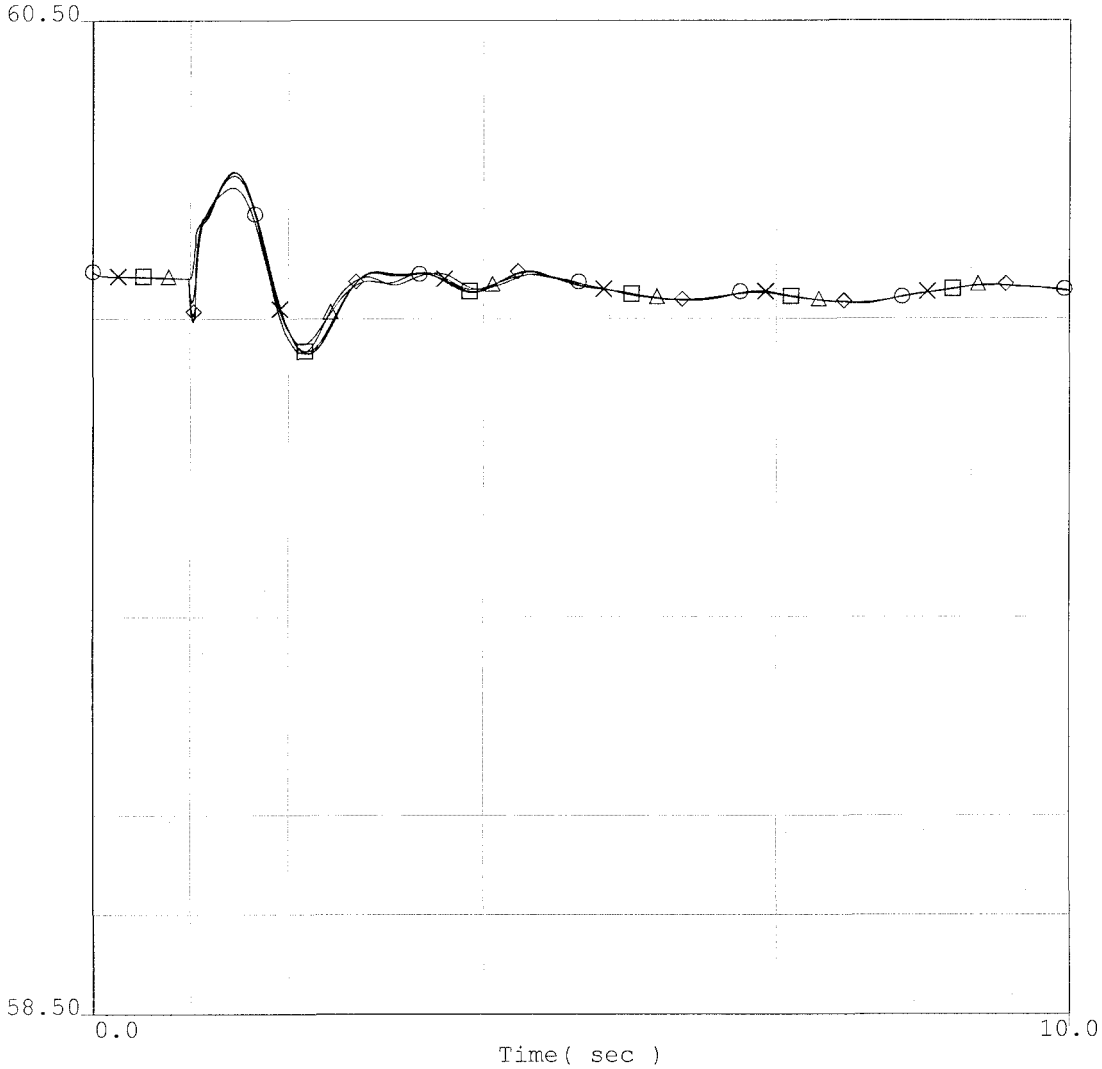
Frequencies:



○	58.5000 fbus	16000	TORTOLIT 500.0	0	0.0	1	1	60.5000
⊠	58.5000 fbus	16105	VAIL 345.0	0	0.0	1	1	60.5000
□	58.5000 fbus	16103	SOUTH 345.0	0	0.0	1	1	60.5000
△	58.5000 fbul	15001	CORONADO 500.0	0	0.0	1	1	60.5000
◇	58.5000 fbus	16109	WINCHSTR 345.0	0	0.0	1	1	60.5000

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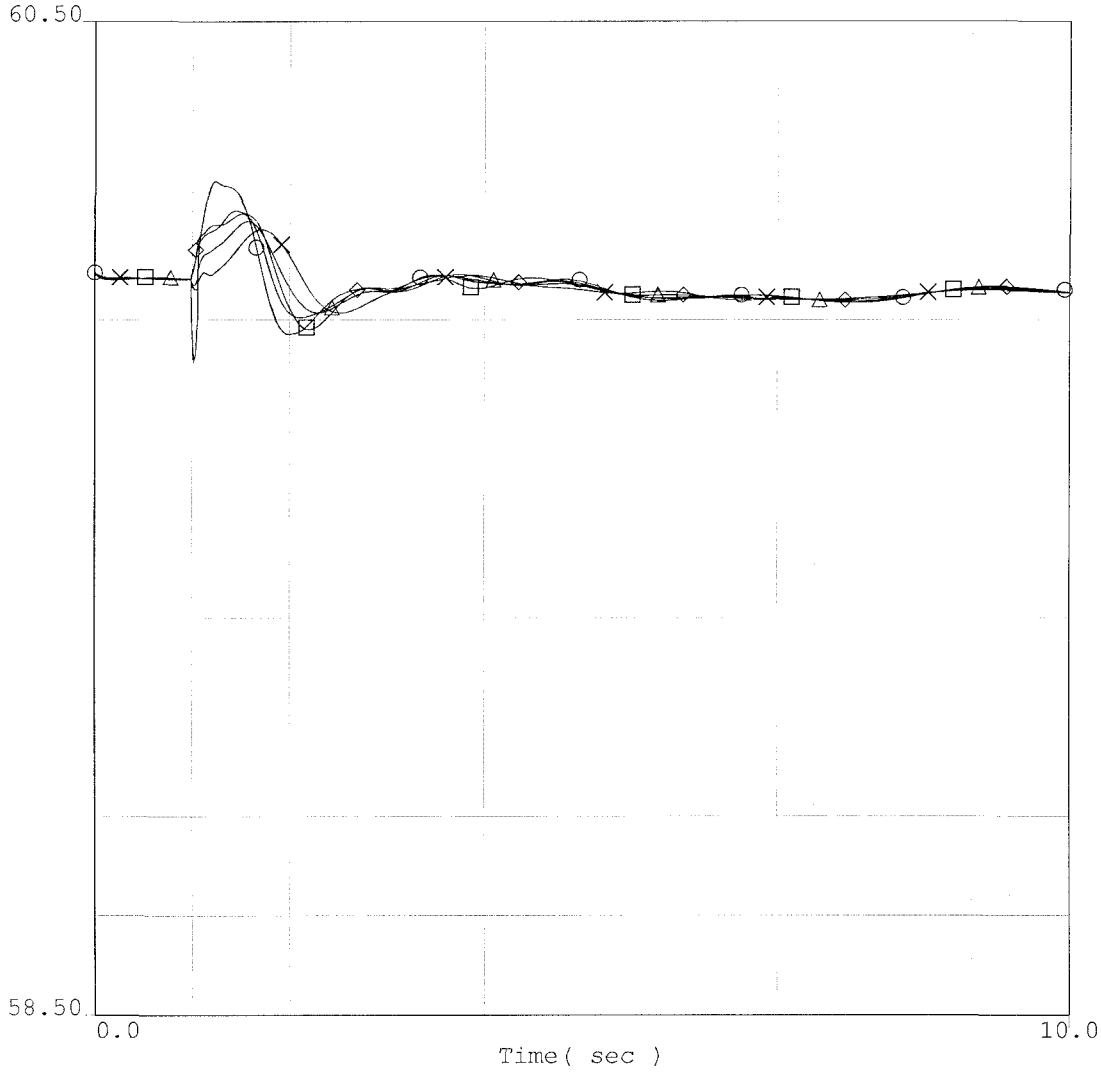
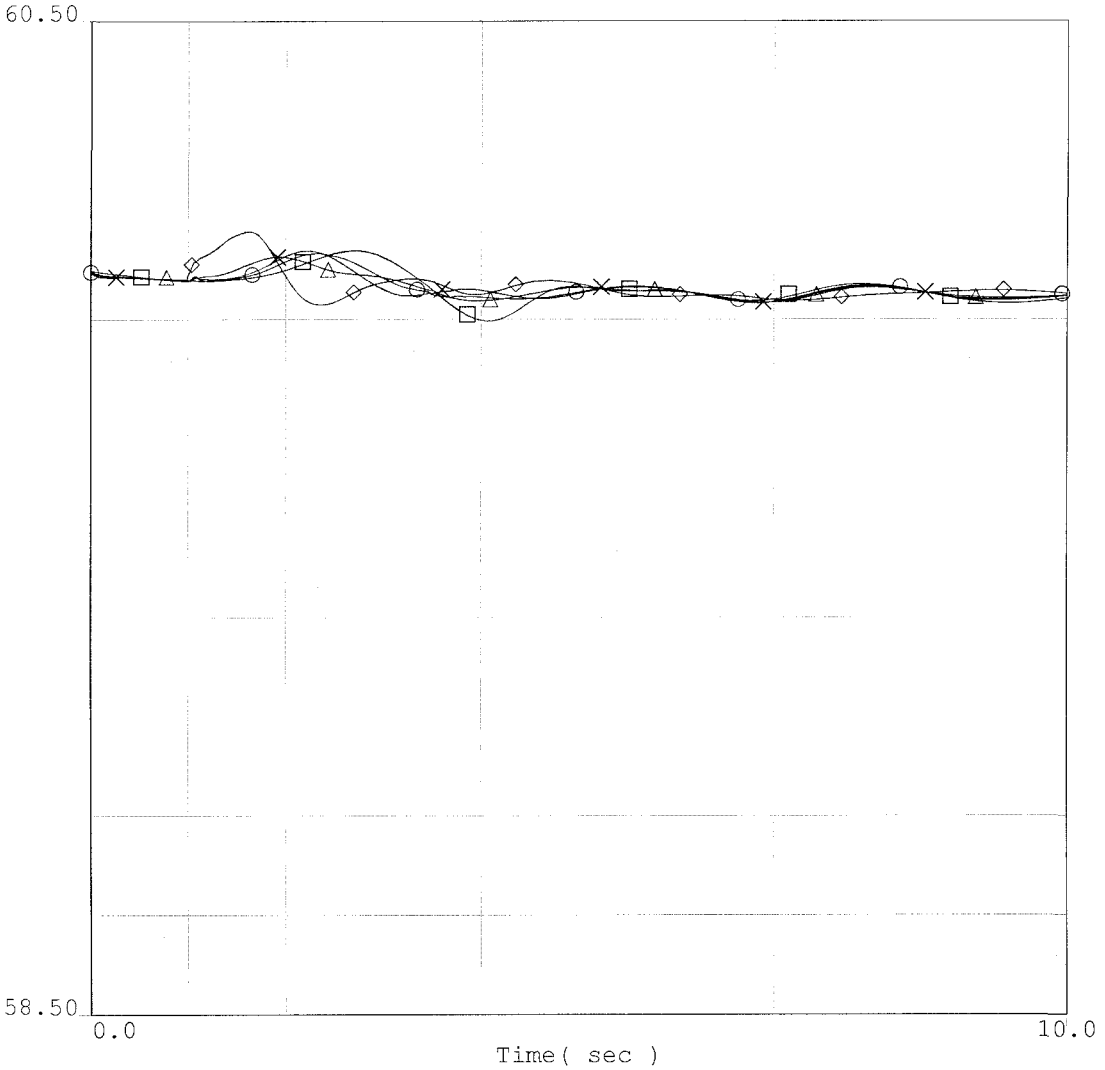
Frequencies:



58.5000	fbul	14231	WESTWNGW 230.0	0	0.0	1	1	60.5000
58.5000	fbus	26003	ADELANTO 500.0	0	0.0	1	1	60.5000
58.5000	fbus	14001	FOURCORN 500.0	0	0.0	1	1	60.5000
58.5000	fbus	26048	MCCULLGH 500.0	0	0.0	1	1	60.5000
58.5000	fbus	14003	NAVAJO 500.0	0	0.0	1	1	60.5000

2014HS-UFSAR01:THREE PHASE FAULT ON THE PALO VERDE-DEVERS 500KV LINE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/3/11)

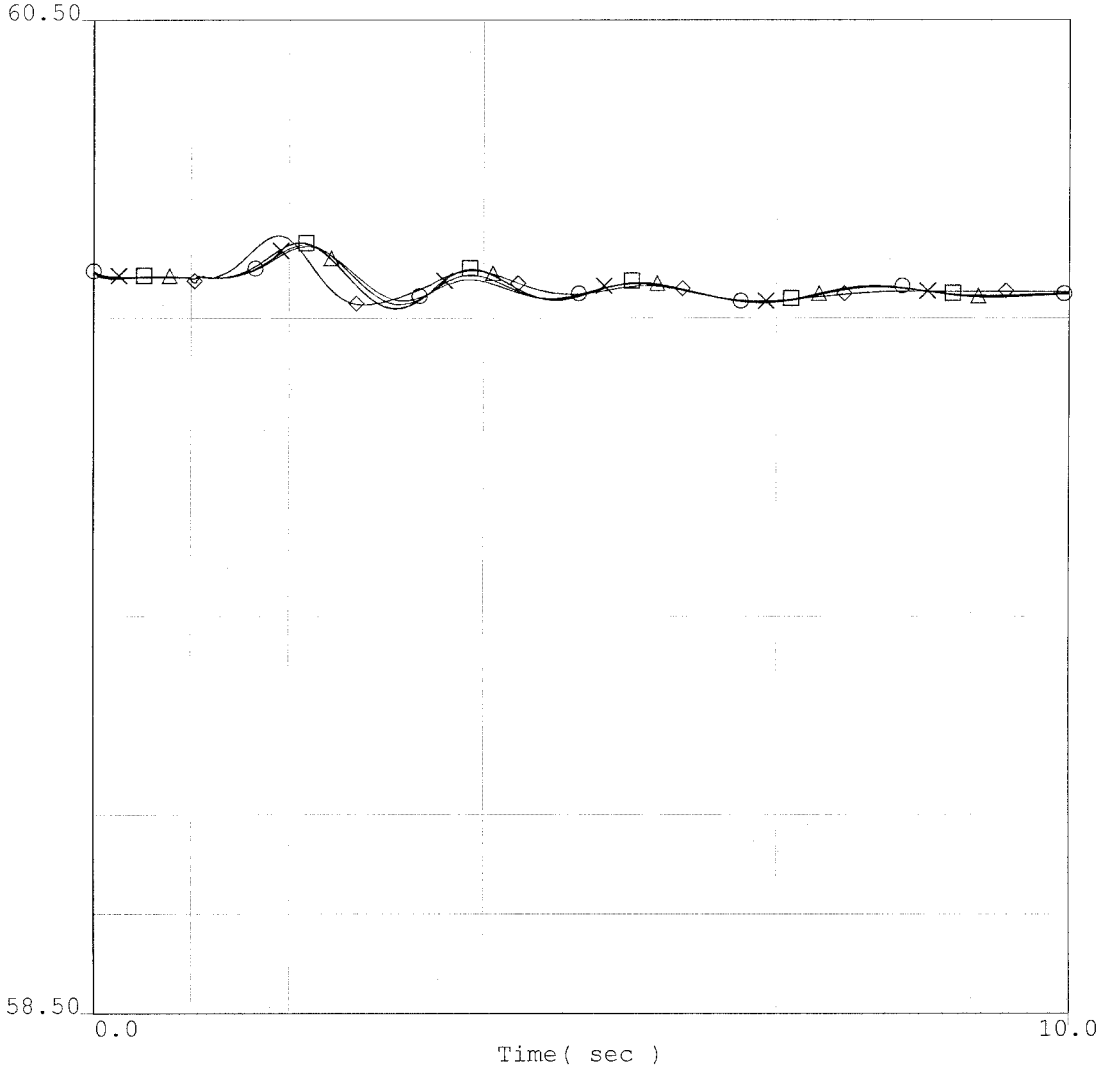
Frequencies:



58.5000	fbus	40489	GRIZZLY 500.0	0	0.0	1	1	60.5000
58.5000	fbus	40687	MALIN 500.0	0	0.0	1	1	60.5000
58.5000	fbus	40459	GARRISON 500.0	0	0.0	1	1	60.5000
58.5000	fbus	60235	MIDPOINT 345.0	0	0.0	1	1	60.5000
58.5000	fbus	66230	PINTO 138.0	0	0.0	1	1	60.5000

2014HS-UFSAR01:THREE PHASE FAULT ON THE PALO VERDE-DEVERS 500KV LINE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/3/11)

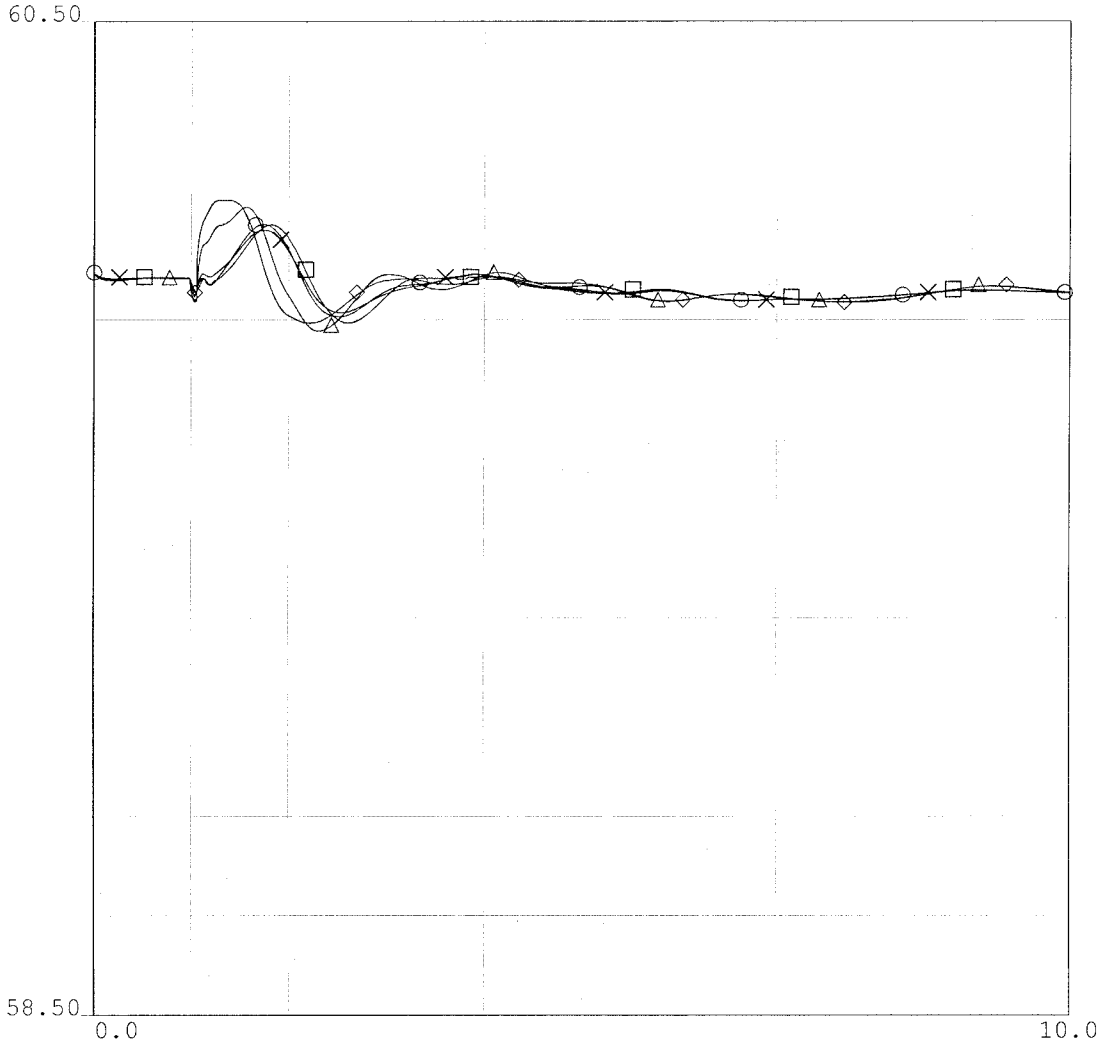
Frequencies:



58.5000 fbus	30005	ROUND MT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30015	TABLE MT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30035	TRACY 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30040	TESLA 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30060	MIDWAY 500.0	0	0.0	1	1	60.5000

2014HS-UFSAR01:THREE PHASE FAULT ON THE PALO VERDE-DEVERS 500KV LINE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/3/11)

Frequencies:



58.5000	fbus	24801	DEVERS 500.0	0	0.0	1	1	60.5000
58.5000	fbus	24086	LUGO 500.0	0	0.0	1	1	60.5000
58.5000	fbus	26094	SYLMARLA 230.0	0	0.0	1	1	60.5000
58.5000	fbus	22468	MIGUEL 500.0	0	0.0	1	1	60.5000
58.5000	fbus	22536	N.GILA 500.0	0	0.0	1	1	60.5000

2014HS-UFSAR01:THREE PHASE FAULT ON THE PALO VERDE-DEVERS 500KV LINE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/3/11)

HIGHEST VOLTAGE DIP

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct	@time
14	RUDD	69	vbul	0.995	0.879	11.6	1.517
22	N.GILA	500	vbus	1.034	0.879	15	1.517
22	CARLTNHS	138	vbug	0.965	0.901	6.6	1.517

LOWEST FREQUENCY

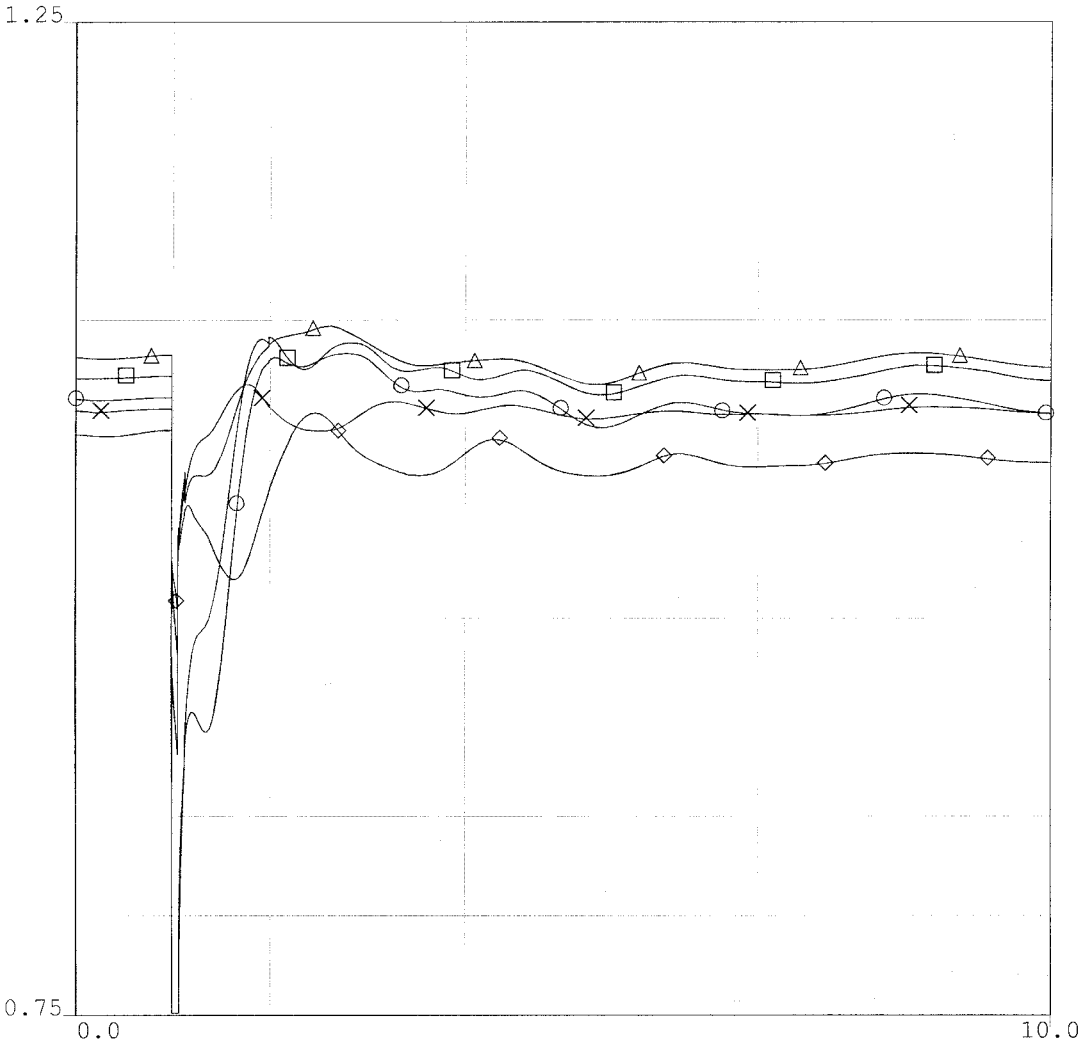
AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
14	WHITETNK	69	fbul	59.486	1.046
14	Q1COL1	34.5	fbus	58.45	1.046
14	WPHX GT2	13.8	fbug	59.757	2

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

There were 0 violations of MORC criteria 1 (25% Voltage Dip) !
There were 0 violations of MORC criteria 2 (20% Voltage Dip for 20 Cycles)!
There were 0 violations of MORC criteria 3 (59.6 HZ for 6 Cycles)!

ARIZONA_voltages:



0.7500 vbus	15021	PALOVRDE 500.0	0	0.0	1	1	1.2500
0.7500 vbus	14001	FOURCORN 500.0	0	0.0	1	1	1.2500
0.7500 vbus	15011	KYRENE 500.0	0	0.0	1	1	1.2500
0.7500 vbus	14003	NAVAJO 500.0	0	0.0	1	1	1.2500
0.7500 vbus	26003	ADELANTO 500.0	0	0.0	1	1	1.2500

2014HS-UFSAR02:THREE PHASE FAULT ON THE HASSAYAMPA-N.GILA 500KV LINE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/3/11)

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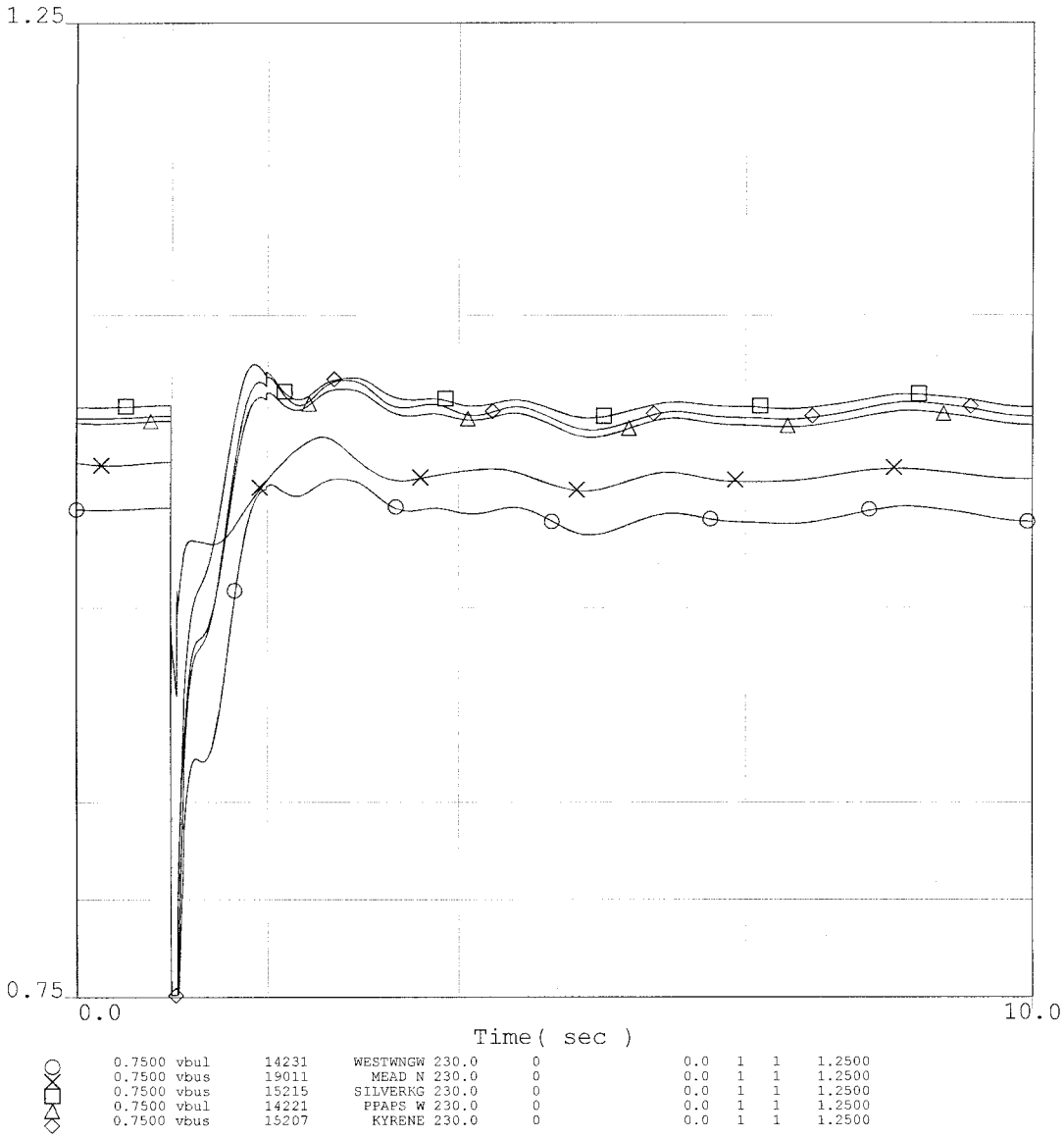
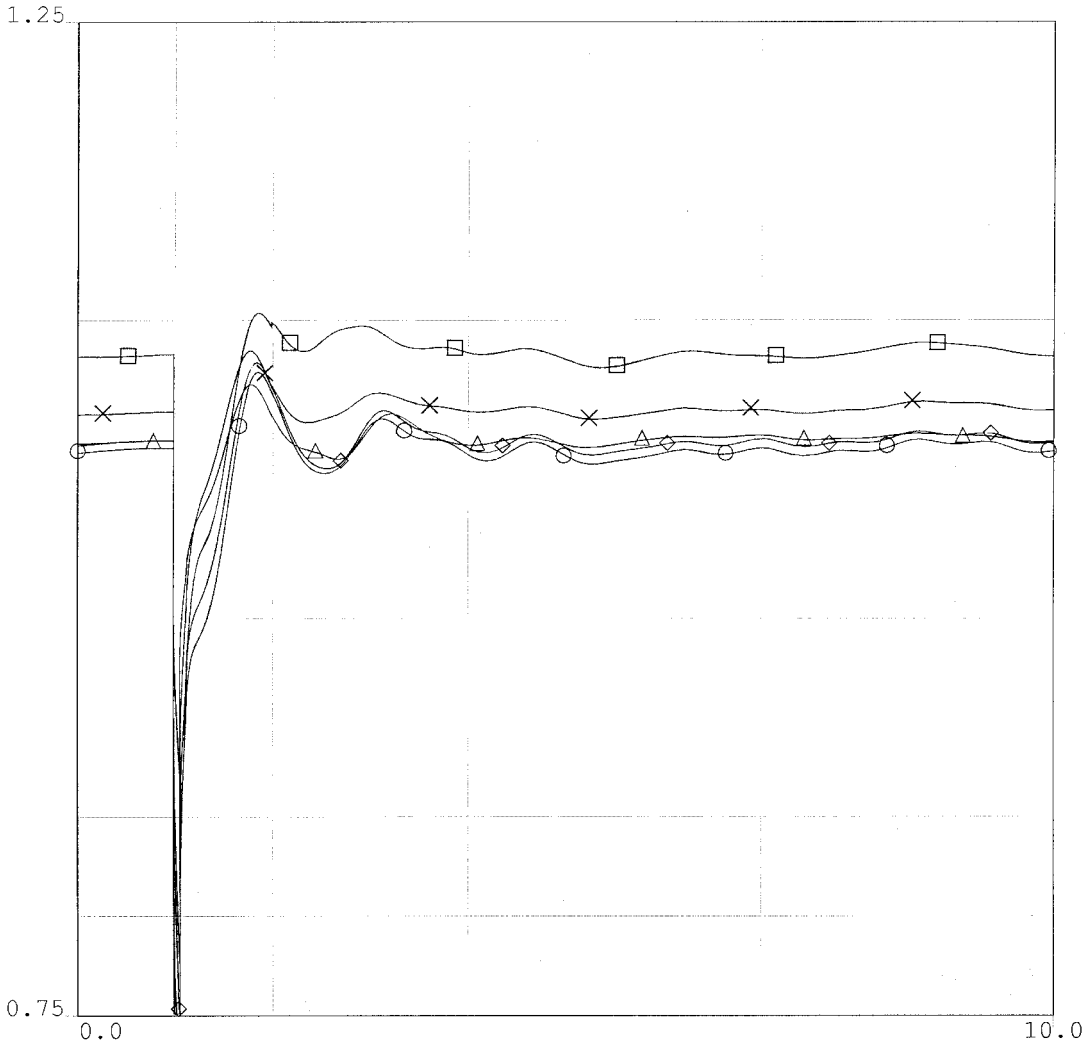
Sun Apr 03 17:20:39 2011

ARIZONA_voltages:



2014HS-UFSAR02:THREE PHASE FAULT ON THE HASSAYAMPA-N.GILA 500KV LINE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/3/11)

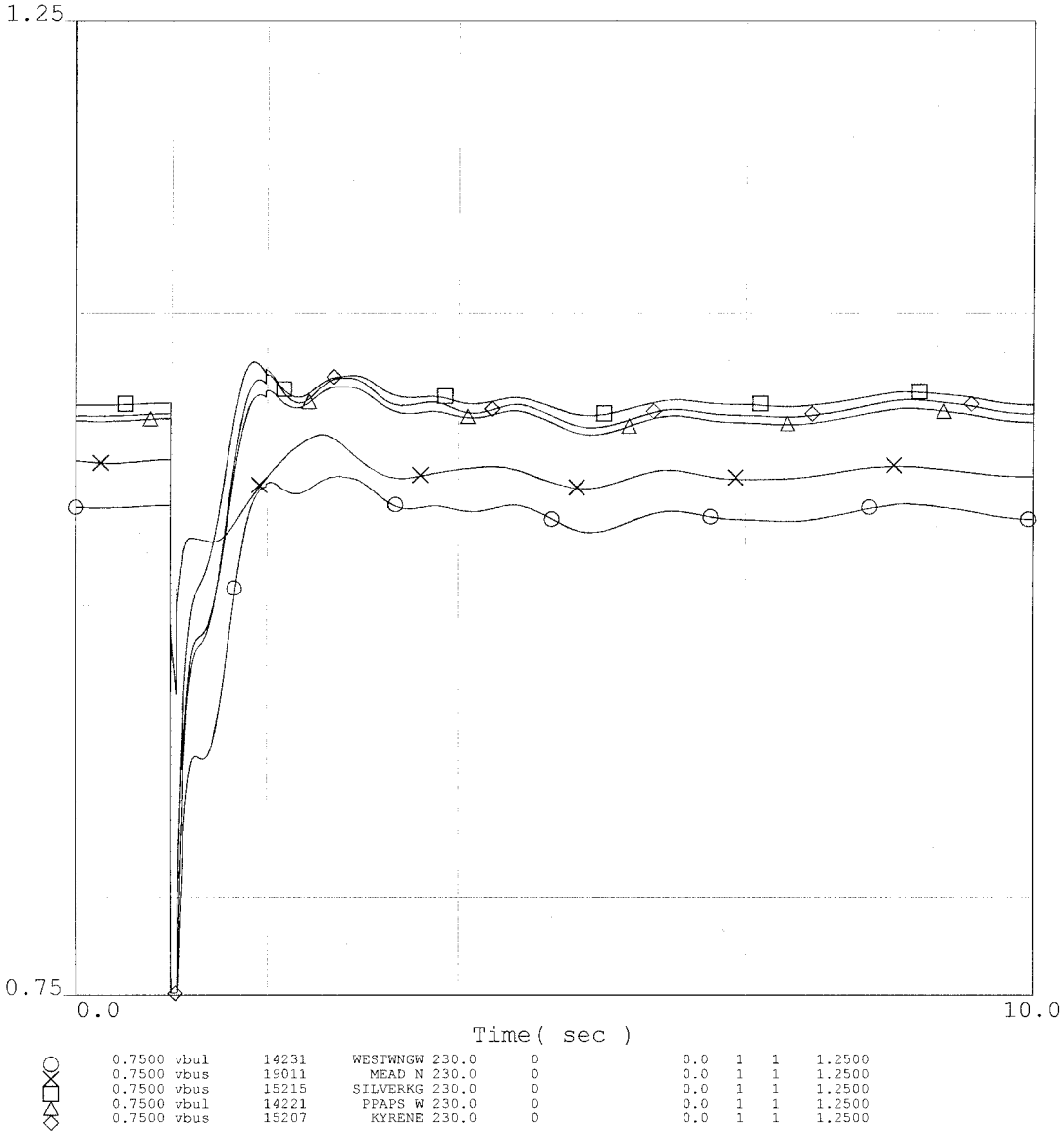
ARIZONA_voltages:



○	0.7500 vbus	16103	SOUTH 345.0	0	0.0	1	1	1.2500
⊠	0.7500 vbus	14000	CHOLLA 500.0	0	0.0	1	1	1.2500
□	0.7500 vbus	15041	SILVERKG 500.0	0	0.0	1	1	1.2500
△	0.7500 vbus	16104	SPRINGR 345.0	0	0.0	1	1	1.2500
◇	0.7500 vbus	16109	WINCHSTR 345.0	0	0.0	1	1	1.2500

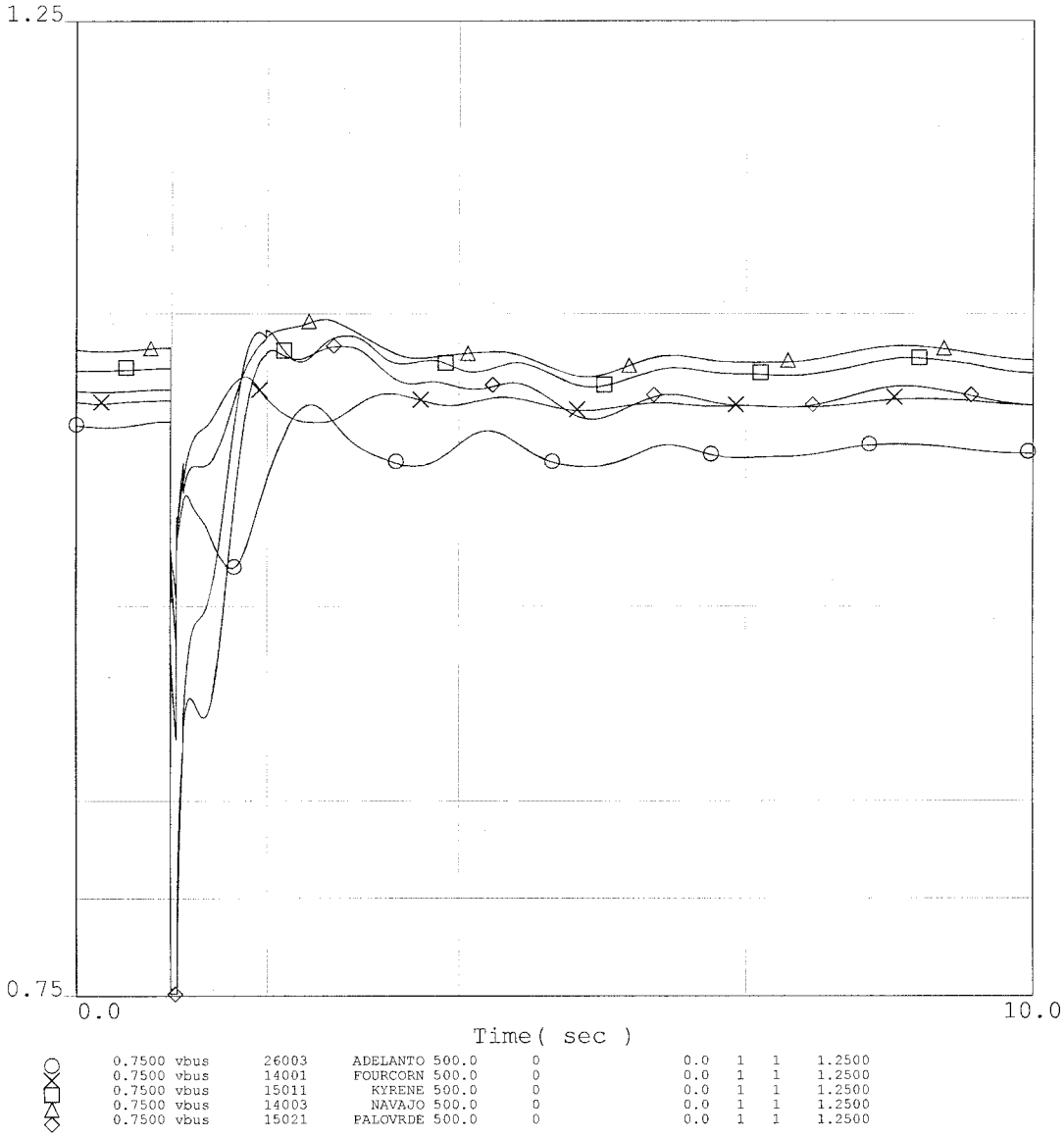
2014HS-UFSAR02:THREE PHASE FAULT ON THE HASSAYAMPA-N.GILA 500KV LINE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/3/11)

ARIZONA_voltages:



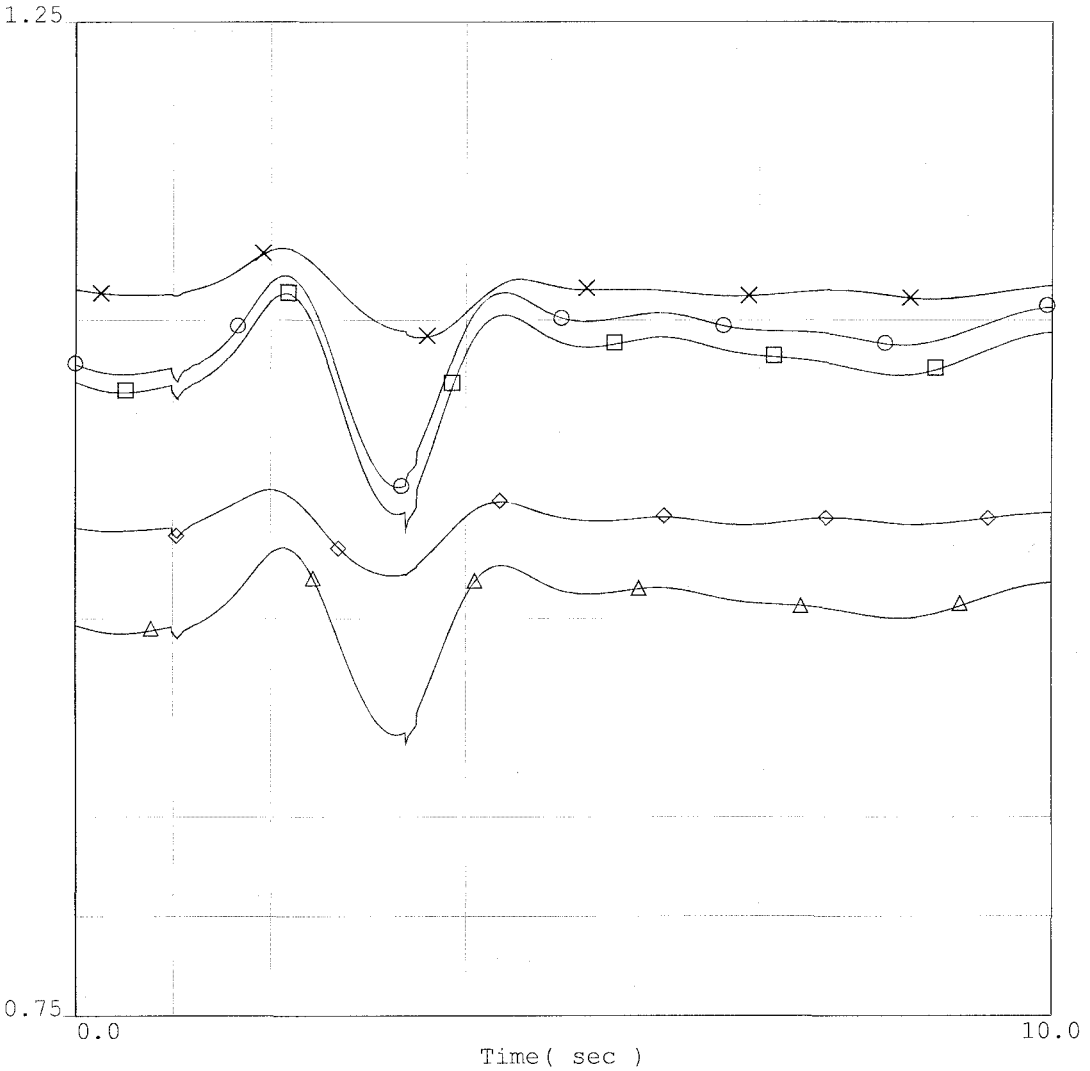
2014HS-UFSAR02:THREE PHASE FAULT ON THE HASSAYAMPA-N.GILA 500KV LINE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/3/11)

ARIZONA_voltages:



2014HS-UFSAR02:THREE PHASE FAULT ON THE HASSAYAMPA-N.GILA 500KV LINE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/3/11)

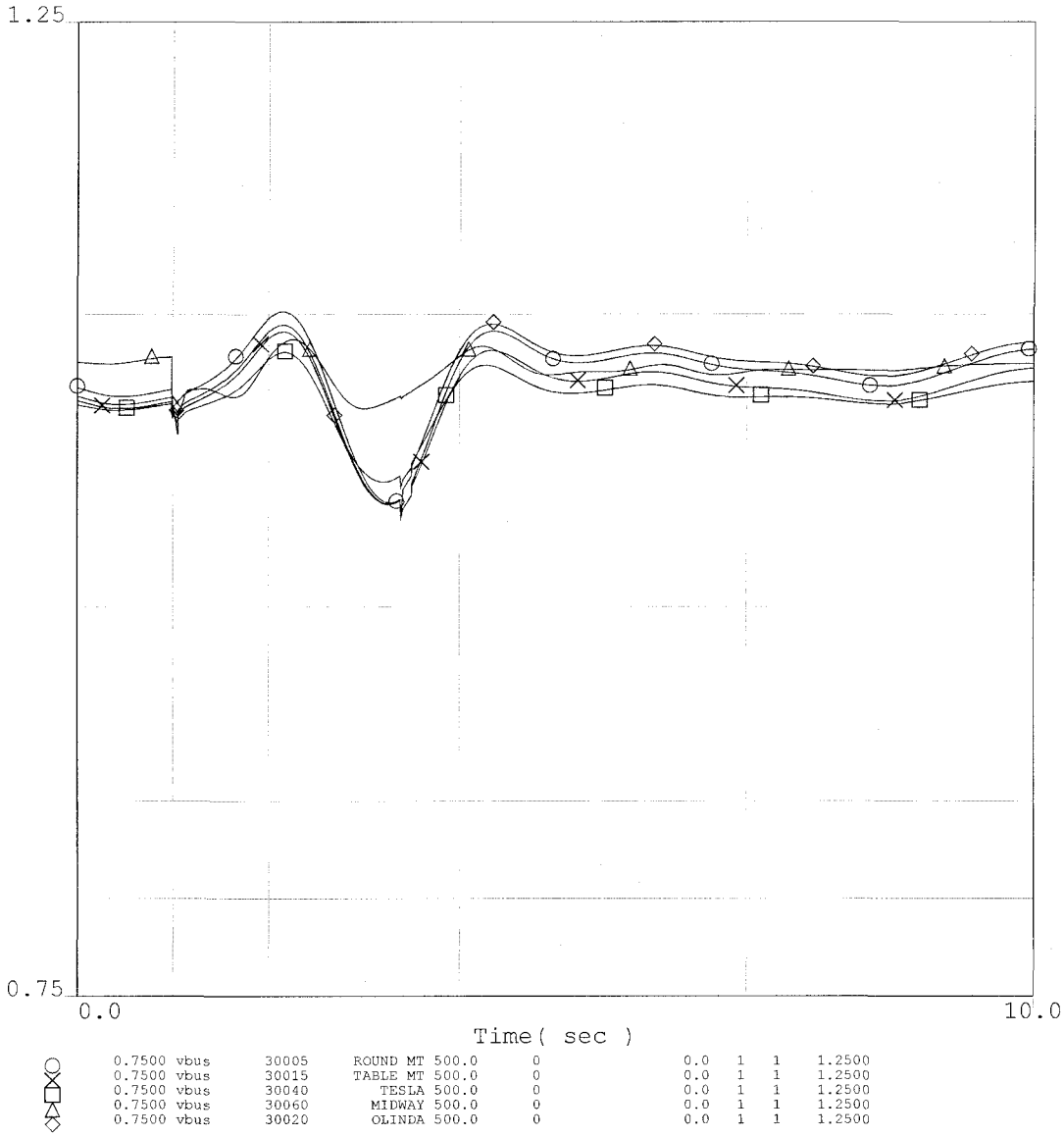
NORTHWEST_voltages:



0.7500 vbus	40489	GRIZZLY 500.0	0	0.0	1	1	1.2500
0.7500 vbus	40459	GARRISON 500.0	0	0.0	1	1	1.2500
0.7500 vbus	40687	MALIN 500.0	0	0.0	1	1	1.2500
0.7500 vbul	45215	NEWELL 69.0	0	0.0	1	1	1.2500
0.7500 vbus	60235	MIDPOINT 345.0	0	0.0	1	1	1.2500

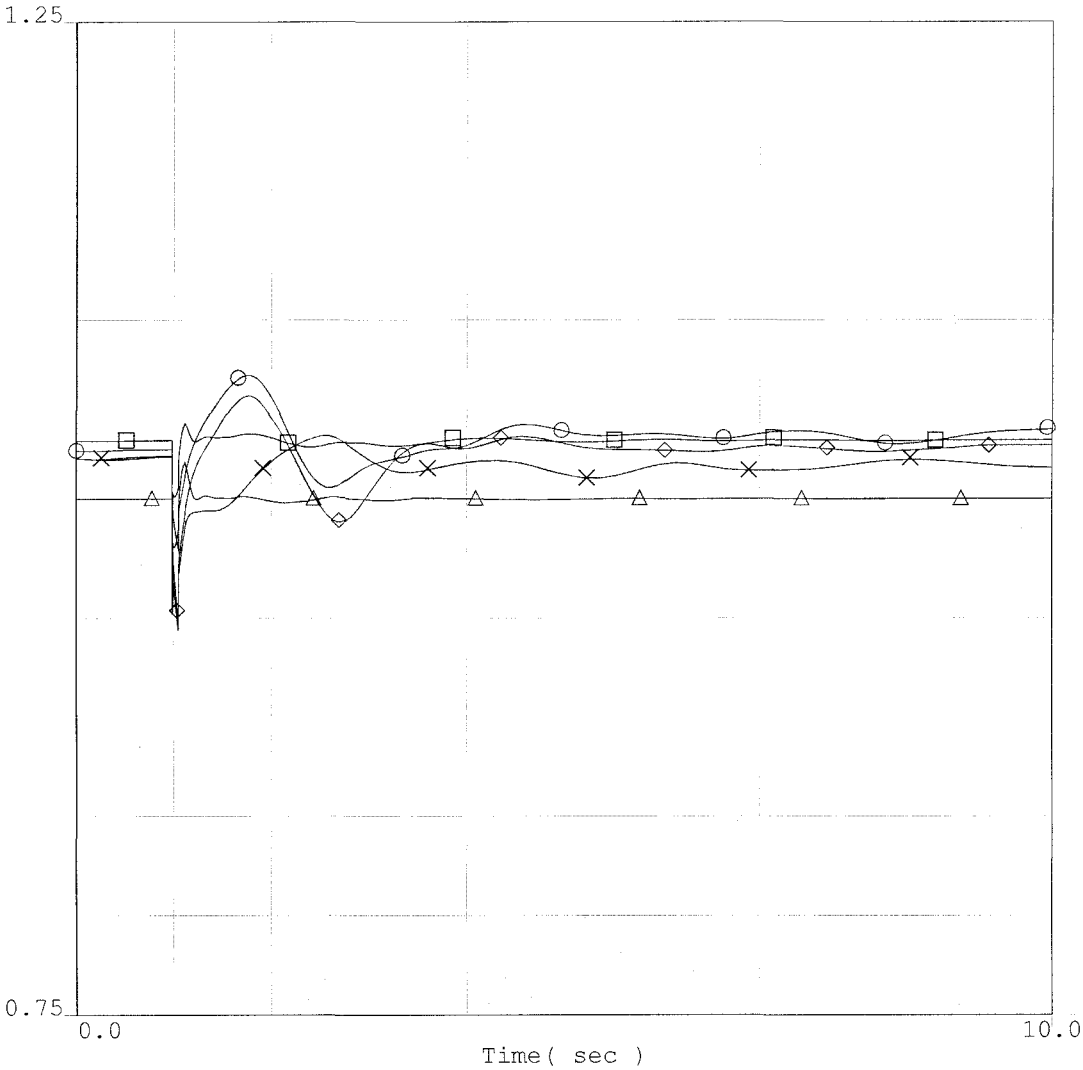
2014HS-UFSAR02:THREE PHASE FAULT ON THE HASSAYAMPA-N.GILA 500KV LINE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/3/11)

CALIFORNIA_voltages:



2014HS-UFSAR02:THREE PHASE FAULT ON THE HASSAYAMPA-N.GILA 500KV LINE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/3/11)

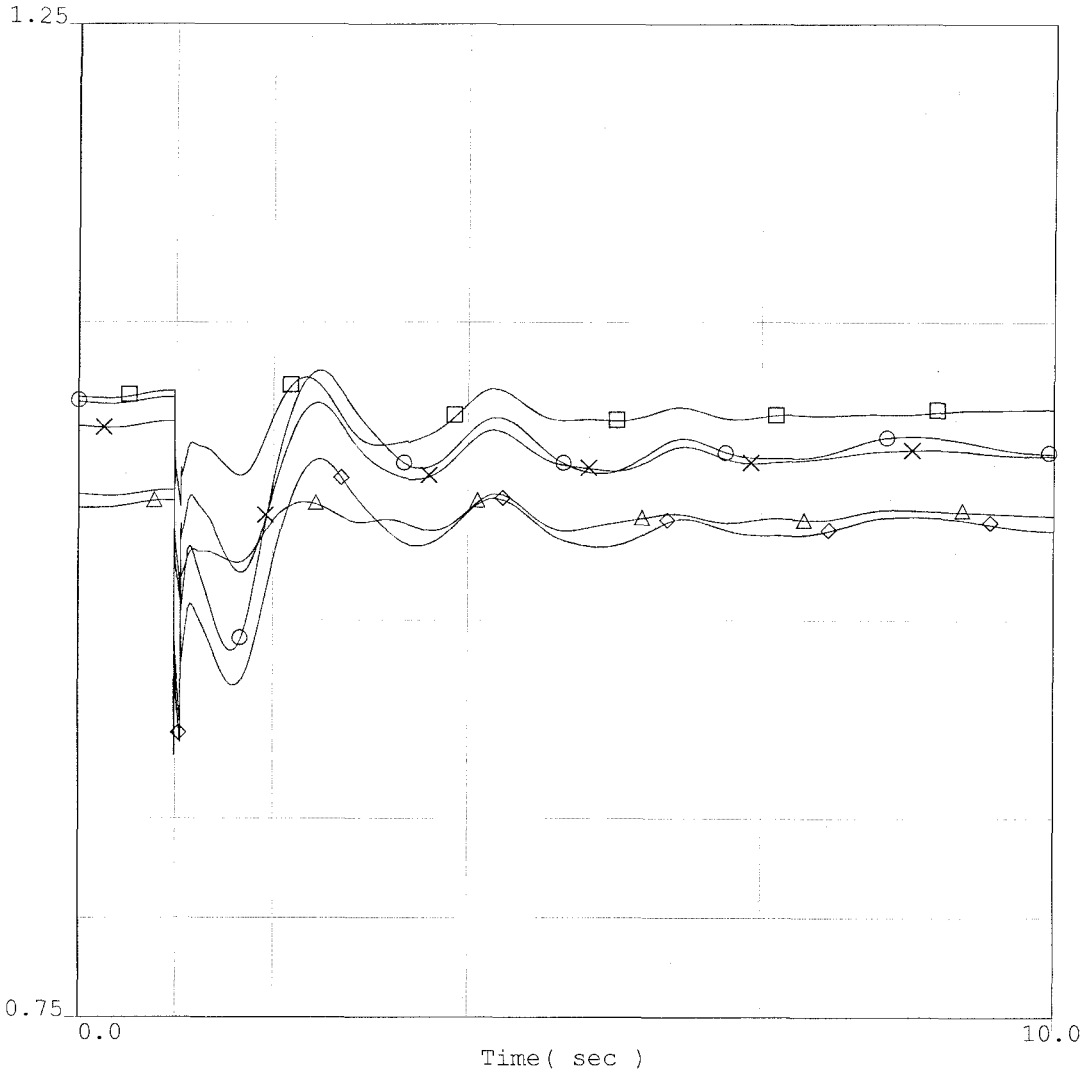
UTAH_voltages:



0.7500 vbus	66230	PINTO 138.0	0	0.0	1	1	1.2500
0.7500 vbus	18019	H ALLEN 230.0	0	0.0	1	1	1.2500
0.7500 vbus	66280	REDBUTTE 345.0	0	0.0	1	1	1.2500
0.7500 vbus	66420	SGSY 138.0	0	0.0	1	1	1.2500
0.7500 vbus	79023	DURANGO 115.0	0	0.0	1	1	1.2500

2014HS-UFSAR02:THREE PHASE FAULT ON THE HASSAYAMPA-N.GILA 500KV LINE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/3/11)

CALIFORNIA_voltages:



0.7500	vbus	24801	DEVERS 500.0	0	0.0	1	1	1.2500
0.7500	vbus	24086	LUGO 500.0	0	0.0	1	1	1.2500
0.7500	vbus	24156	VINCENT 500.0	0	0.0	1	1	1.2500
0.7500	vbus	26094	SYLMARLA 230.0	0	0.0	1	1	1.2500
0.7500	vbus	24804	DEVERS 230.0	0	0.0	1	1	1.2500

2014HS-UFSAR02:THREE PHASE FAULT ON THE HASSAYAMPA-N.GILA 500KV LINE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
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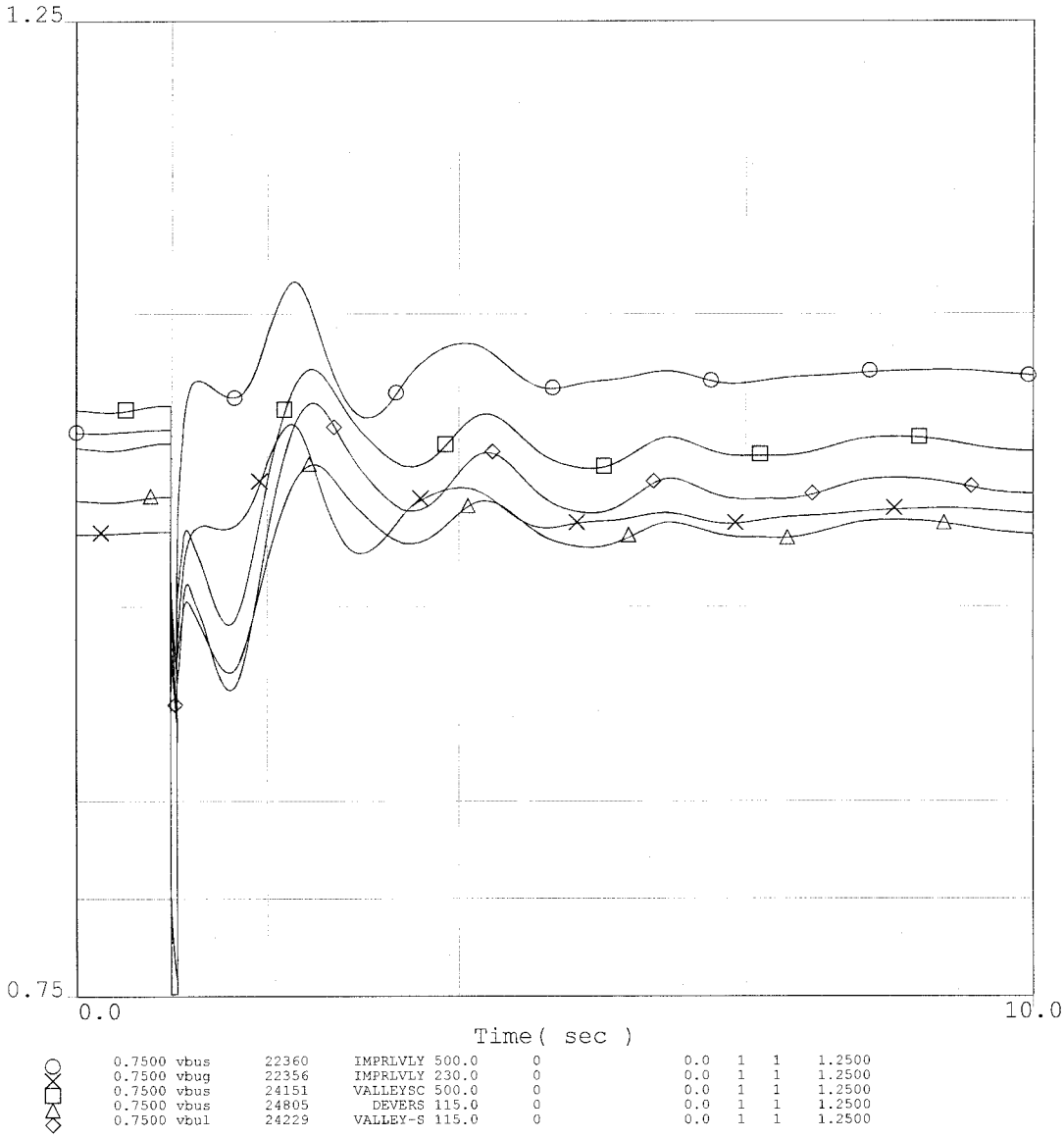
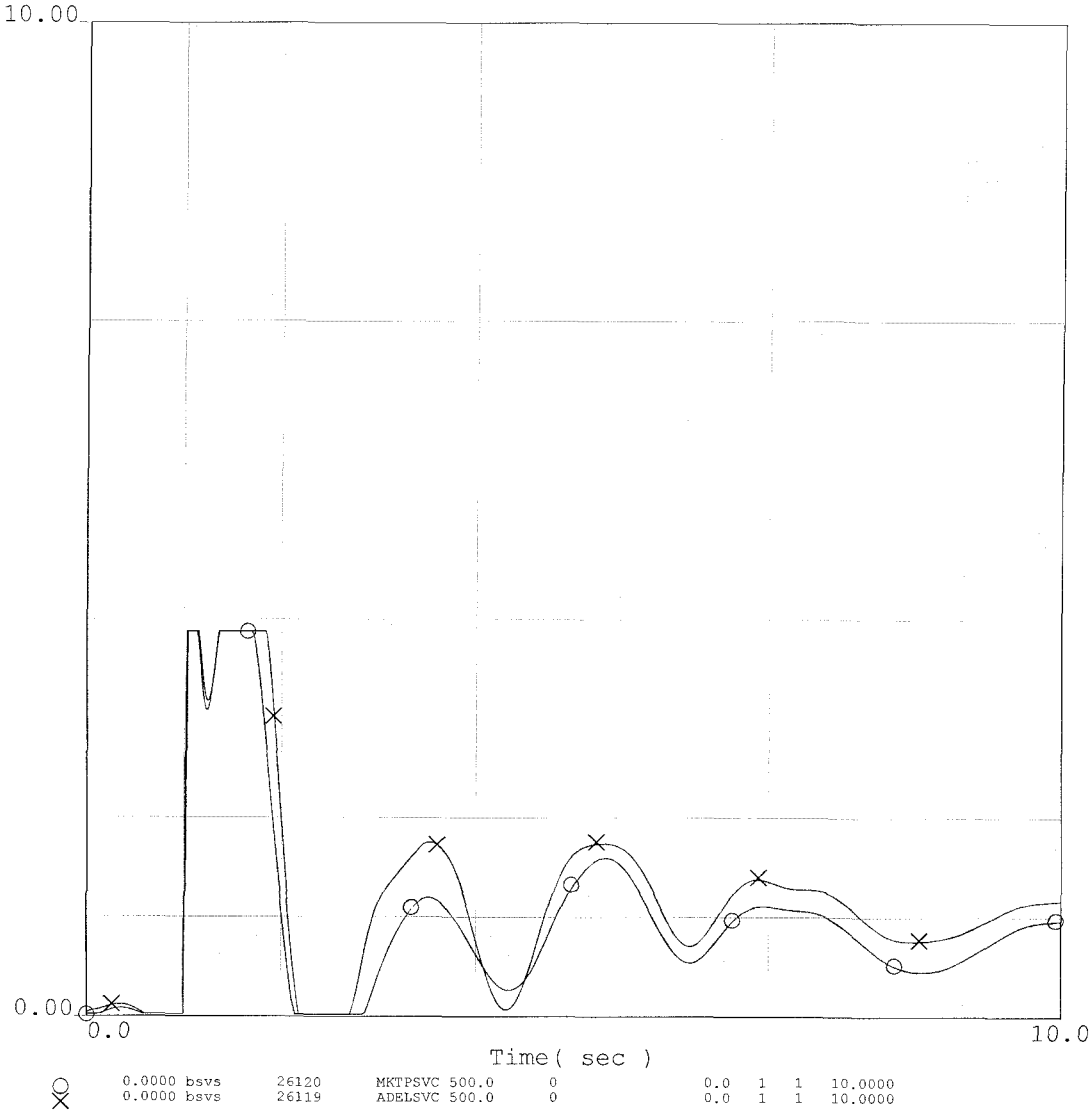
CALIFORNIA_voltages:



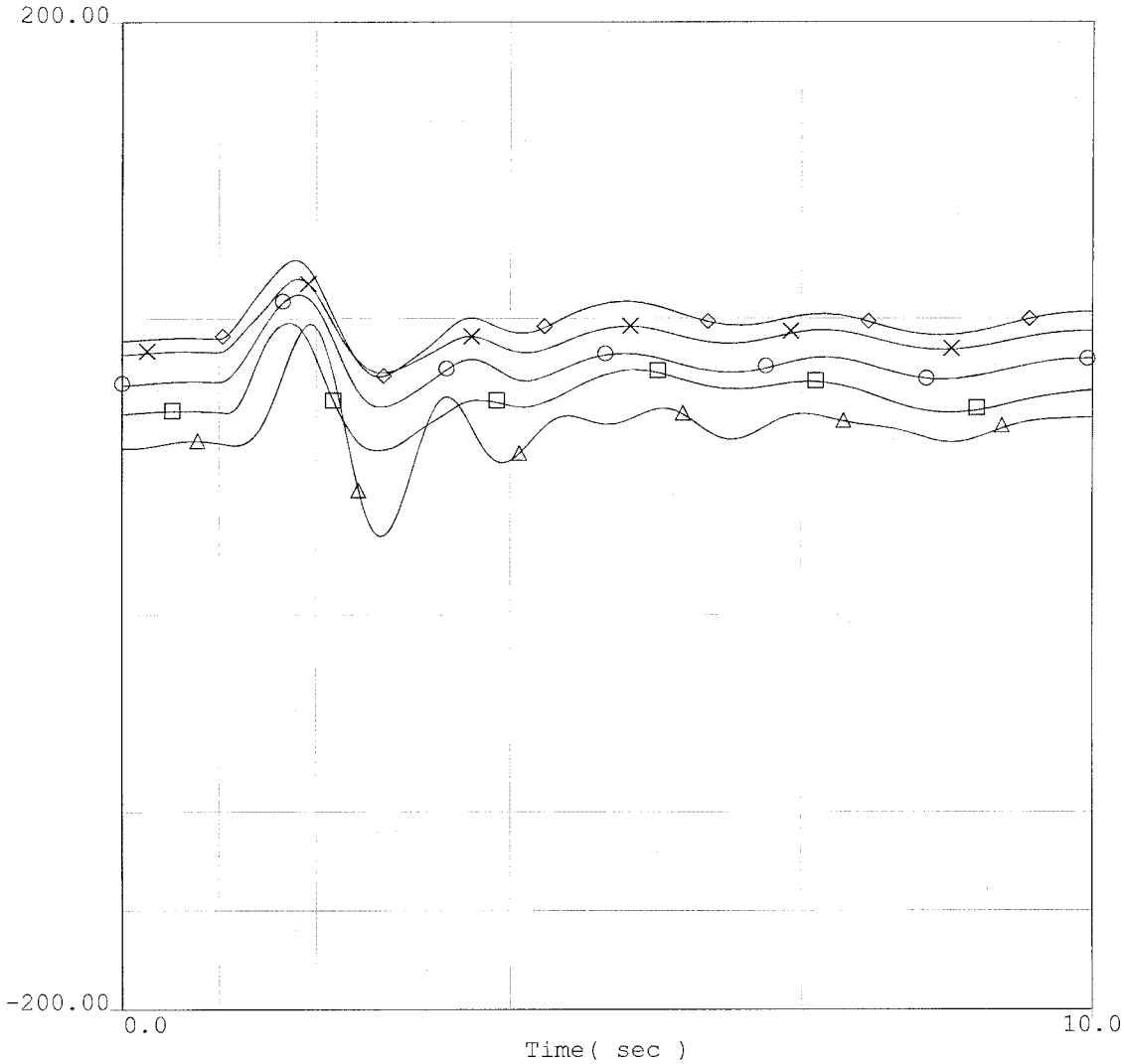
2014HS-UFSAR02:THREE PHASE FAULT ON THE HASSAYAMPA-N.GILA 500KV LINE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/3/11)

SVC_output



2014HS-UFSAR02:THREE PHASE FAULT ON THE HASSAYAMPA-N.GILA 500KV LINE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/3/11)

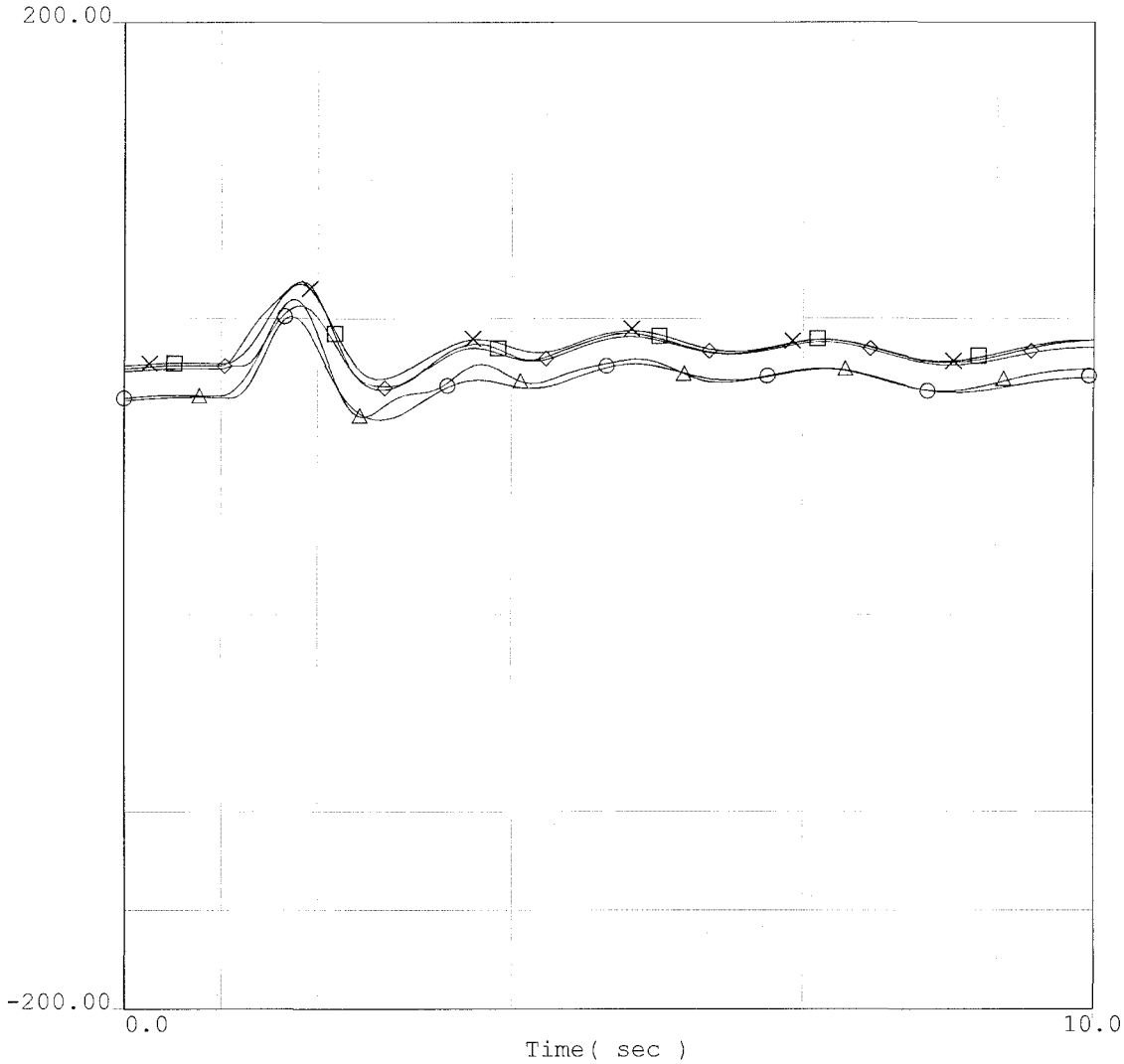
SYSTEM_Rotorangles



-200.0000 ang	16500	SPR GEN1	19.0	0	0.0	1	1	200.0000
-200.0000 ang	10321	SJUAN_G4	22.0	0	0.0	1	1	200.0000
-200.0000 ang	14942	SAGUARO2	15.5	0	0.0	1	1	200.0000
-200.0000 ang	17024	APACHCT1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	16518	SPR GEN3	21.0	0	0.0	1	1	200.0000

2014HS-UFSAR02:THREE PHASE FAULT ON THE HASSAYAMPA-N.GILA 500KV LINE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/3/11)

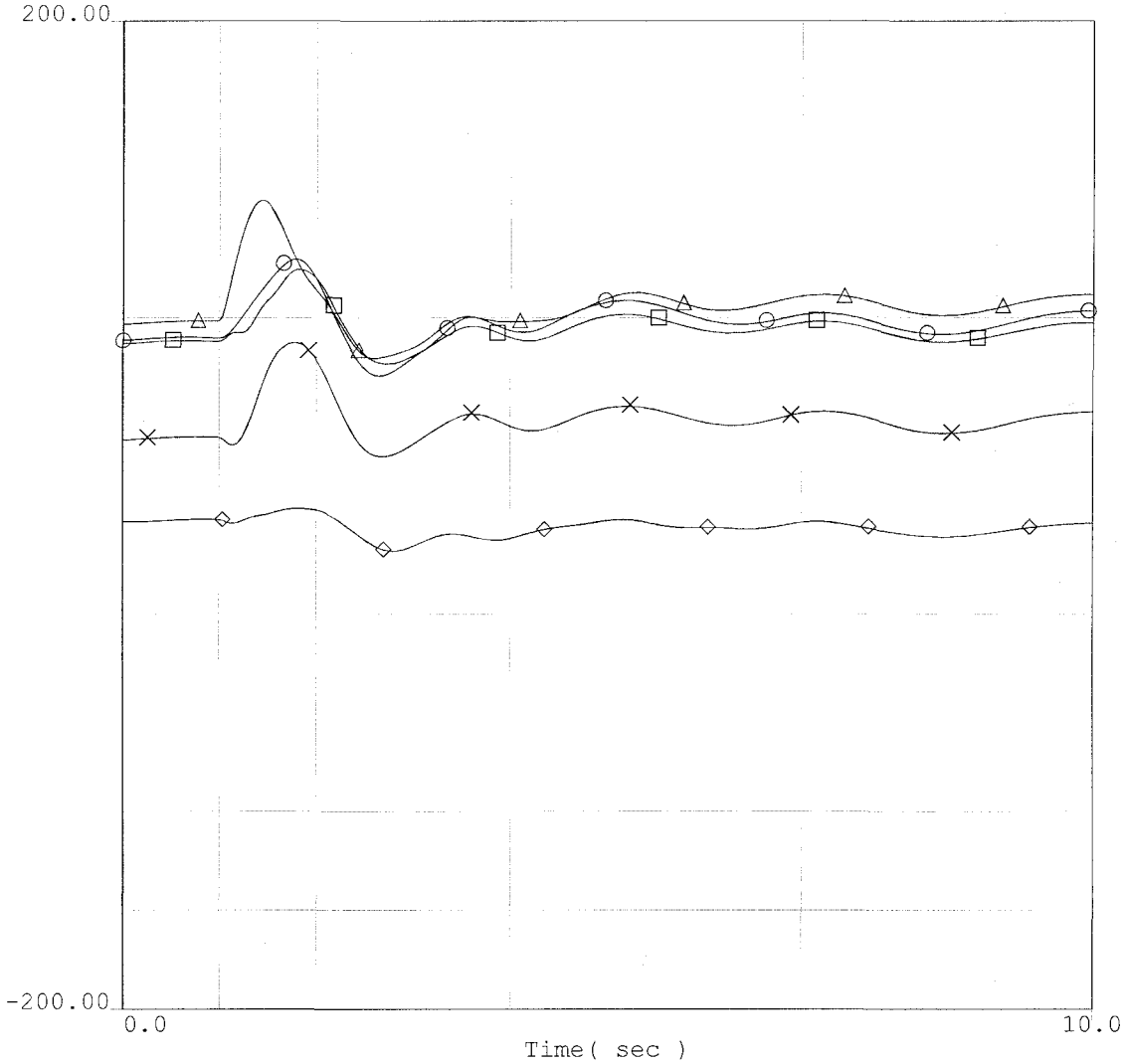
SYSTEM_Rotorangles



-200.0000 ang	15140	DBG-CT1	18.0	0	0.0	1	1	200.0000
-200.0000 ang	14945	SAG. CT3	13.8	0	0.0	1	1	200.0000
-200.0000 ang	14902	CHOLLA3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	15921	SANTAN 1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	14903	CHOLLA4	22.0	0	0.0	1	1	200.0000

2014HS-UFSAR02:THREE PHASE FAULT ON THE HASSAYAMPA-N.GILA 500KV LINE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/3/11)

SYSTEM_Rotorangles



-200.0000 ang	16518	SPR GEN3	21.0	0	0.0	1	1	200.0000
-200.0000 ang	16503	SUNDTGE4	18.0	0	0.0	1	1	200.0000
-200.0000 ang	14914	FCNGN4CC	22.0	0	0.0	H	1	200.0000
-200.0000 ang	14931	PALOVRD1	24.0	0	0.0	1	1	200.0000
-200.0000 ang	24004	ALAMT4 G	18.0	0	0.0	H	1	200.0000

2014HS-UFSAR02:THREE PHASE FAULT ON THE HASSAYAMPA-N.GILA 500KV LINE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
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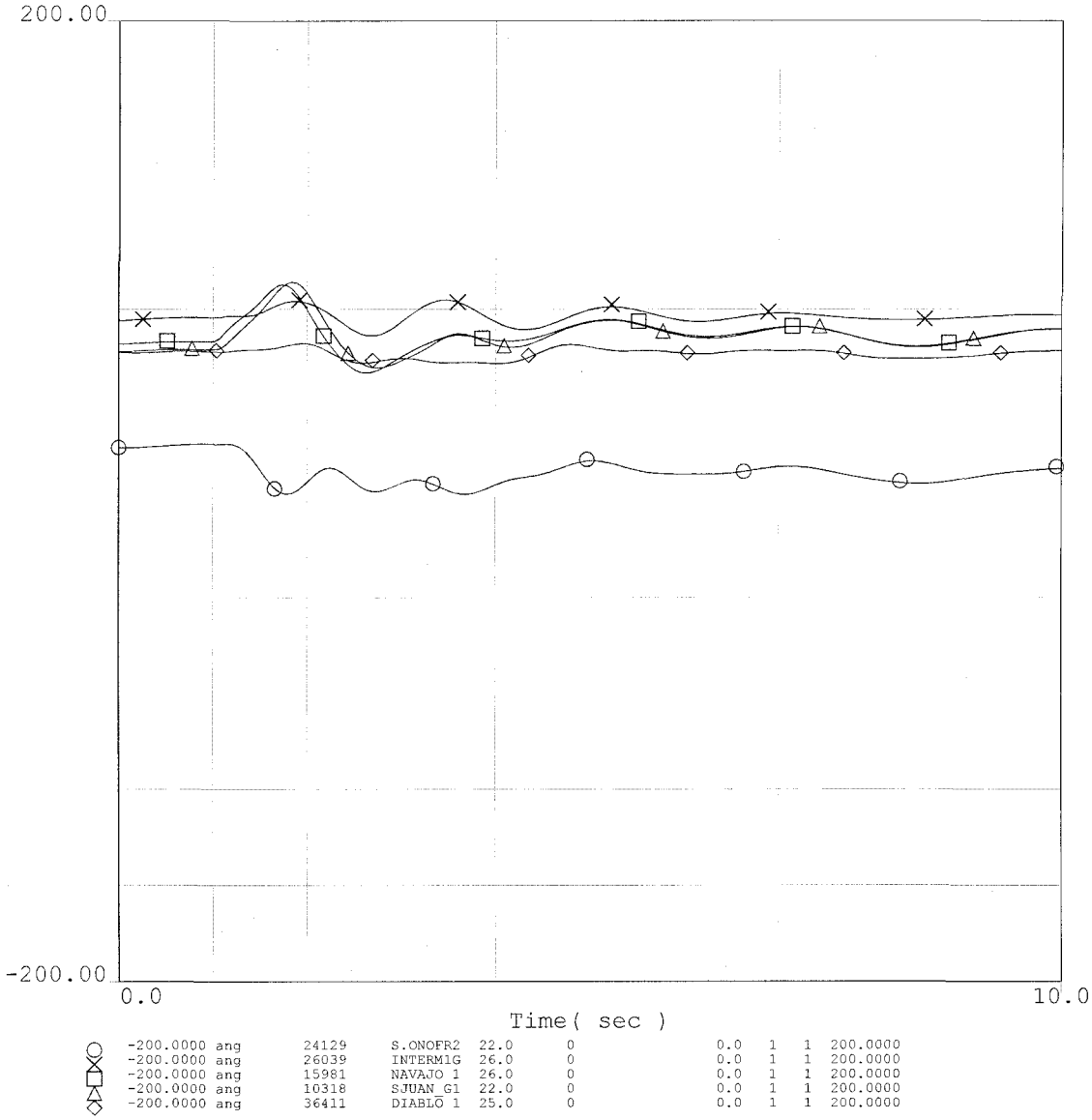
SYSTEM_Rotorangles



2014HS-UFSAR02:THREE PHASE FAULT ON THE HASSAYAMPA-N.GILA 500KV LINE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
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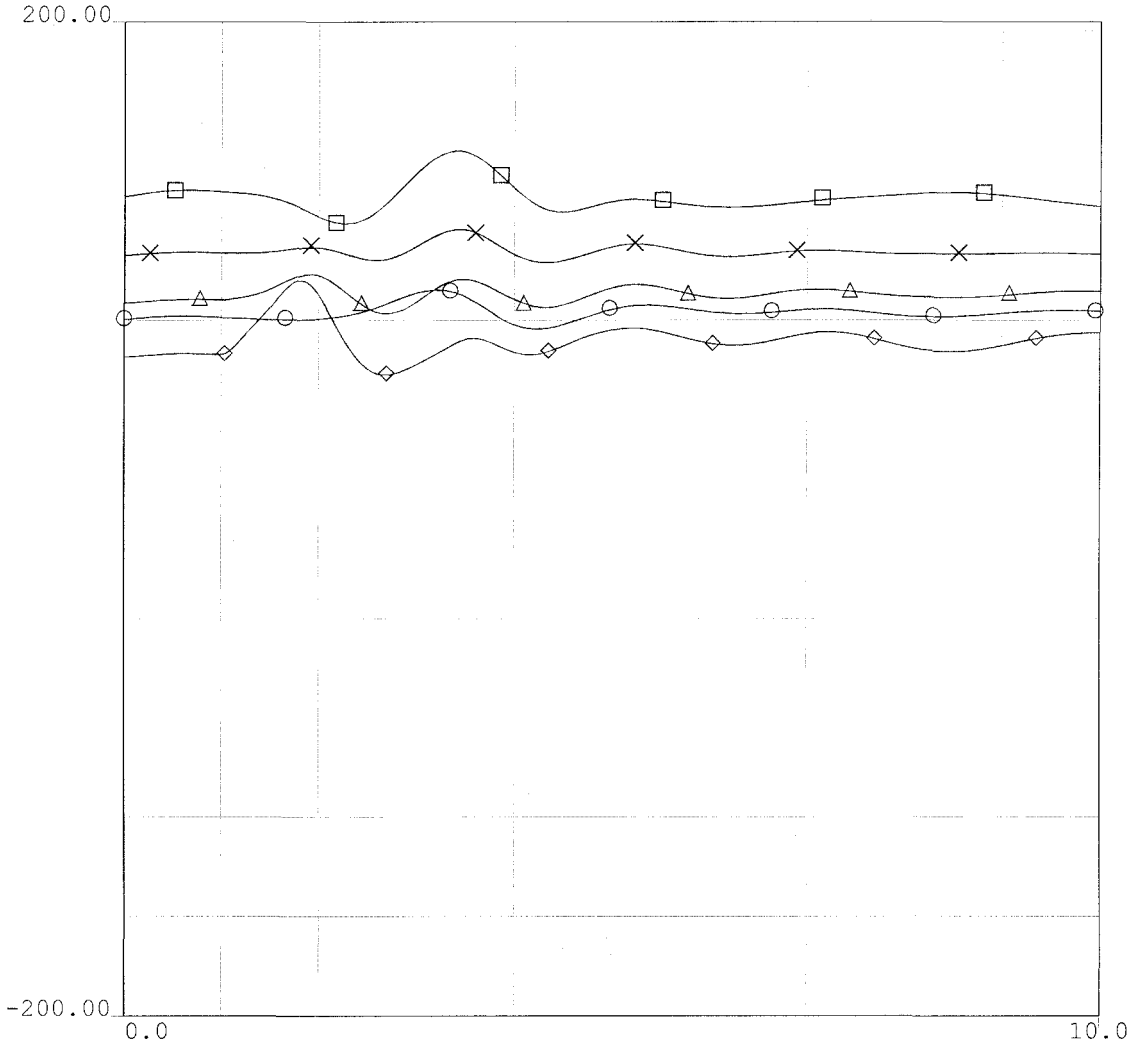
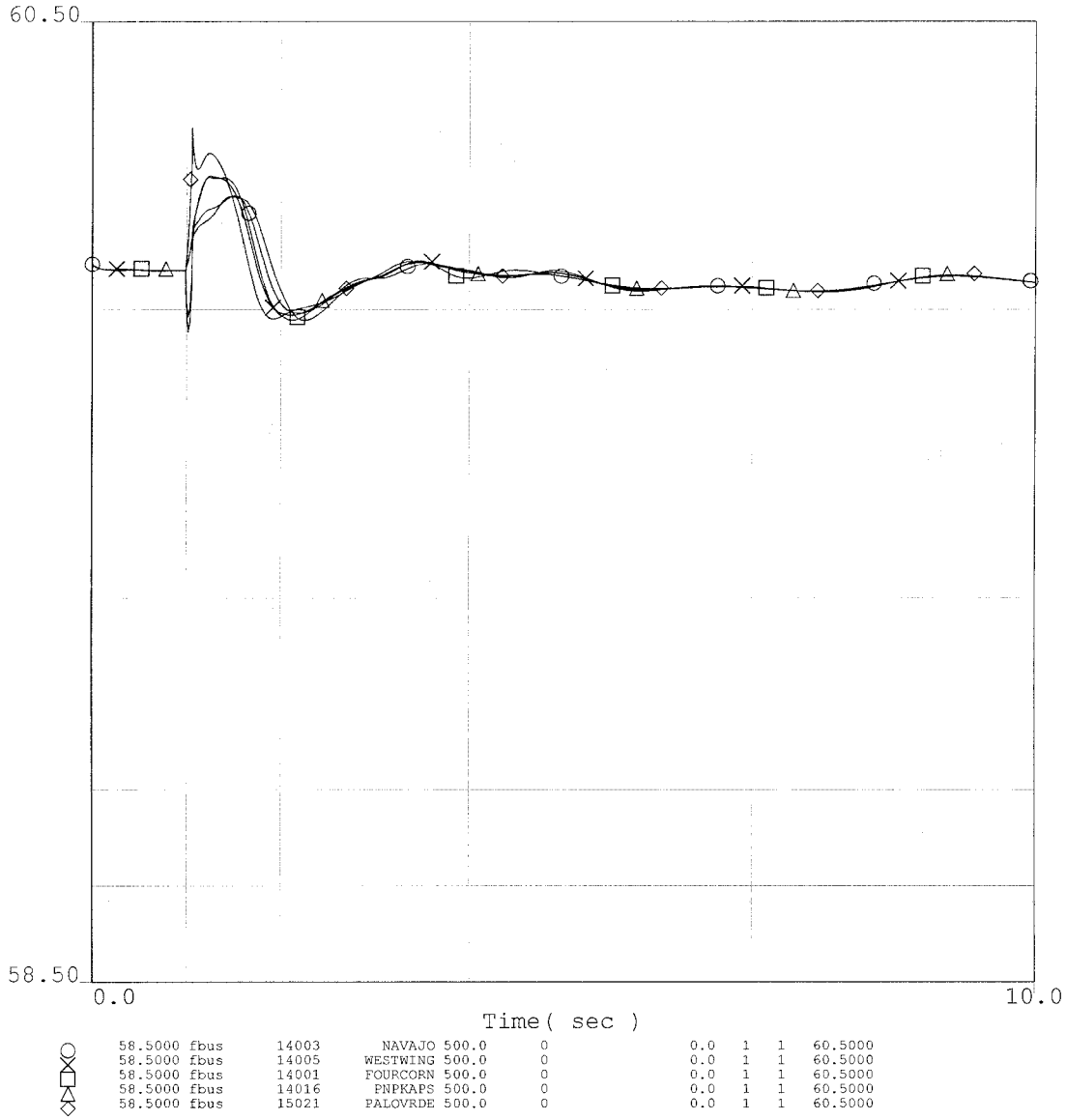
SYSTEM_Rotorangles



-200.0000 ang	73129	MBPP-1	24.0	0	0.0	1	1	200.0000
-200.0000 ang	60086	BRIDGER1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	62050	COLSTP 1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	65500	EHUNTR 3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	10321	SJUAN_G4	22.0	0	0.0	1	1	200.0000

2014HS-UFSAR02:THREE PHASE FAULT ON THE HASSAYAMPA-N.GILA 500KV LINE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/3/11)

Frequencies:



2014HS-UFSAR02:THREE PHASE FAULT ON THE HASSAYAMPA-N.GILA 500KV LINE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
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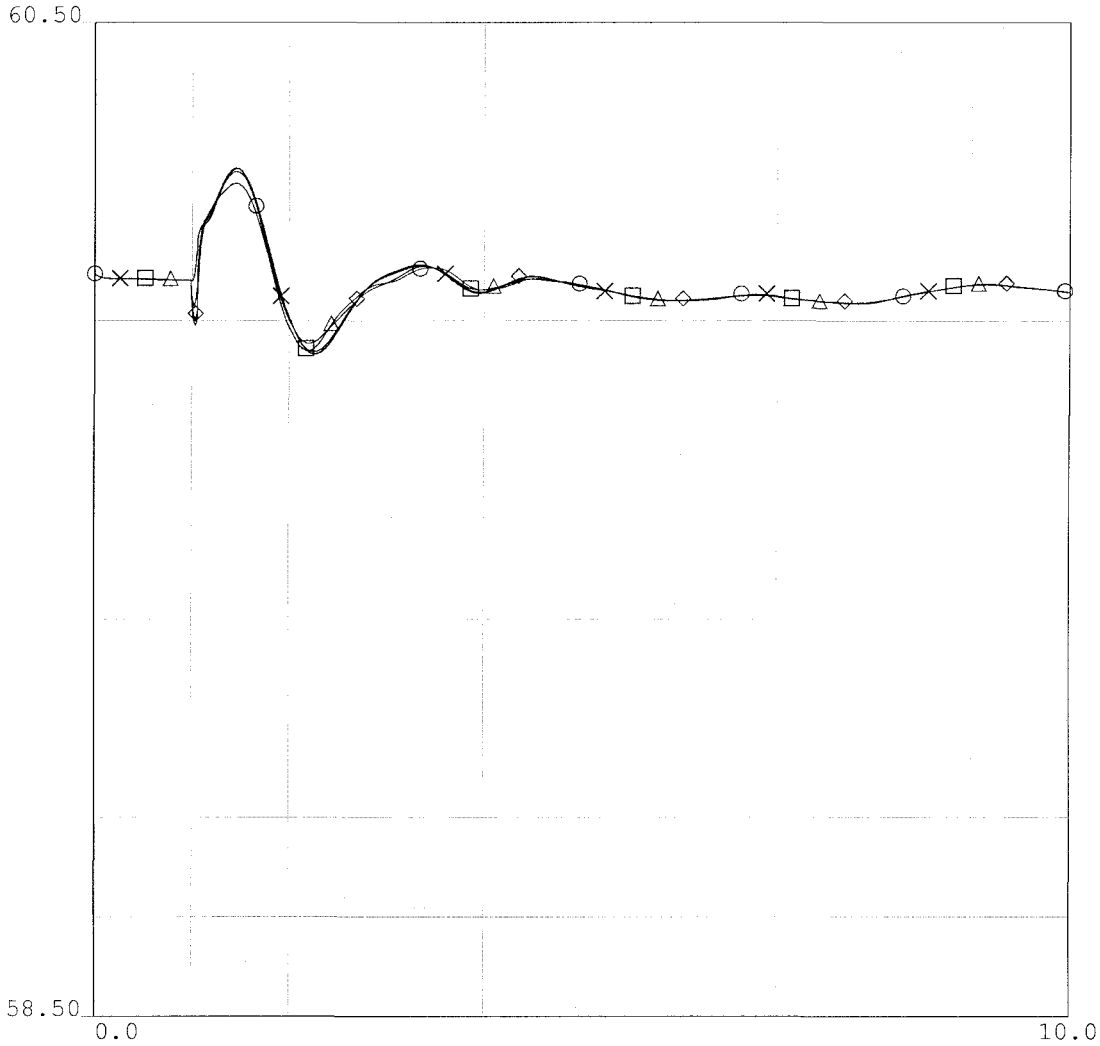
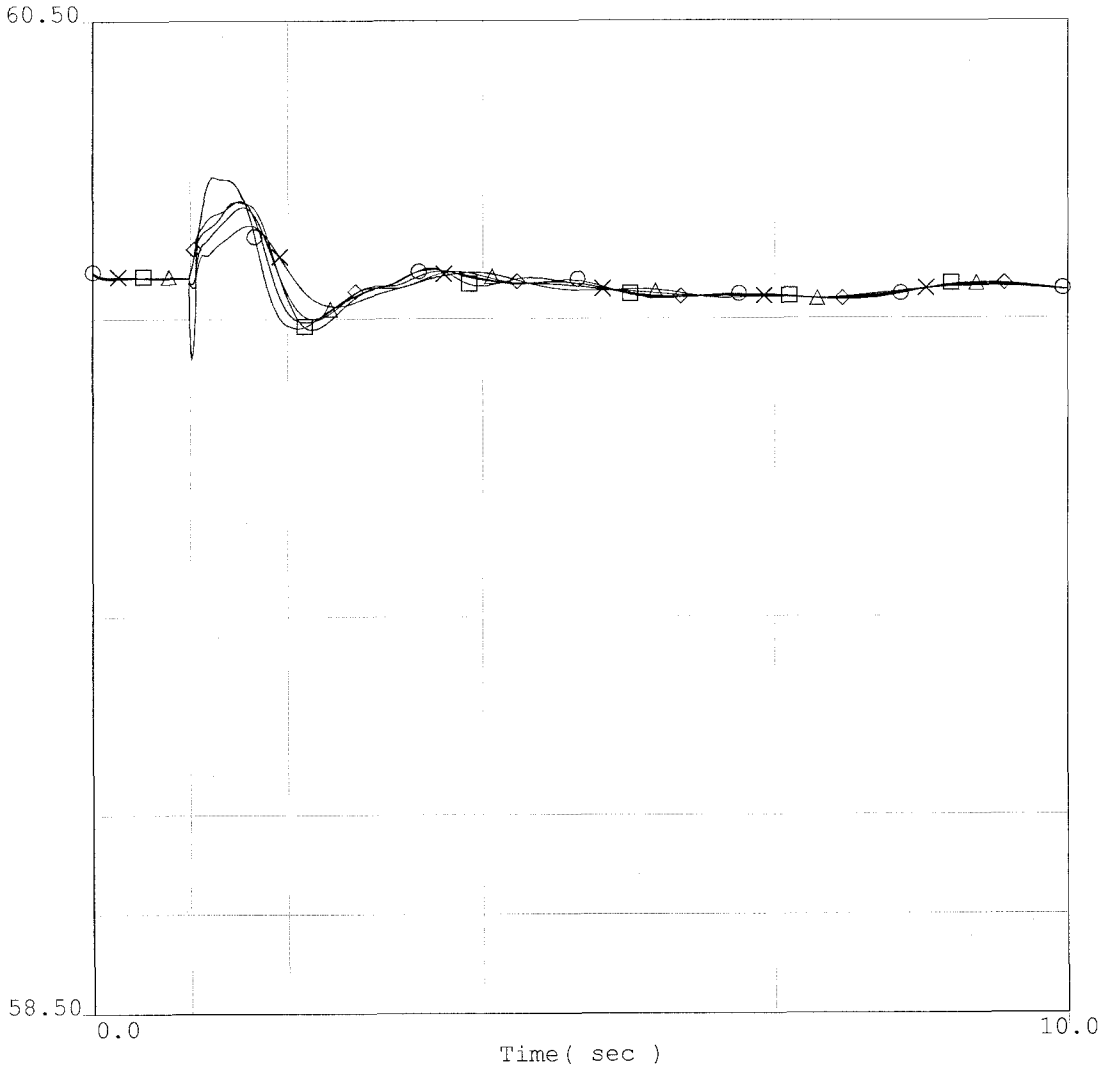
Frequencies:



58.5000 fbus	16000	TORTOLIT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	16105	VAIL 345.0	0	0.0	1	1	60.5000
58.5000 fbus	16103	SOUTH 345.0	0	0.0	1	1	60.5000
58.5000 fbul	15001	CORONADO 500.0	0	0.0	1	1	60.5000
58.5000 fbus	16109	WINCHSTR 345.0	0	0.0	1	1	60.5000

2014HS-UFSAR02:THREE PHASE FAULT ON THE HASSAYAMPA-N.GILA 500KV LINE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/3/11)

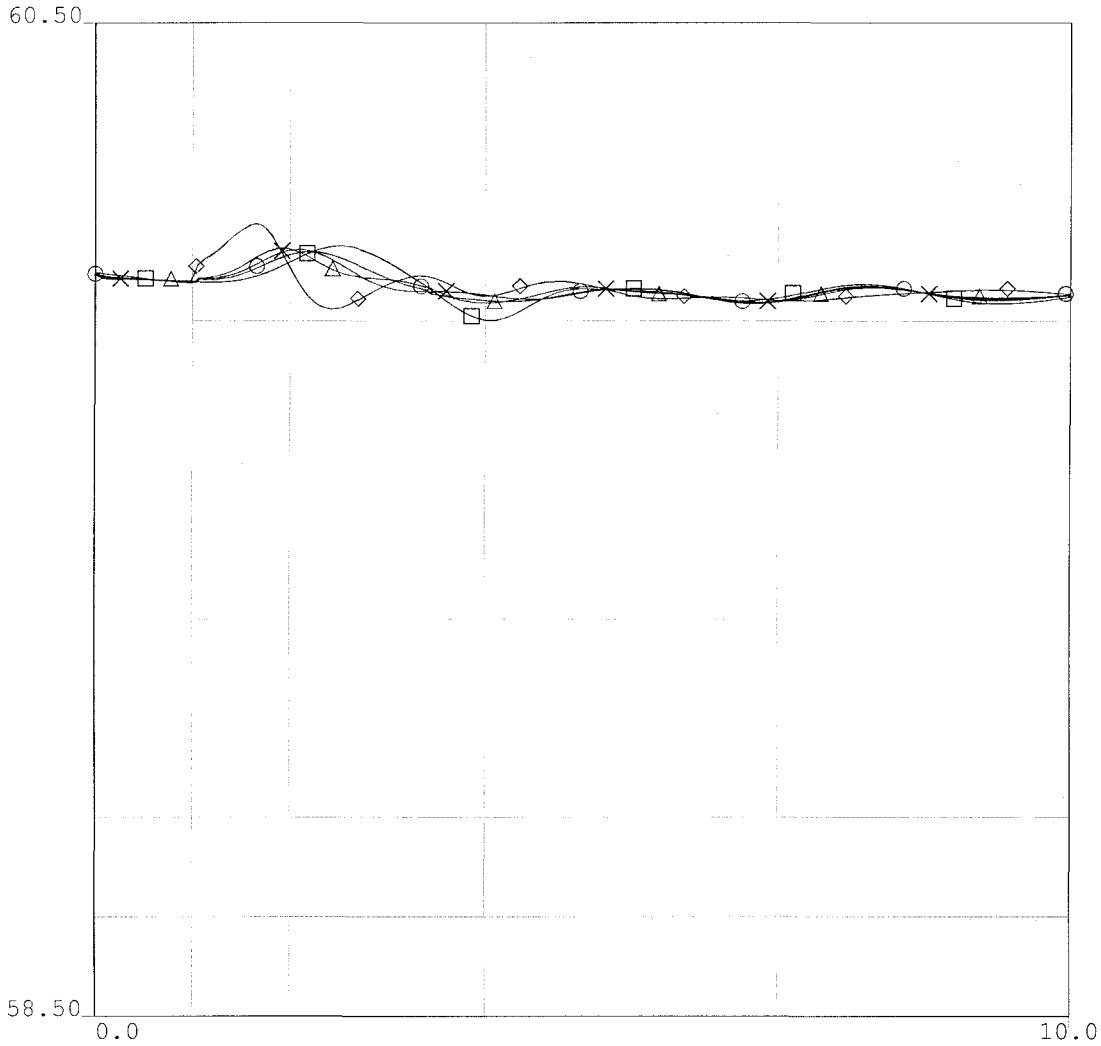
Frequencies:



58.5000 fbul	14231	WESTWNGW 230.0	0	0.0	1	1	60.5000
58.5000 fbus	26003	ADELANTO 500.0	0	0.0	1	1	60.5000
58.5000 fbus	14001	FOURCORN 500.0	0	0.0	1	1	60.5000
58.5000 fbus	26048	MCCULLGH 500.0	0	0.0	1	1	60.5000
58.5000 fbus	14003	NAVAJO 500.0	0	0.0	1	1	60.5000

2014HS-UFSAR02:THREE PHASE FAULT ON THE HASSAYAMPA-N.GILA 500KV LINE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/3/11)

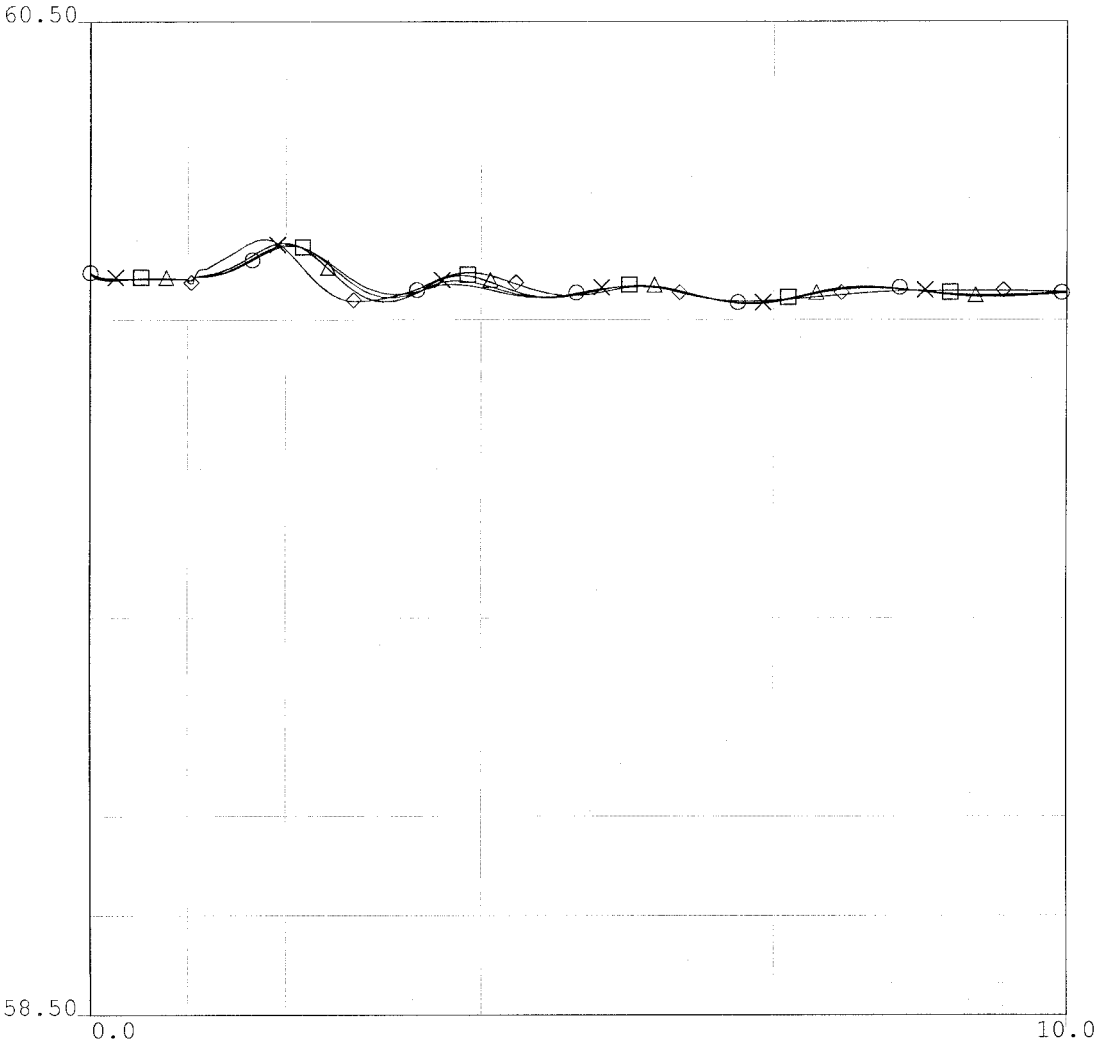
Frequencies:



58.5000 fbus	40489	GRIZZLY 500.0	0	0.0	1	1	60.5000
58.5000 fbus	40687	MALIN 500.0	0	0.0	1	1	60.5000
58.5000 fbus	40459	GARRISON 500.0	0	0.0	1	1	60.5000
58.5000 fbus	60235	MIDPOINT 345.0	0	0.0	1	1	60.5000
58.5000 fbus	66230	PINTO 138.0	0	0.0	1	1	60.5000

2014HS-UFSAR02:THREE PHASE FAULT ON THE HASSAYAMPA-N.GILA 500KV LINE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/3/11)

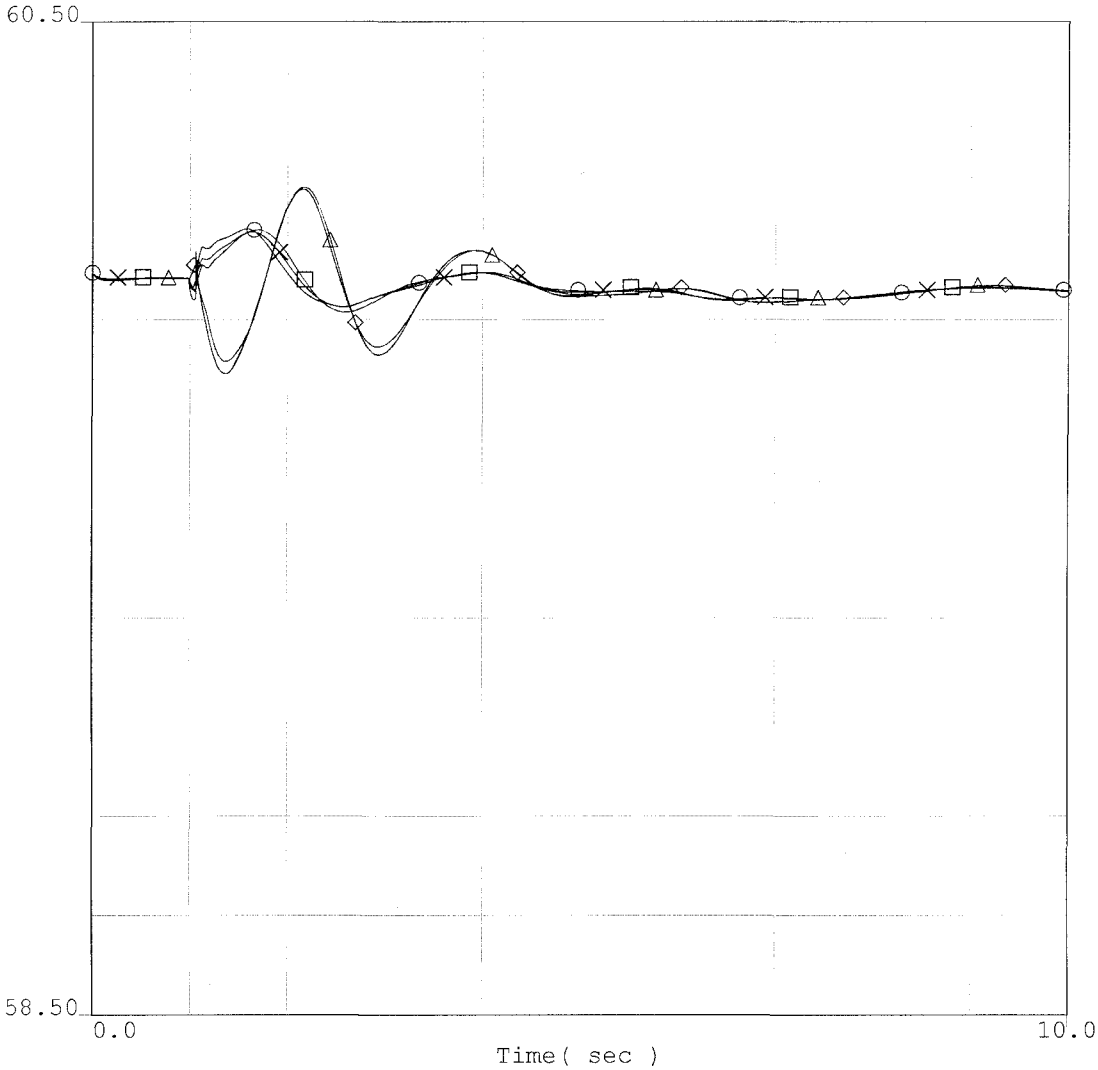
Frequencies:



58.5000 fbus	30005	ROUND MT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30015	TABLE MT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30035	TRACY 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30040	TESLA 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30060	MIDWAY 500.0	0	0.0	1	1	60.5000

2014HS-UFSAR02:THREE PHASE FAULT ON THE HASSAYAMPA-N.GILA 500KV LINE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/3/11)

Frequencies:



58.5000 fbus	24801	DEVERS 500.0	0	0.0	1	1	60.5000
58.5000 fbus	24086	LUGO 500.0	0	0.0	1	1	60.5000
58.5000 fbus	26094	SYLMARLA 230.0	0	0.0	1	1	60.5000
58.5000 fbus	22468	MIGUEL 500.0	0	0.0	1	1	60.5000
58.5000 fbus	22536	N.GILA 500.0	0	0.0	1	1	60.5000

2014HS-UFSAR02:THREE PHASE FAULT ON THE HASSAYAMPA-N.GILA 500KV LINE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/3/11)

HIGHEST VOLTAGE DIP

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct	@time
14	KOFA	69	vbul	0.989	0.821	17	1.767
24	COLRIVER	500	vbus	1.058	0.871	17.7	1.504
24	DEVRSVC1	500	vbug	1.059	0.935	11.7	1.579

LOWEST FREQUENCY

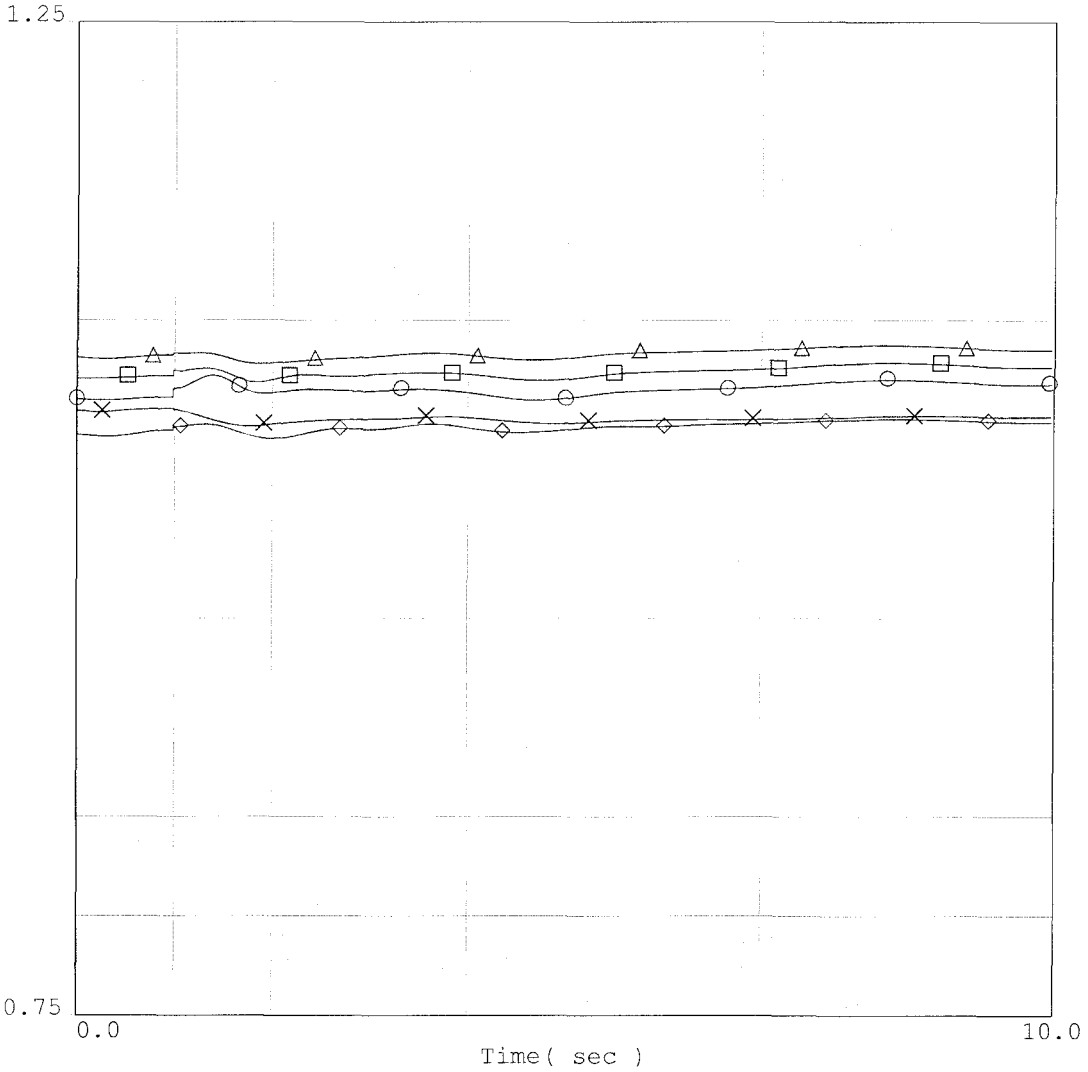
AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
14	WHITETNK	69	fbul	59.498	1.046
14	Q1COL6	34.5	fbus	57.271	1.033
20	CPC-U2	13.8	fbug	59.719	1.417

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

There were 0 violations of MORC criteria 1 (25% Voltage Dip) !
There were 0 violations of MORC criteria 2 (20% Voltage Dip for 20 Cycles)!
There were 0 violations of MORC criteria 3 (59.6 HZ for 6 Cycles)!

ARIZONA_voltages:



○	0.7500	vbus	15021	PALOVRDE	500.0	0	0.0	1	1	1.2500
✕	0.7500	vbus	14001	FOURCORN	500.0	0	0.0	1	1	1.2500
□	0.7500	vbus	15011	KYRENE	500.0	0	0.0	1	1	1.2500
△	0.7500	vbus	14003	NAVAJO	500.0	0	0.0	1	1	1.2500
◇	0.7500	vbus	26003	ADELANTO	500.0	0	0.0	1	1	1.2500

2014HS-UFSAR03:LOSS OF THE LARGEST GENERATOR- ONE PALO VERDE UNIT #3
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/4/11)

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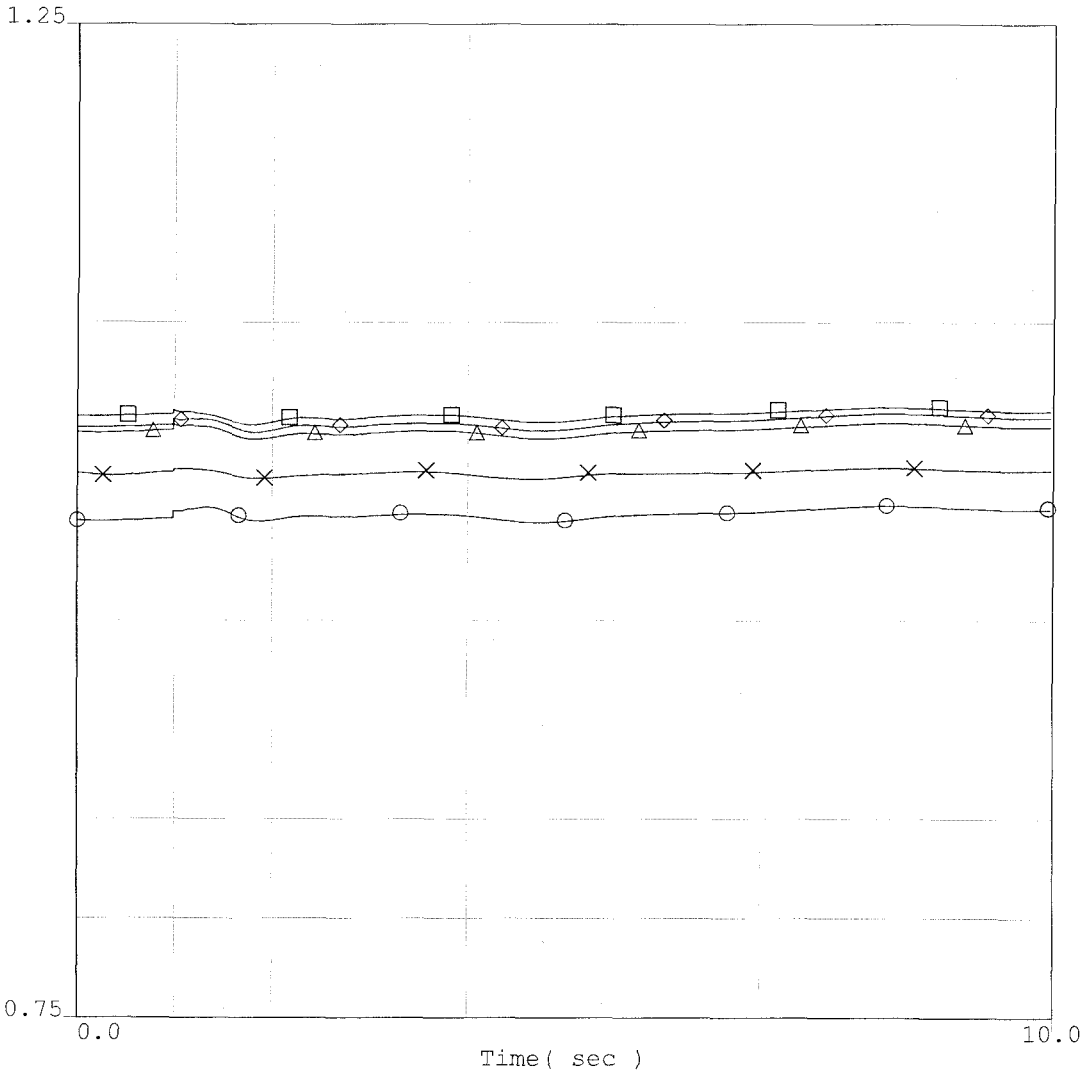
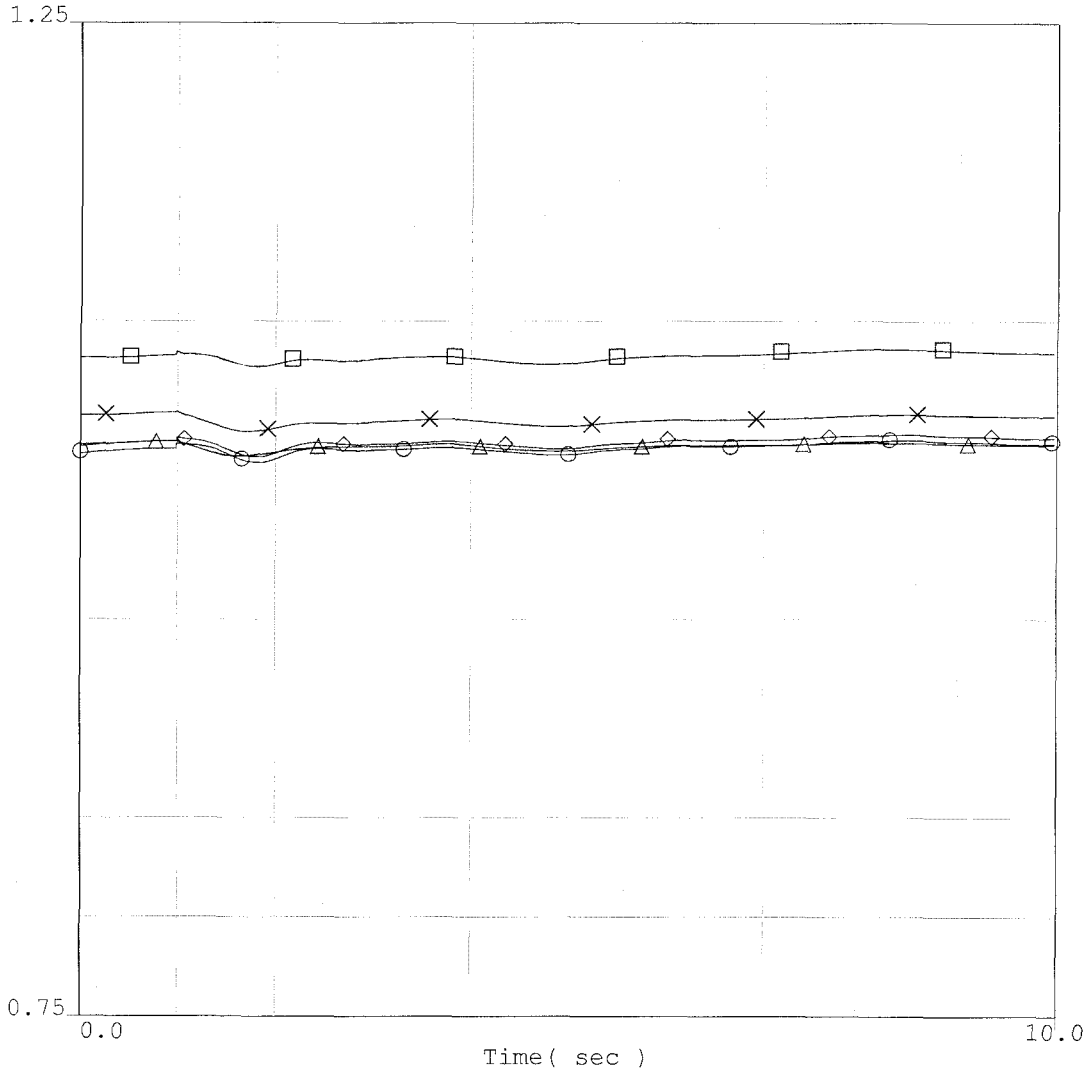
ARIZONA_voltages:



○	0.7500	vbul	14231	WESTWNGW 230.0	0	0.0	1	1	1.2500
×	0.7500	vbus	19011	MEAD N 230.0	0	0.0	1	1	1.2500
□	0.7500	vbus	15215	SILVERKG 230.0	0	0.0	1	1	1.2500
△	0.7500	vbul	14221	PPAPS W 230.0	0	0.0	1	1	1.2500
◇	0.7500	vbus	15207	KYRENE 230.0	0	0.0	1	1	1.2500

2014HS-UFSAR03:LOSS OF THE LARGEST GENERATOR- ONE PALO VERDE UNIT #3
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/4/11)

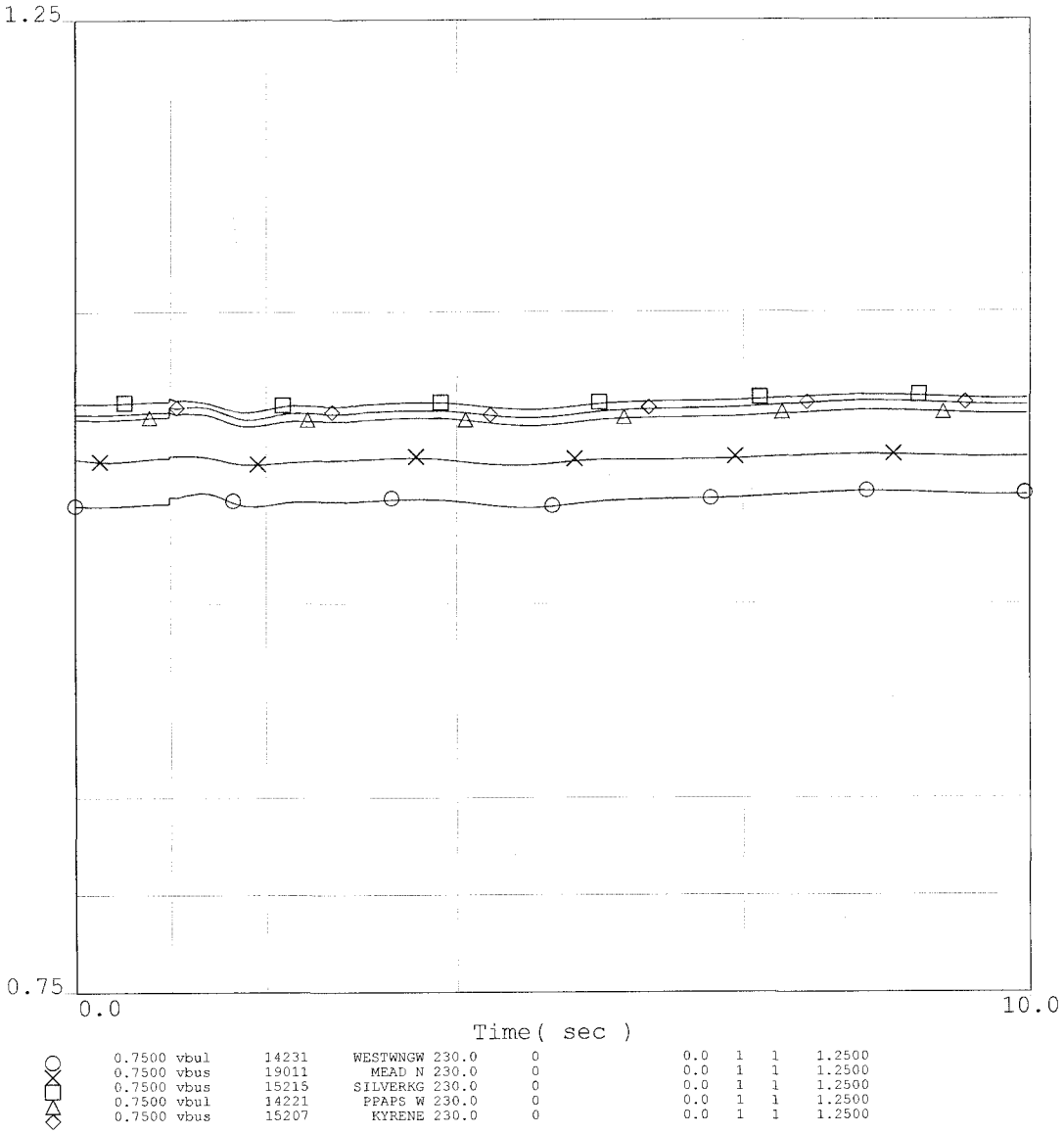
ARIZONA_voltages:



0.7500	vbus	16103	SOUTH 345.0	0	0.0	1	1	1.2500
0.7500	vbus	14000	CHOLLA 500.0	0	0.0	1	1	1.2500
0.7500	vbus	15041	SILVERKG 500.0	0	0.0	1	1	1.2500
0.7500	vbus	16104	SPRINGR 345.0	0	0.0	1	1	1.2500
0.7500	vbus	16109	WINCHSTR 345.0	0	0.0	1	1	1.2500

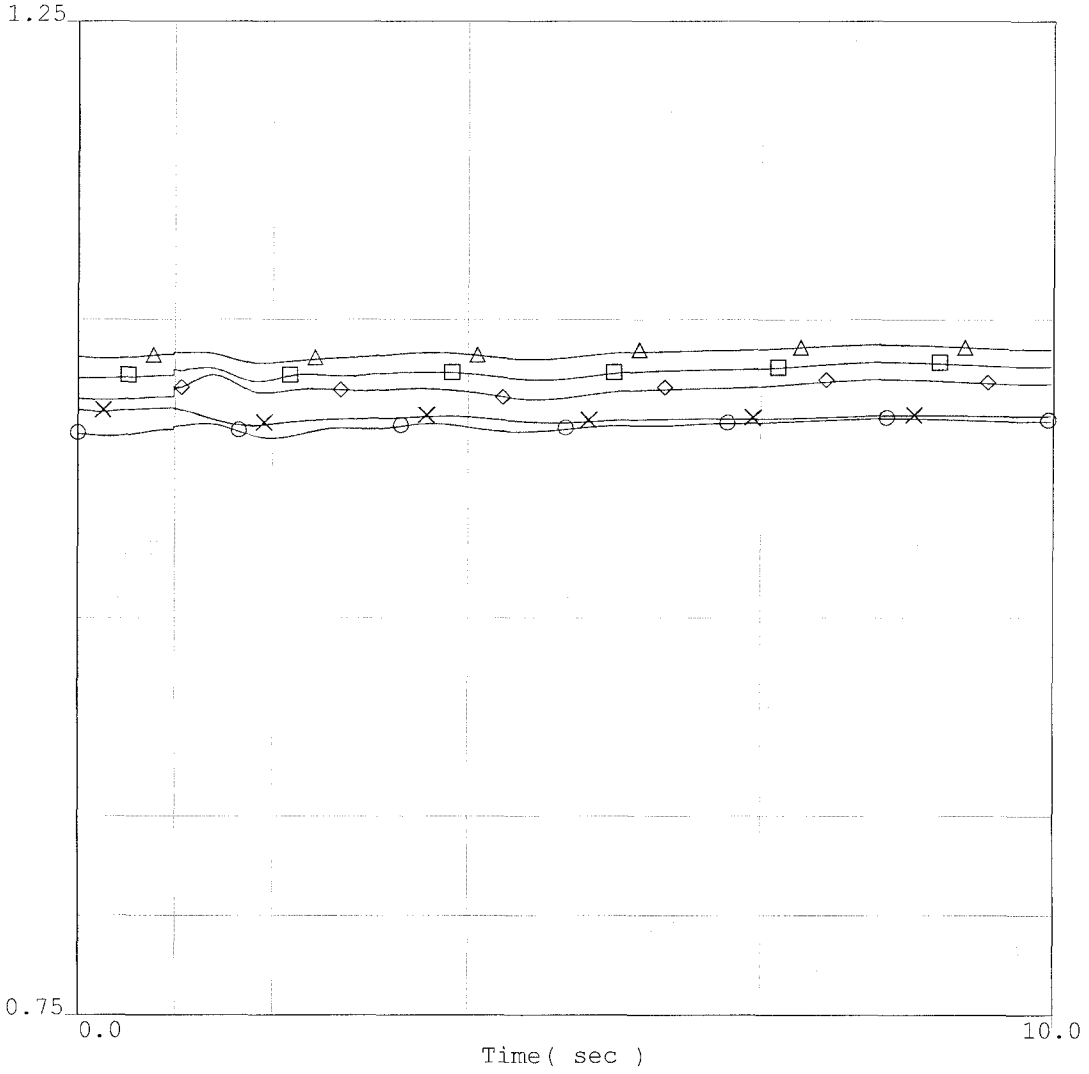
2014HS-UFSAR03:LOSS OF THE LARGEST GENERATOR- ONE PALO VERDE UNIT #3
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/4/11)

ARIZONA_voltages:



2014HS-UFSAR03:LOSS OF THE LARGEST GENERATOR- ONE PALO VERDE UNIT #3
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/4/11)

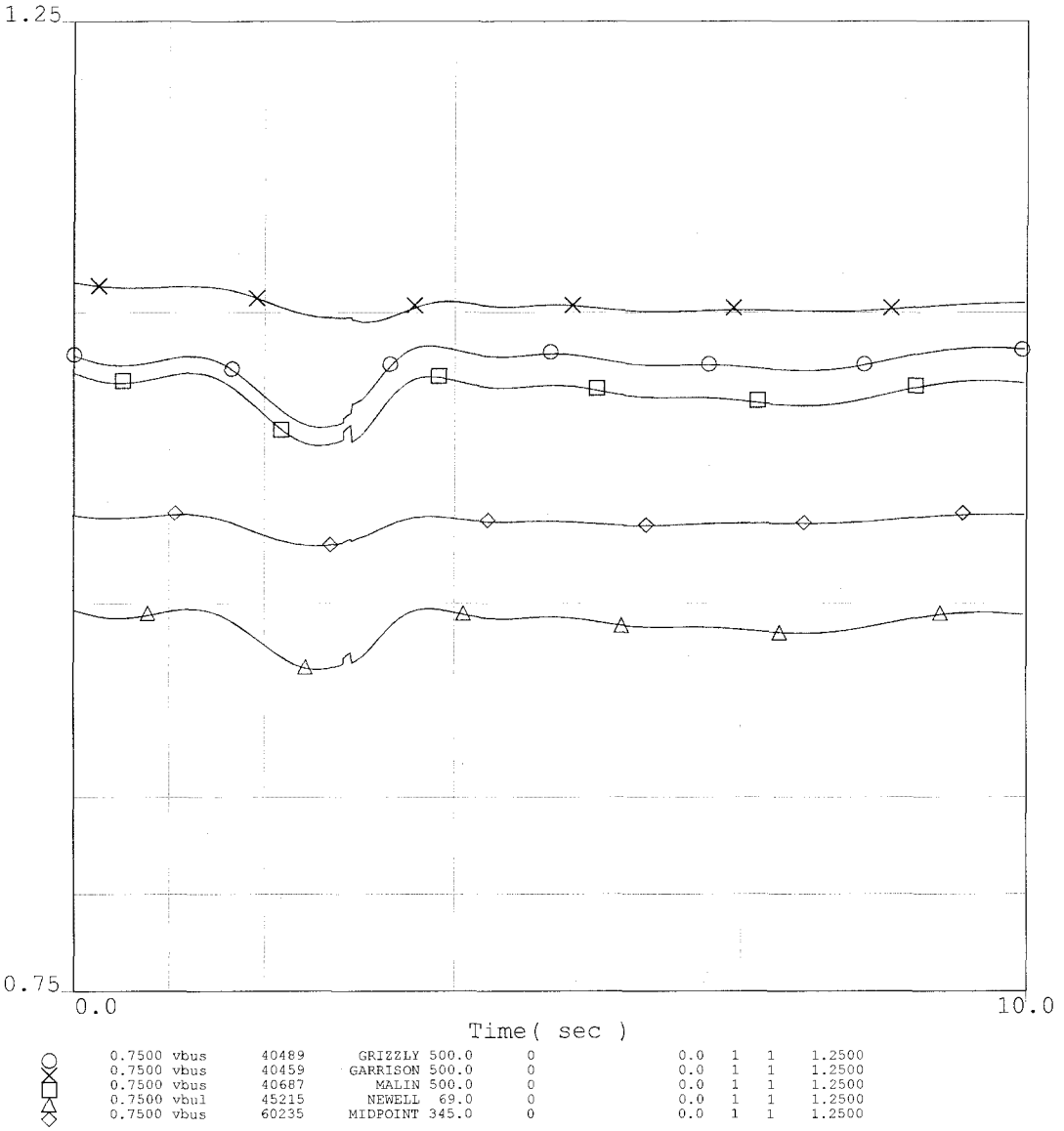
ARIZONA_voltages:



○	0.7500 vbus	26003	ADELANTO 500.0	0	0.0	1	1	1.2500
⊠	0.7500 vbus	14001	FOURCORN 500.0	0	0.0	1	1	1.2500
□	0.7500 vbus	15011	KYRENE 500.0	0	0.0	1	1	1.2500
△	0.7500 vbus	14003	NAVAJO 500.0	0	0.0	1	1	1.2500
◇	0.7500 vbus	15021	PALOVRDE 500.0	0	0.0	1	1	1.2500

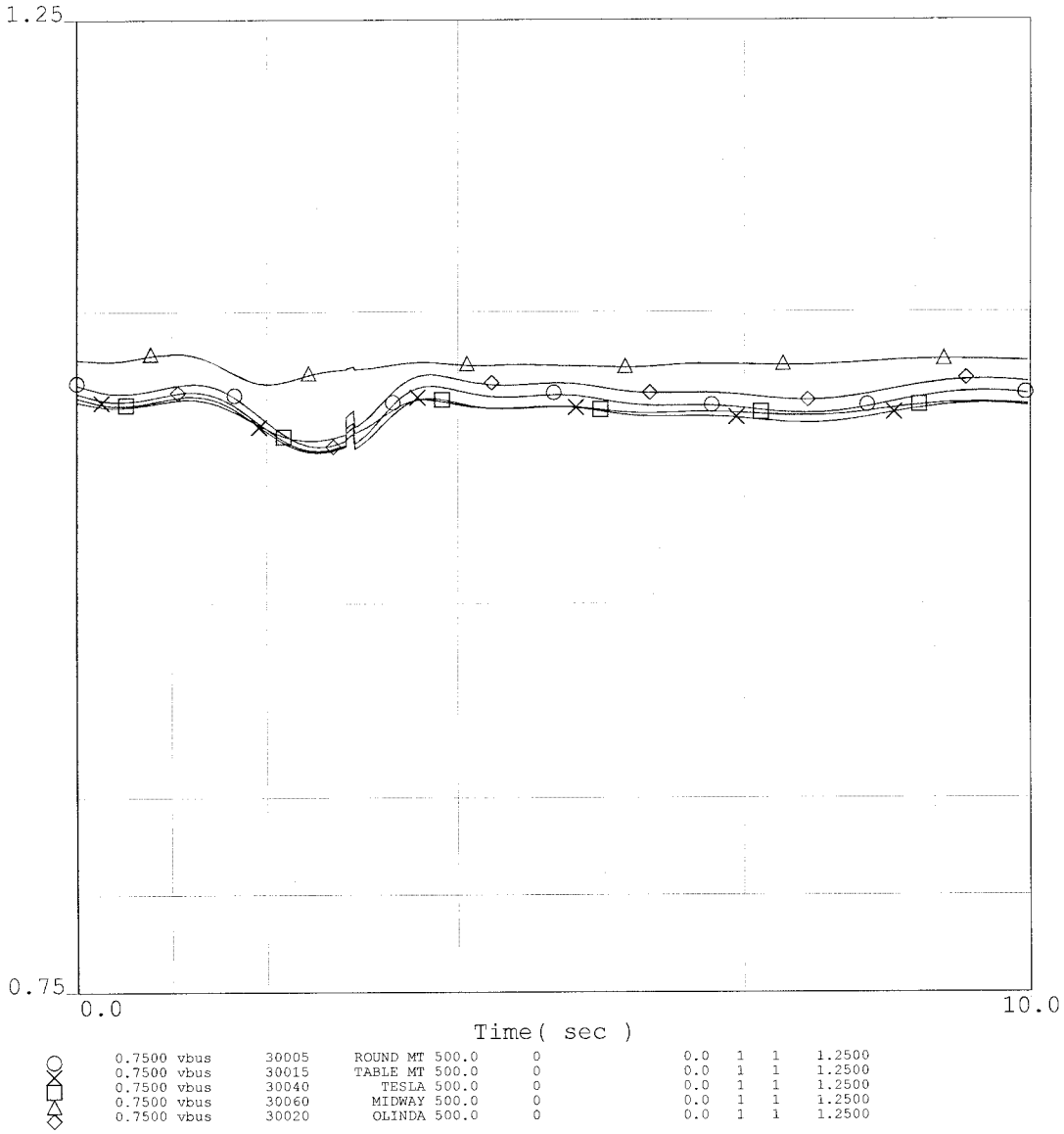
2014HS-UFSAR03:LOSS OF THE LARGEST GENERATOR- ONE PALO VERDE UNIT #3
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/4/11)

NORTHWEST_voltages:



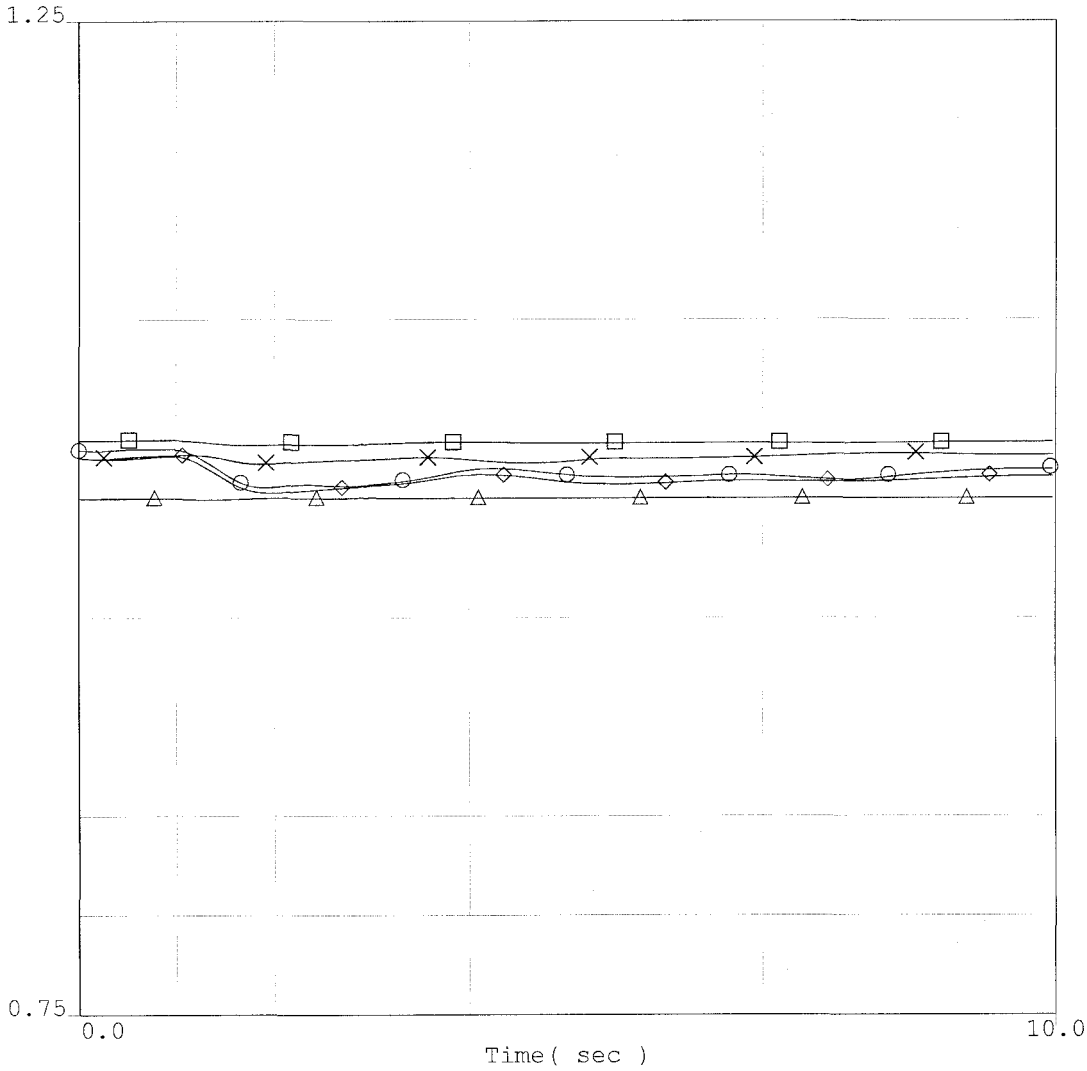
2014HS-UFSAR03:LOSS OF THE LARGEST GENERATOR- ONE PALO VERDE UNIT #3
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 OMVARS(4/4/11)

CALIFORNIA_voltages:



2014HS-UFSAR03:LOSS OF THE LARGEST GENERATOR- ONE PALO VERDE UNIT #3
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/4/11)

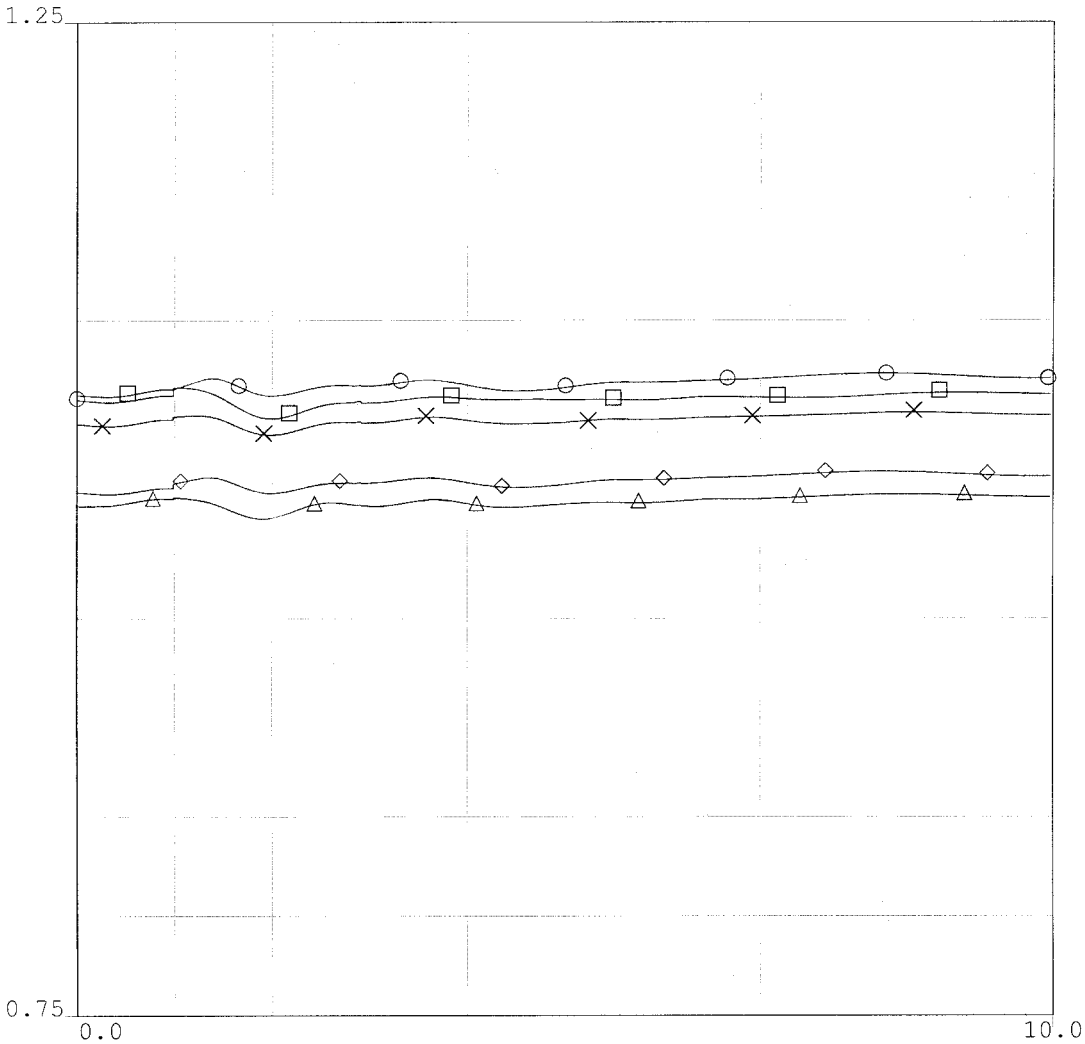
UTAH_voltages:



0.7500 vbus	66230	PINTO 138.0	0	0.0	1	1	1.2500
0.7500 vbus	18019	H ALLEN 230.0	0	0.0	1	1	1.2500
0.7500 vbus	66280	REDBUTTE 345.0	0	0.0	1	1	1.2500
0.7500 vbus	66420	SGSY 138.0	0	0.0	1	1	1.2500
0.7500 vbus	79023	DURANGO 115.0	0	0.0	1	1	1.2500

2014HS-UFSAR03:LOSS OF THE LARGEST GENERATOR- ONE PALO VERDE UNIT #3
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/4/11)

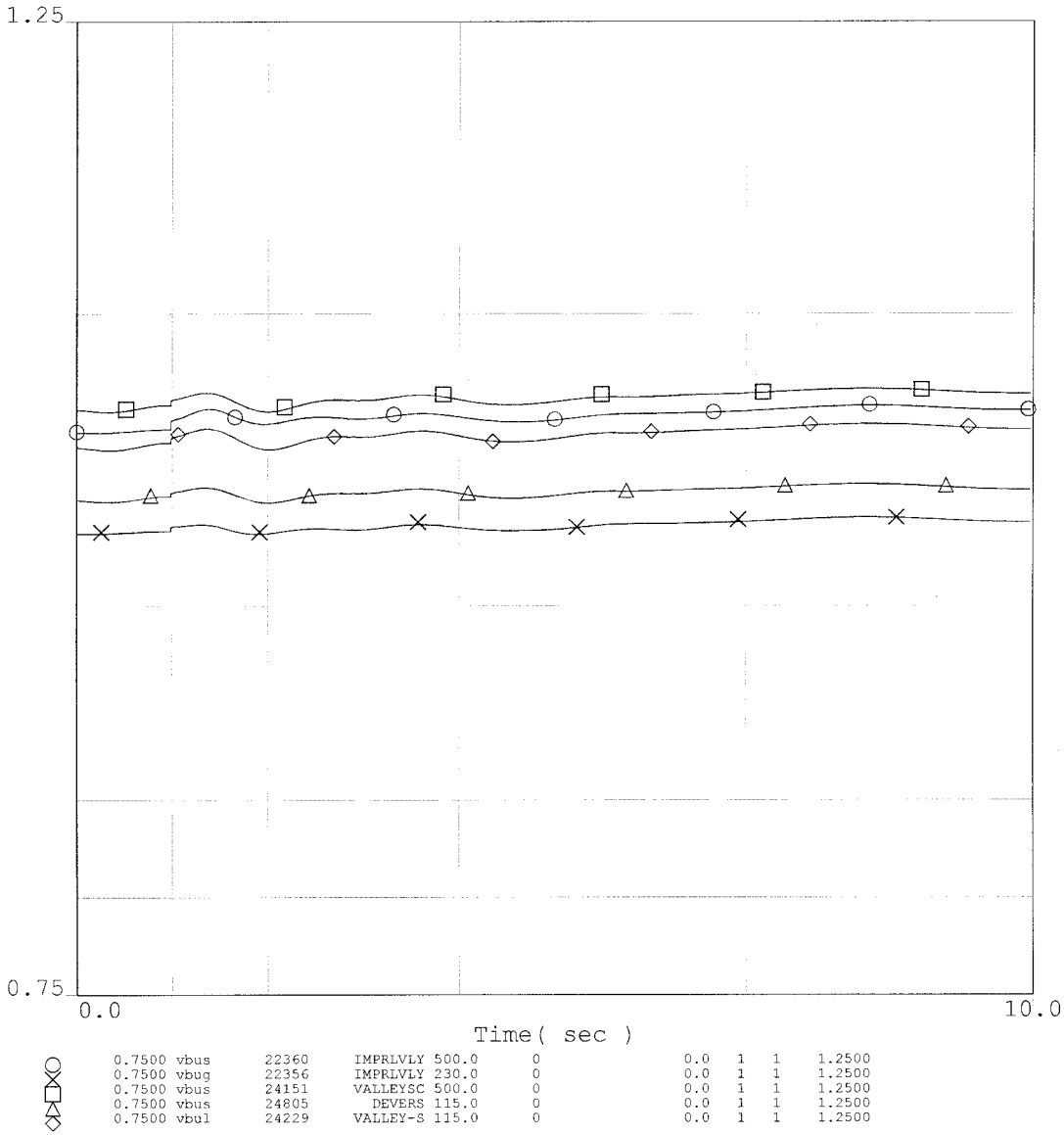
CALIFORNIA_voltages:



0.7500 vbus	24801	DEVERS 500.0	0	0.0	1	1	1.2500
0.7500 vbus	24086	LUGO 500.0	0	0.0	1	1	1.2500
0.7500 vbus	24156	VINCENT 500.0	0	0.0	1	1	1.2500
0.7500 vbus	26094	SYLMARLA 230.0	0	0.0	1	1	1.2500
0.7500 vbus	24804	DEVERS 230.0	0	0.0	1	1	1.2500

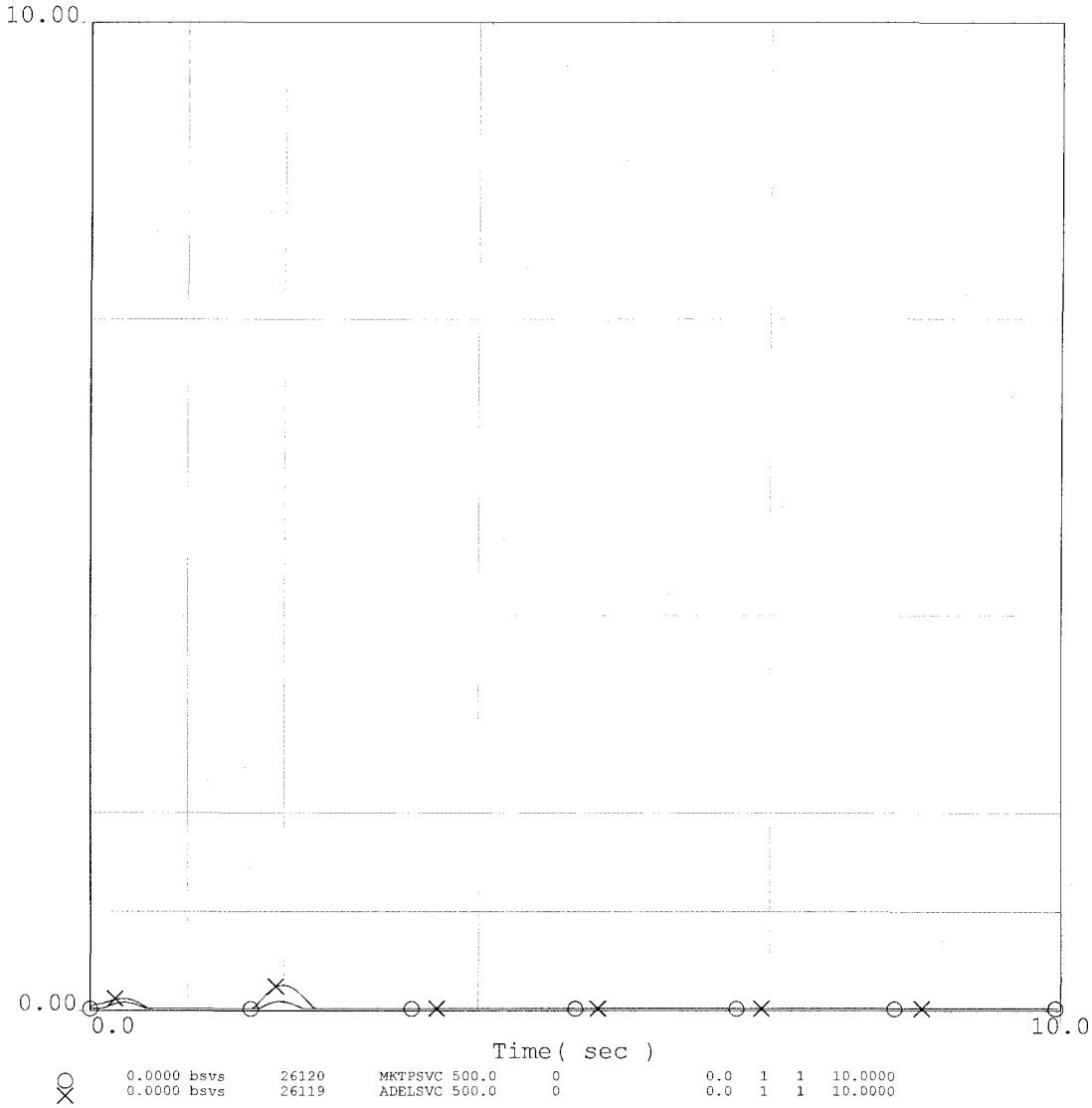
2014HS-UFSAR03:LOSS OF THE LARGEST GENERATOR- ONE PALO VERDE UNIT #3
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/4/11)

CALIFORNIA_voltages:



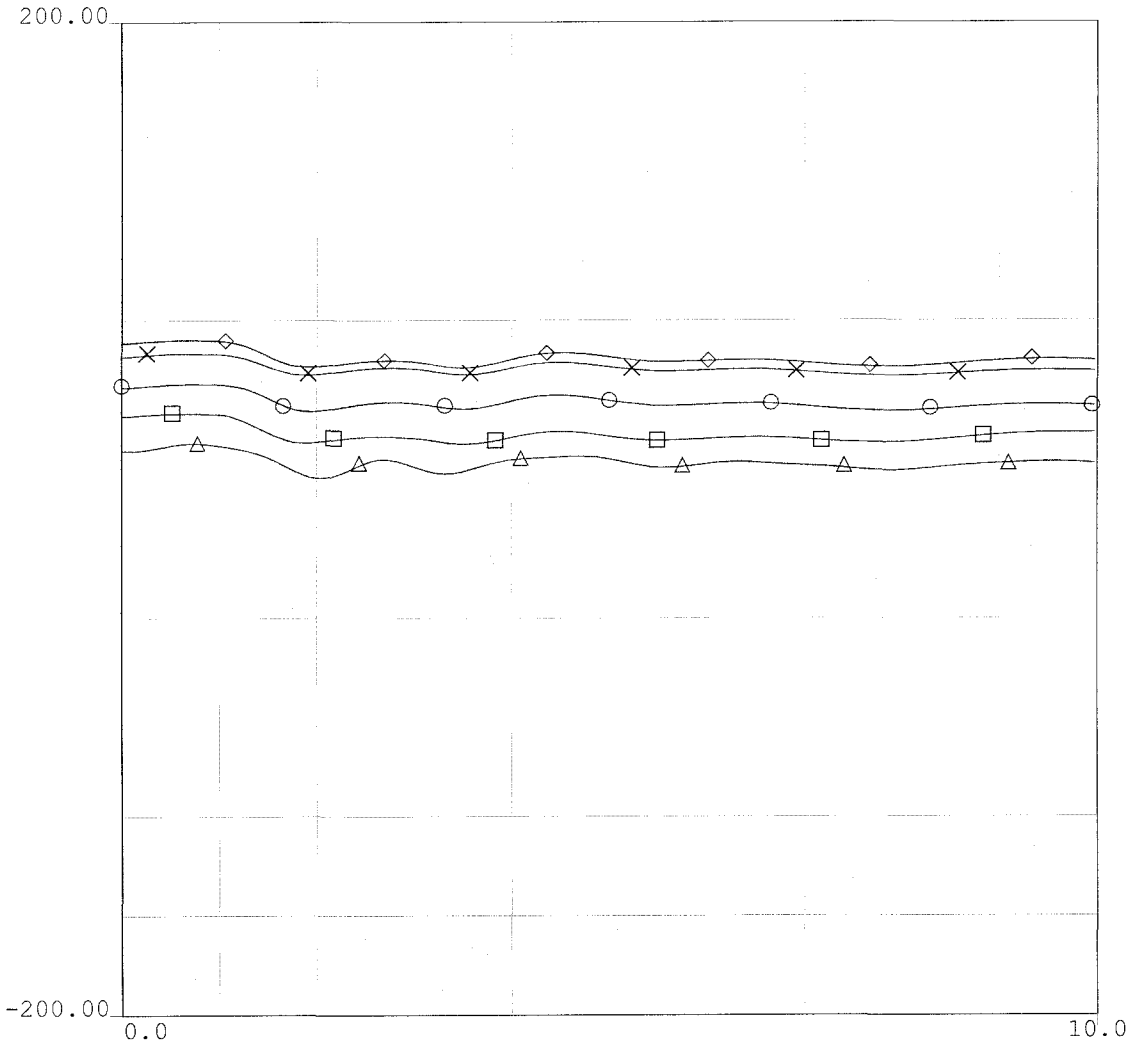
2014HS-UFSAR03:LOSS OF THE LARGEST GENERATOR- ONE PALO VERDE UNIT #3
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/4/11)

SVC_output



2014HS-UFSAR03:LOSS OF THE LARGEST GENERATOR- ONE PALO VERDE UNIT #3
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/4/11)

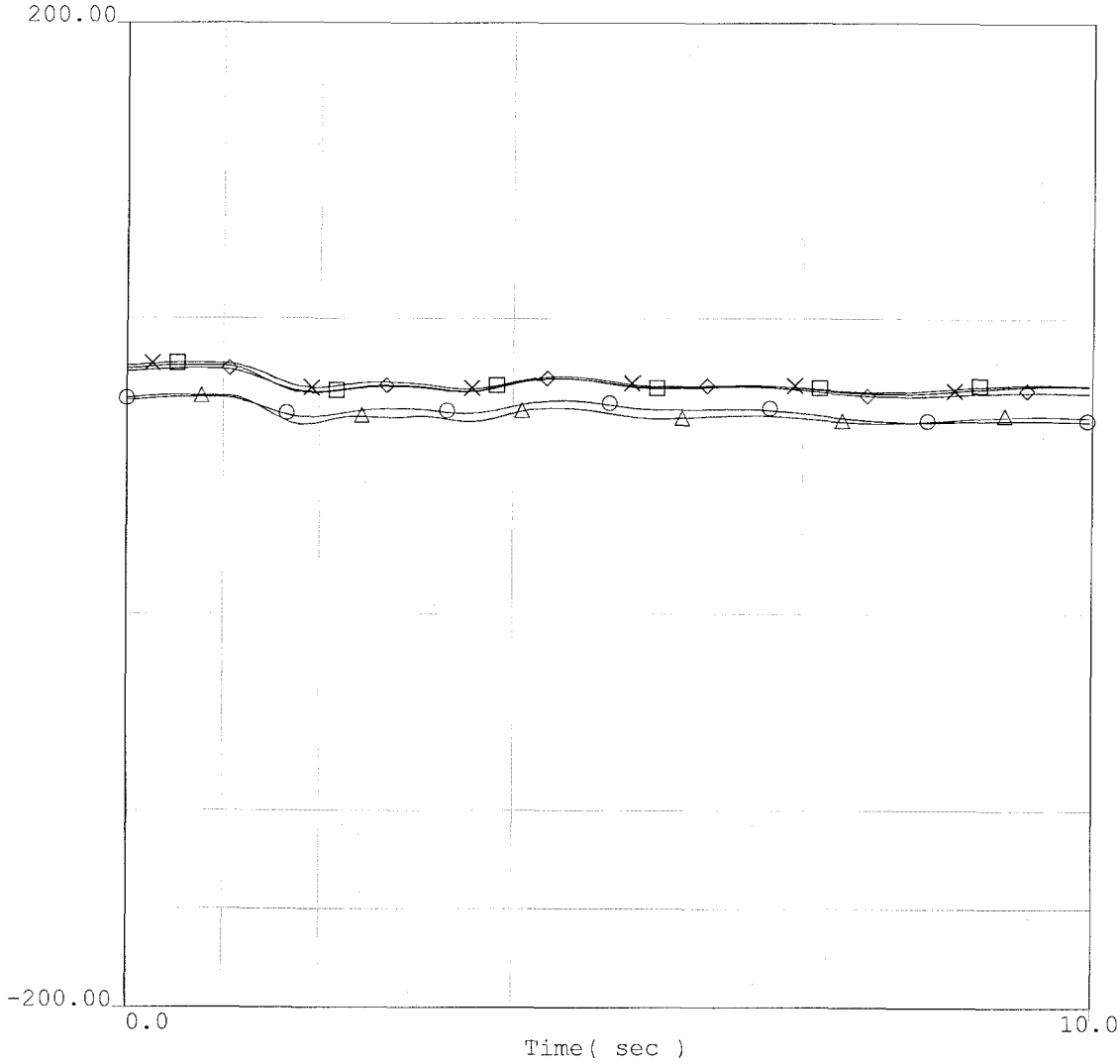
SYSTEM_Rotorangles



-200.0000 ang	16500	SPR GEN1	19.0	0	0.0	1	1	200.0000
-200.0000 ang	10321	SJUAN_G4	22.0	0	0.0	1	1	200.0000
-200.0000 ang	14942	SAGUARO2	15.5	0	0.0	1	1	200.0000
-200.0000 ang	17024	APACHCT1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	16518	SPR GEN3	21.0	0	0.0	1	1	200.0000

2014HS-UFSAR03:LOSS OF THE LARGEST GENERATOR- ONE PALO VERDE UNIT #3
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/4/11)

SYSTEM_Rotorangles



-200.0000 ang	15140	DBG-CT1	18.0	0	0.0	1	1	200.0000
-200.0000 ang	14945	SAG. CT3	13.8	0	0.0	1	1	200.0000
-200.0000 ang	14902	CHOLLA3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	15921	SANTAN 1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	14903	CHOLLA4	22.0	0	0.0	1	1	200.0000

2014HS-UFSAR03:LOSS OF THE LARGEST GENERATOR- ONE PALO VERDE UNIT #3
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/4/11)

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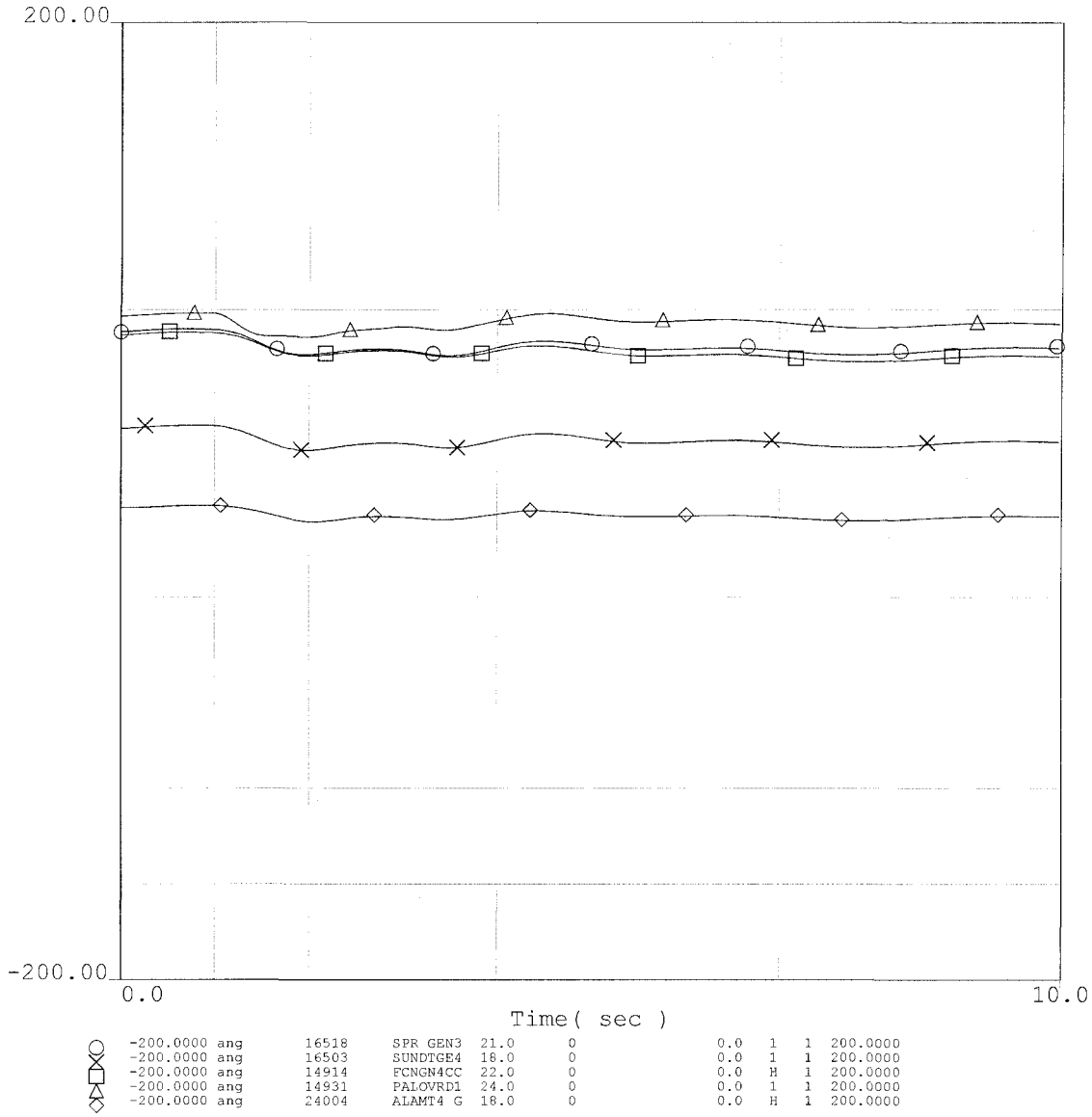
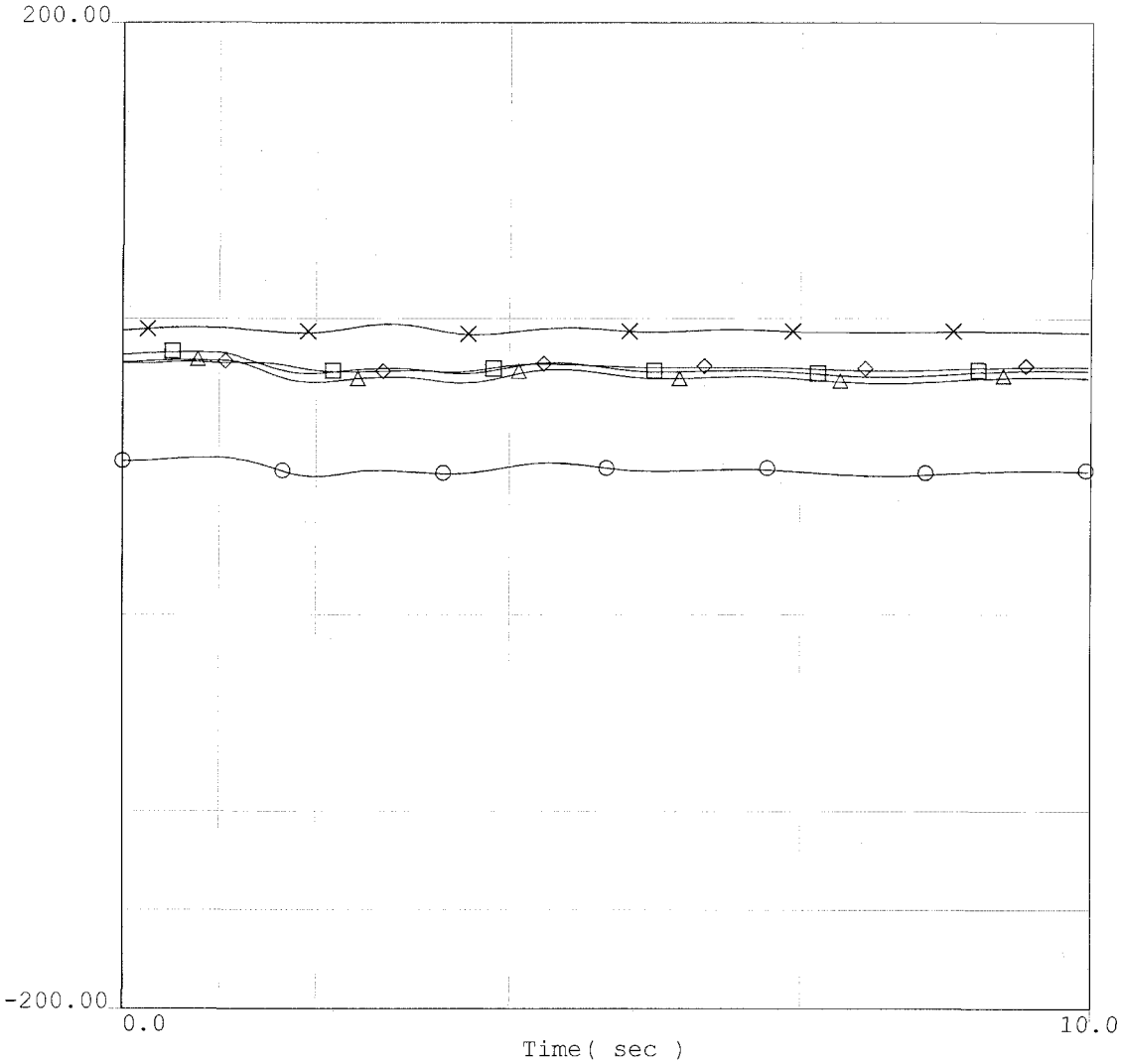
SYSTEM_Rotorangles



2014HS-UFSAR03:LOSS OF THE LARGEST GENERATOR- ONE PALO VERDE UNIT #3
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/4/11)

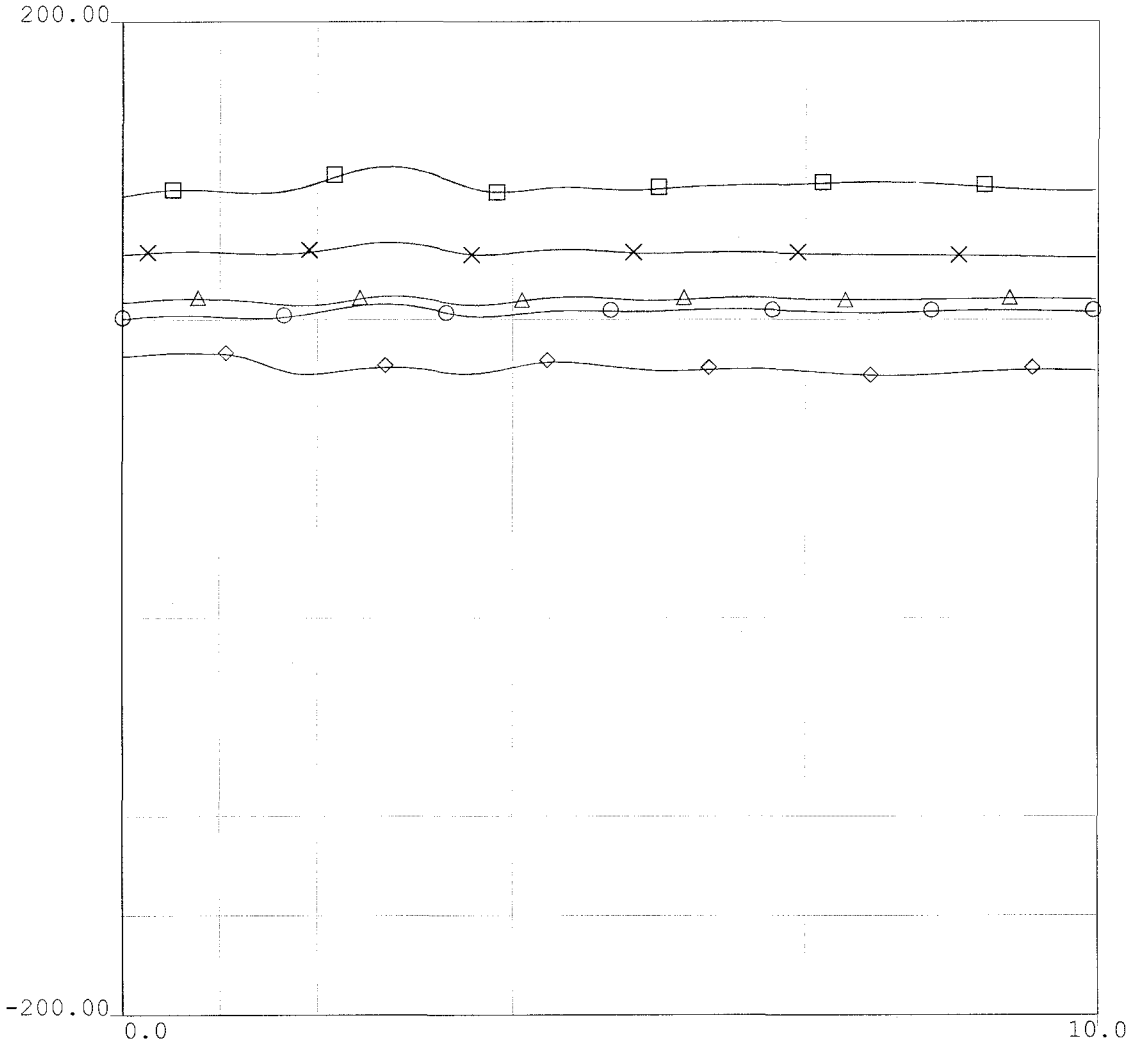
SYSTEM_Rotorangles



-200.0000 ang	24129	S.ONOFR2	22.0	0	0.0	1	1	200.0000
-200.0000 ang	26039	INTERM1G	26.0	0	0.0	1	1	200.0000
-200.0000 ang	15981	NAVAJO 1	26.0	0	0.0	1	1	200.0000
-200.0000 ang	10318	SJUAN_G1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	36411	DIABLO 1	25.0	0	0.0	1	1	200.0000

2014HS-UFSAR03:LOSS OF THE LARGEST GENERATOR- ONE PALO VERDE UNIT #3
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/4/11)

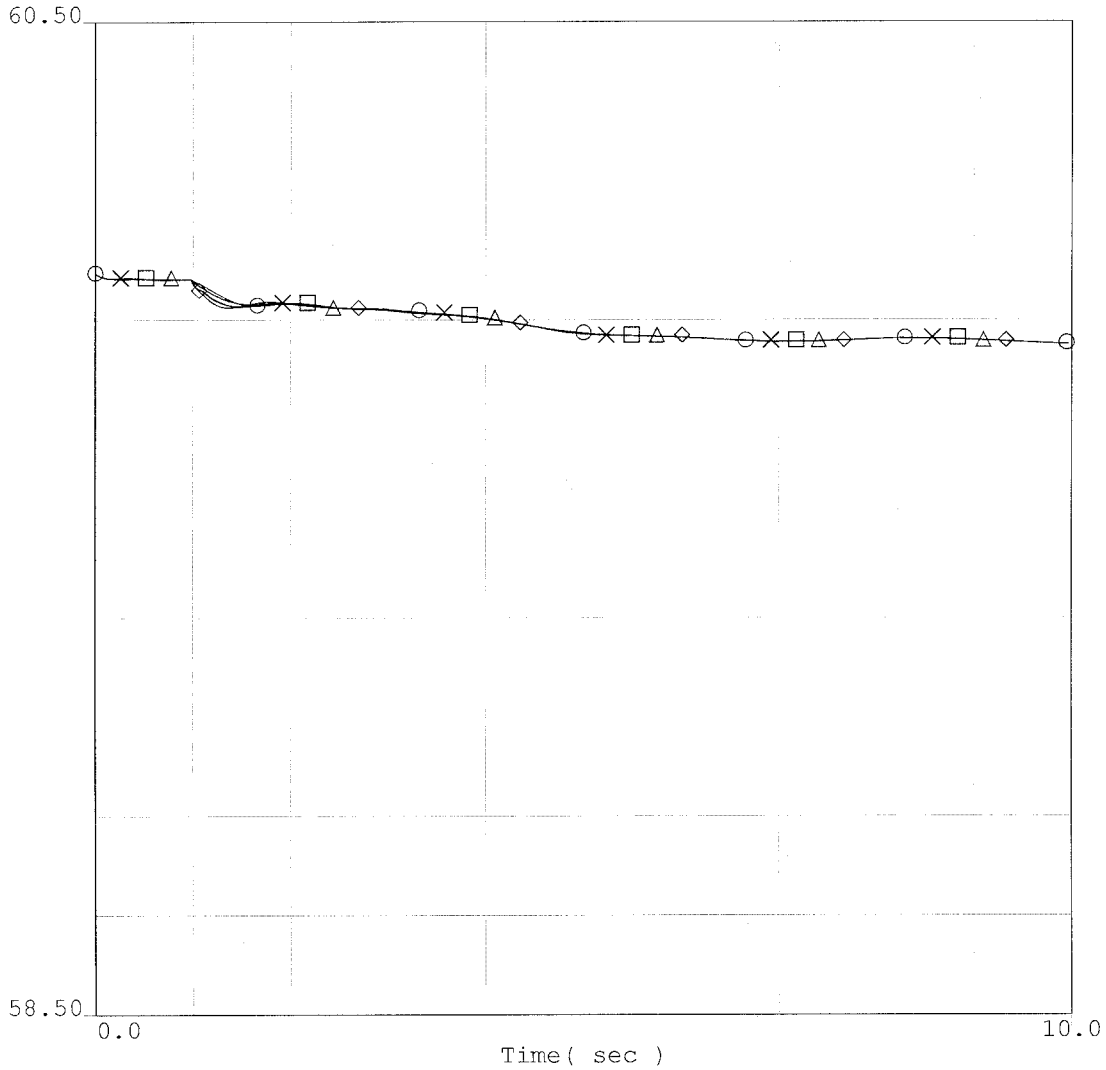
SYSTEM_Rotorangles



-200.0000 ang	73129	MBPP-1	24.0	0	0.0	1	1	200.0000
-200.0000 ang	60086	BRIDGER1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	62050	COLSTP 1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	65500	EHUNTR 3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	10321	SJUAN_G4	22.0	0	0.0	1	1	200.0000

2014HS-UFSAR03:LOSS OF THE LARGEST GENERATOR- ONE PALO VERDE UNIT #3
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/4/11)

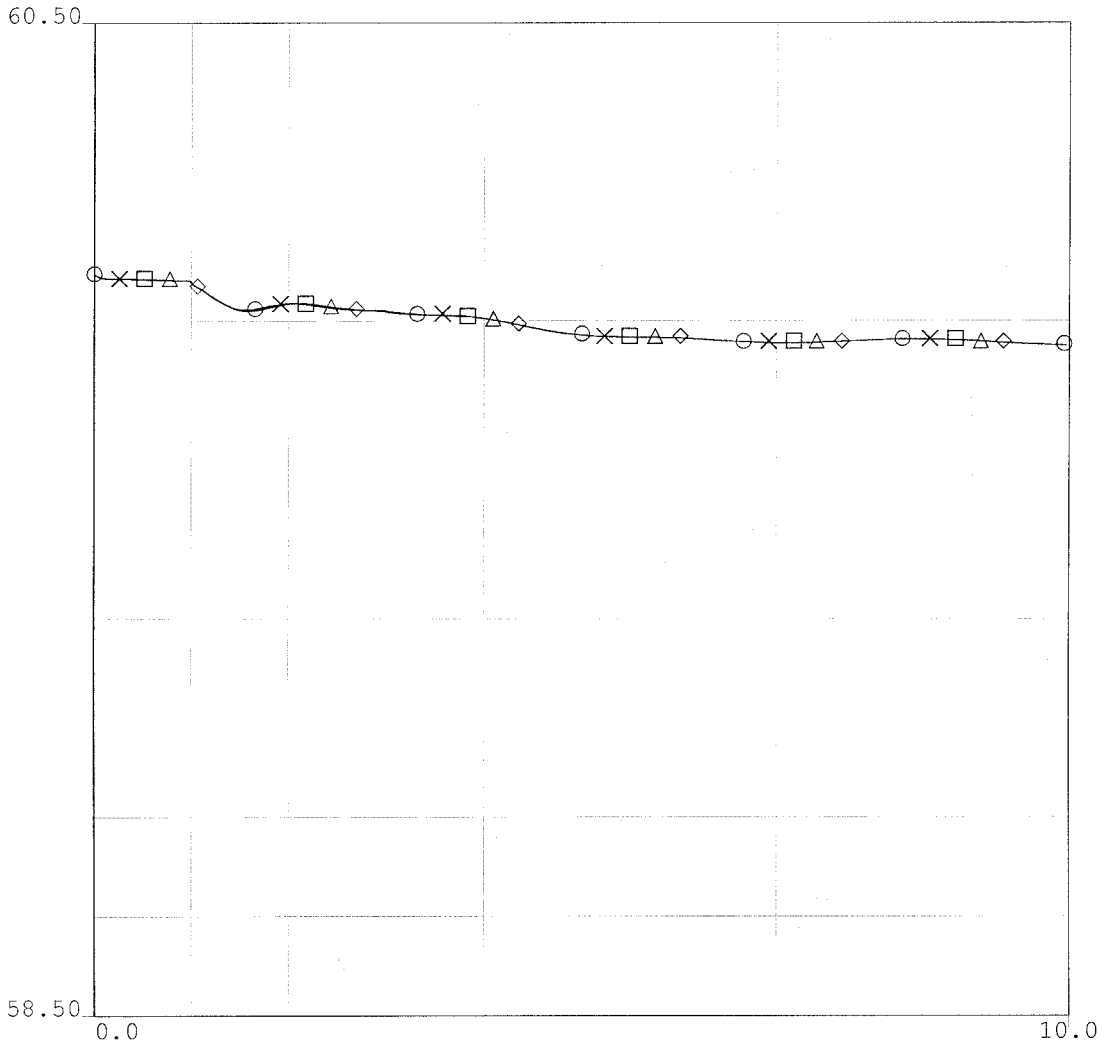
Frequencies:



○	58.5000 fbus	14003	NAVAJO 500.0	0	0.0	1	1	60.5000
⊗	58.5000 fbus	14005	WESTWING 500.0	0	0.0	1	1	60.5000
□	58.5000 fbus	14001	FOURCORN 500.0	0	0.0	1	1	60.5000
△	58.5000 fbus	14016	PNPKAPS 500.0	0	0.0	1	1	60.5000
◇	58.5000 fbus	15021	PALOVRDE 500.0	0	0.0	1	1	60.5000

2014HS-UFSAR03:LOSS OF THE LARGEST GENERATOR- ONE PALO VERDE UNIT #3
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/4/11)

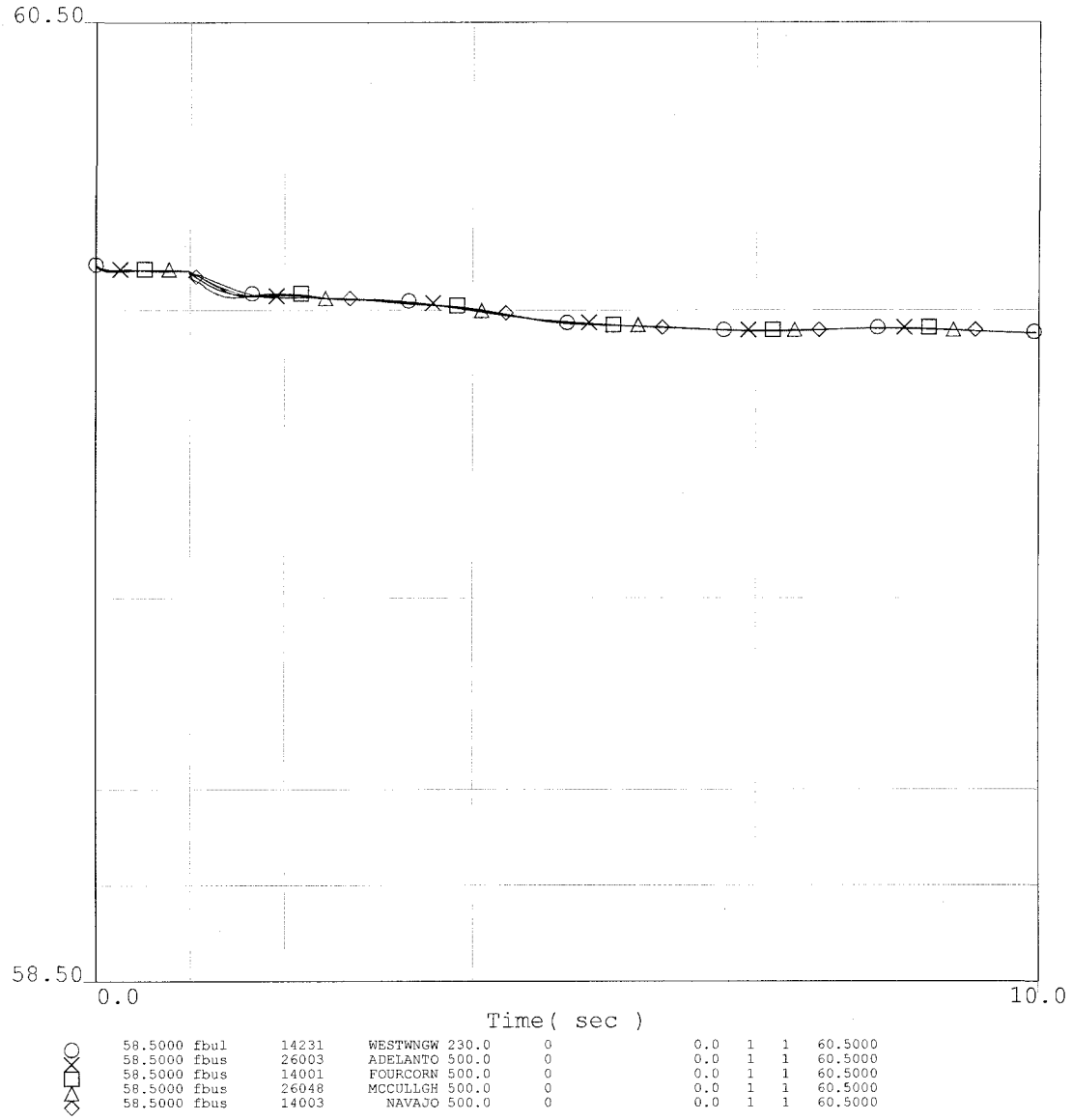
Frequencies:



58.5000 fbus	16000	TORTOLIT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	16105	VAIL 345.0	0	0.0	1	1	60.5000
58.5000 fbus	16103	SOUTH 345.0	0	0.0	1	1	60.5000
58.5000 fbul	15001	CORONADO 500.0	0	0.0	1	1	60.5000
58.5000 fbus	16109	WINCHSTR 345.0	0	0.0	1	1	60.5000

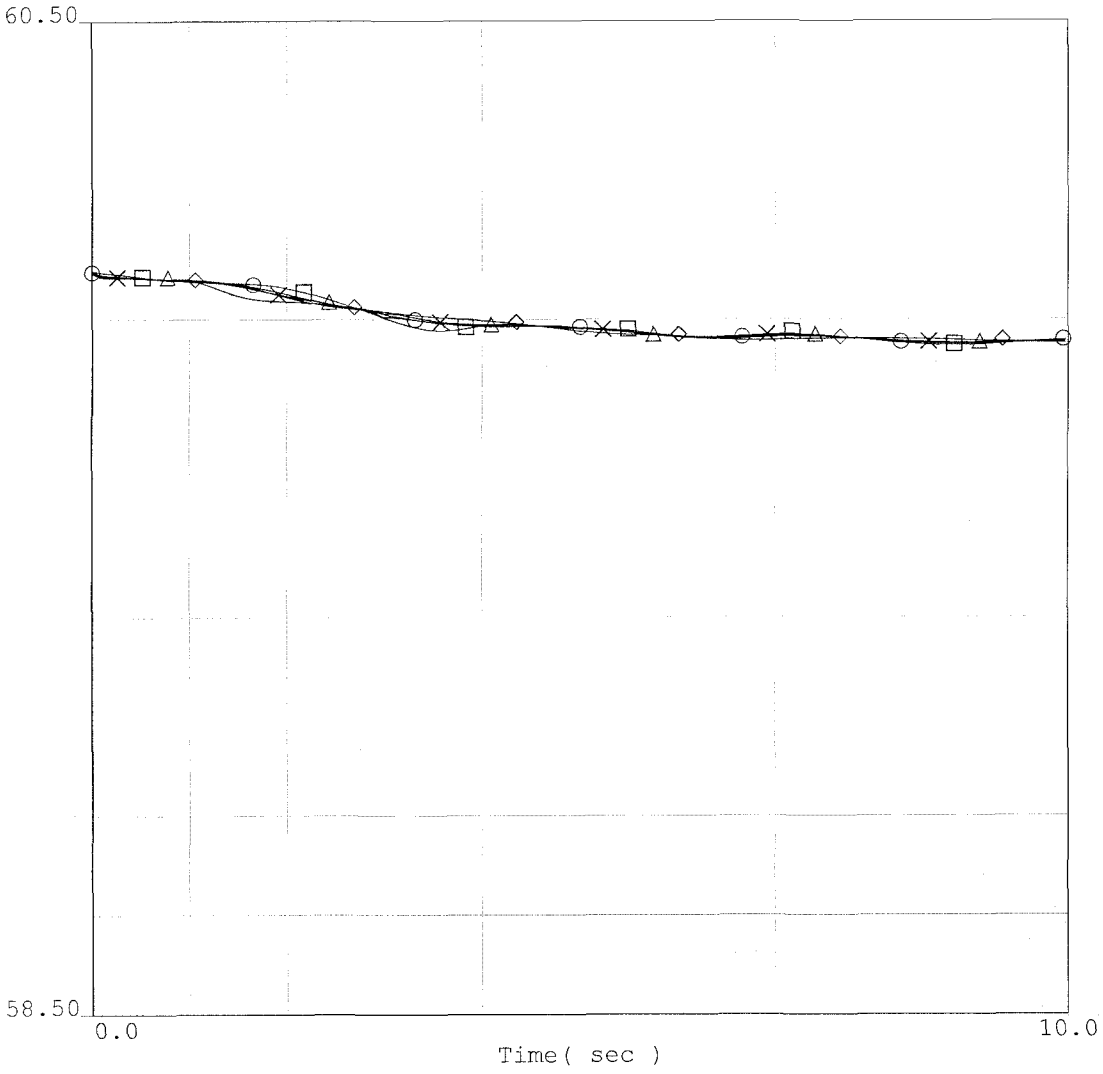
2014HS-UFSAR03:LOSS OF THE LARGEST GENERATOR- ONE PALO VERDE UNIT #3
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/4/11)

Frequencies:



2014HS-UFSAR03:LOSS OF THE LARGEST GENERATOR- ONE PALO VERDE UNIT #3
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/4/11)

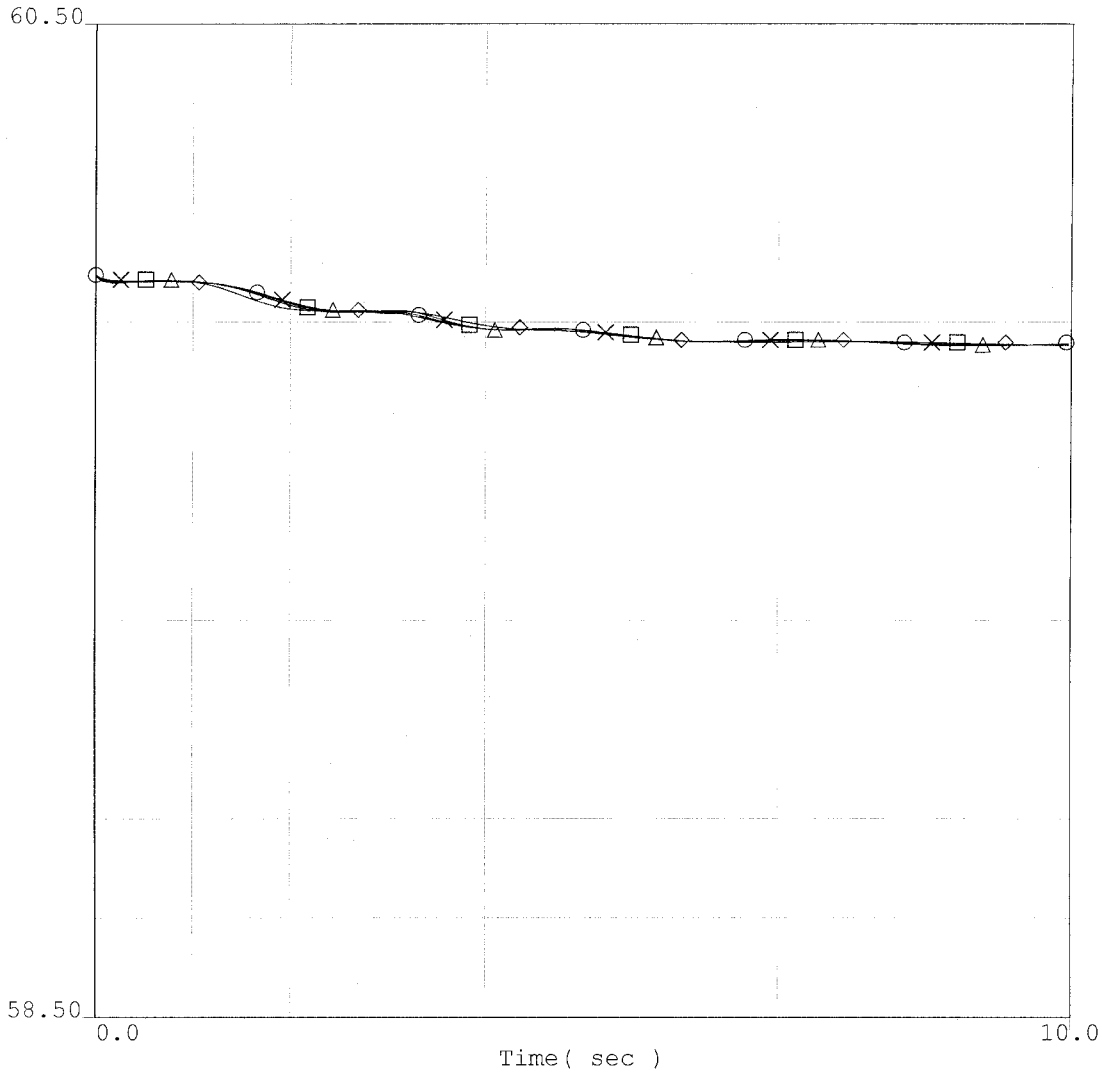
Frequencies:



58.5000 fbus	40489	GRIZZLY 500.0	0	0.0	1	1	60.5000
58.5000 fbus	40687	MALIN 500.0	0	0.0	1	1	60.5000
58.5000 fbus	40459	GARRISON 500.0	0	0.0	1	1	60.5000
58.5000 fbus	60235	MIDPOINT 345.0	0	0.0	1	1	60.5000
58.5000 fbus	66230	PINTO 138.0	0	0.0	1	1	60.5000

2014HS-UFSAR03:LOSS OF THE LARGEST GENERATOR- ONE PALO VERDE UNIT #3
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/4/11)

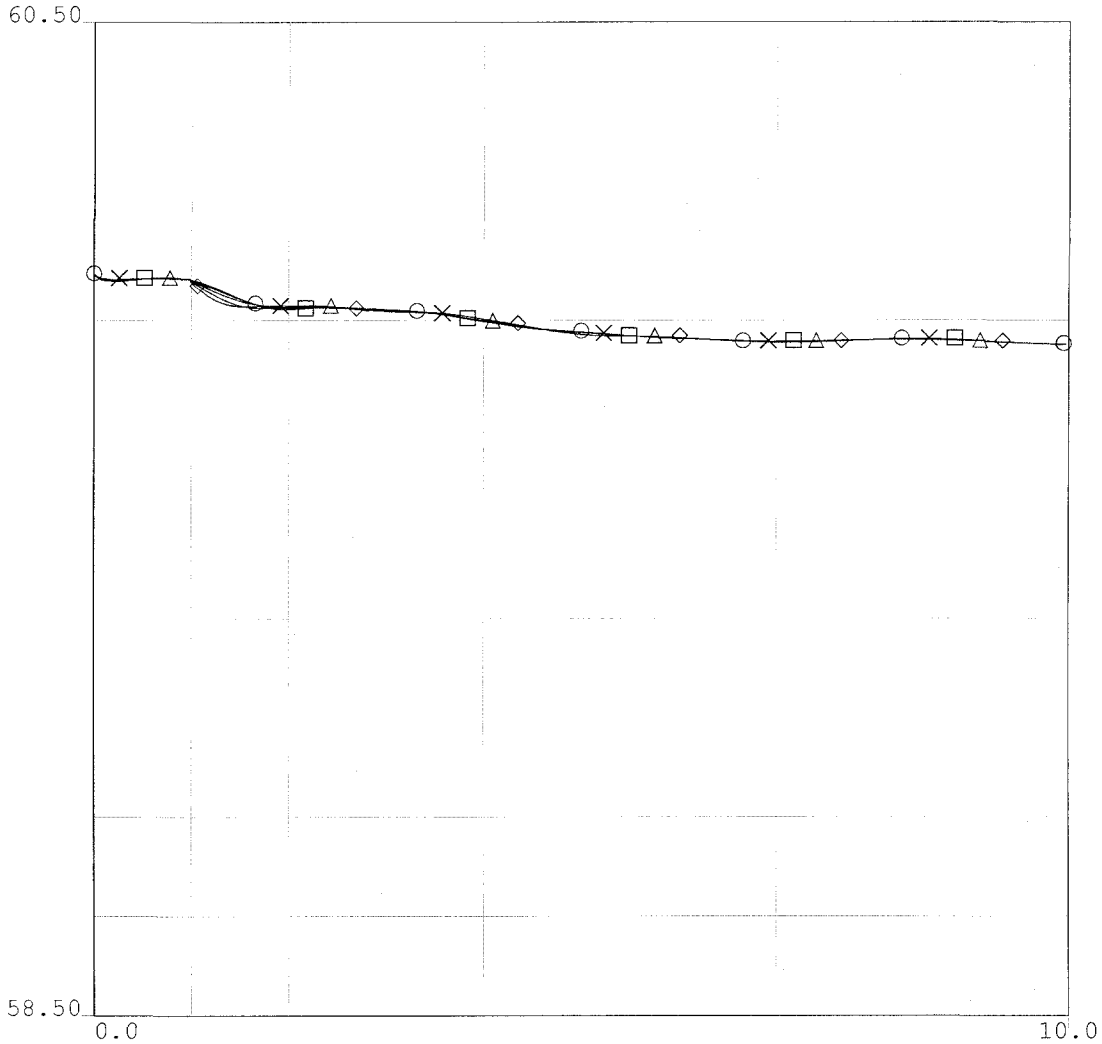
Frequencies:



58.5000 fbus	30005	ROUND MT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30015	TABLE MT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30035	TRACY 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30040	TESLA 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30060	MIDWAY 500.0	0	0.0	1	1	60.5000

2014HS-UFSAR03:LOSS OF THE LARGEST GENERATOR- ONE PALO VERDE UNIT #3
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/4/11)

Frequencies:



58.5000 fbus	24801	DEVERS 500.0	0	0.0	1	1	60.5000
58.5000 fbus	24086	LUGO 500.0	0	0.0	1	1	60.5000
58.5000 fbus	26094	SYLMARLA 230.0	0	0.0	1	1	60.5000
58.5000 fbus	22468	MIGUEL 500.0	0	0.0	1	1	60.5000
58.5000 fbus	22536	N.GILA 500.0	0	0.0	1	1	60.5000

2014HS-UFSAR03:LOSS OF THE LARGEST GENERATOR- ONE PALO VERDE UNIT #3
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 81 0MVARS(4/4/11)

HIGHEST VOLTAGE DIP

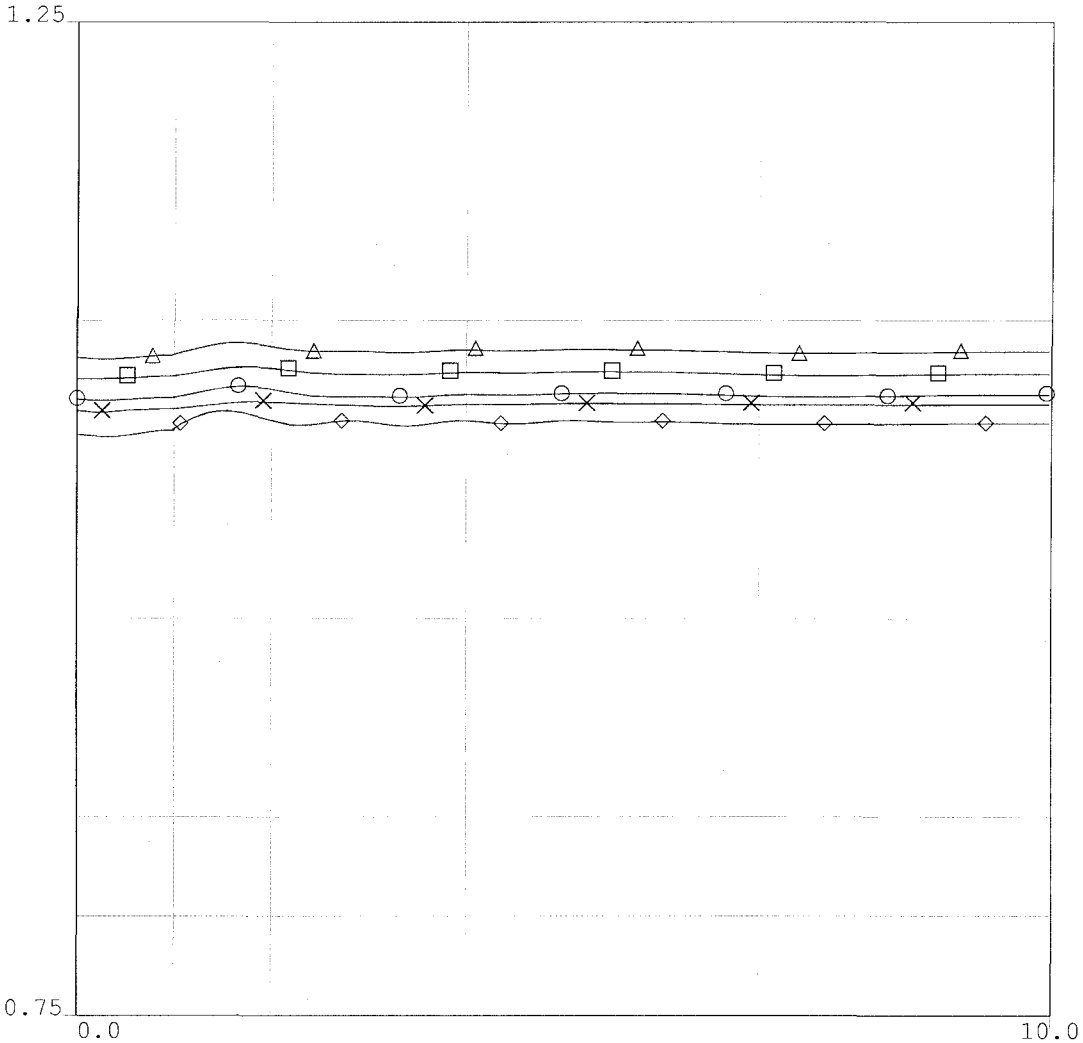
AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct	@time
40	STATELIN	69	vbul	1.003	0.871	13.2	3.142
40	VANSYCLE	69	vbus	1.005	0.871	13.3	3.179
40	COID TAP	69	vbug	1.017	0.976	4	2.617

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
54	LONGLK10	25	fbul	59.819	4.604
54	MUSKEG2	240	fbus	59.819	4.642
54	MUSKEG4	13.8	fbug	59.817	4.642

There were 0 violations of MORC criteria 1 (25% Voltage Dip) !
There were 0 violations of MORC criteria 2 (20% Voltage Dip for 20 Cycles)!
There were 0 violations of MORC criteria 3 (59.6 HZ for 6 Cycles)!

ARIZONA_voltages:



0.7500 vbus	15021	PALOVRDE 500.0	0	0.0	1	1	1.2500
0.7500 vbus	14001	FOURCORN 500.0	0	0.0	1	1	1.2500
0.7500 vbus	15011	KYRENE 500.0	0	0.0	1	1	1.2500
0.7500 vbus	14003	NAVAJO 500.0	0	0.0	1	1	1.2500
0.7500 vbus	26003	ADELANTO 500.0	0	0.0	1	1	1.2500

2014HS-UFSAR04:LOSS OF THE LARGEST PUMPING LOAD-840 MW OF EDMONT IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

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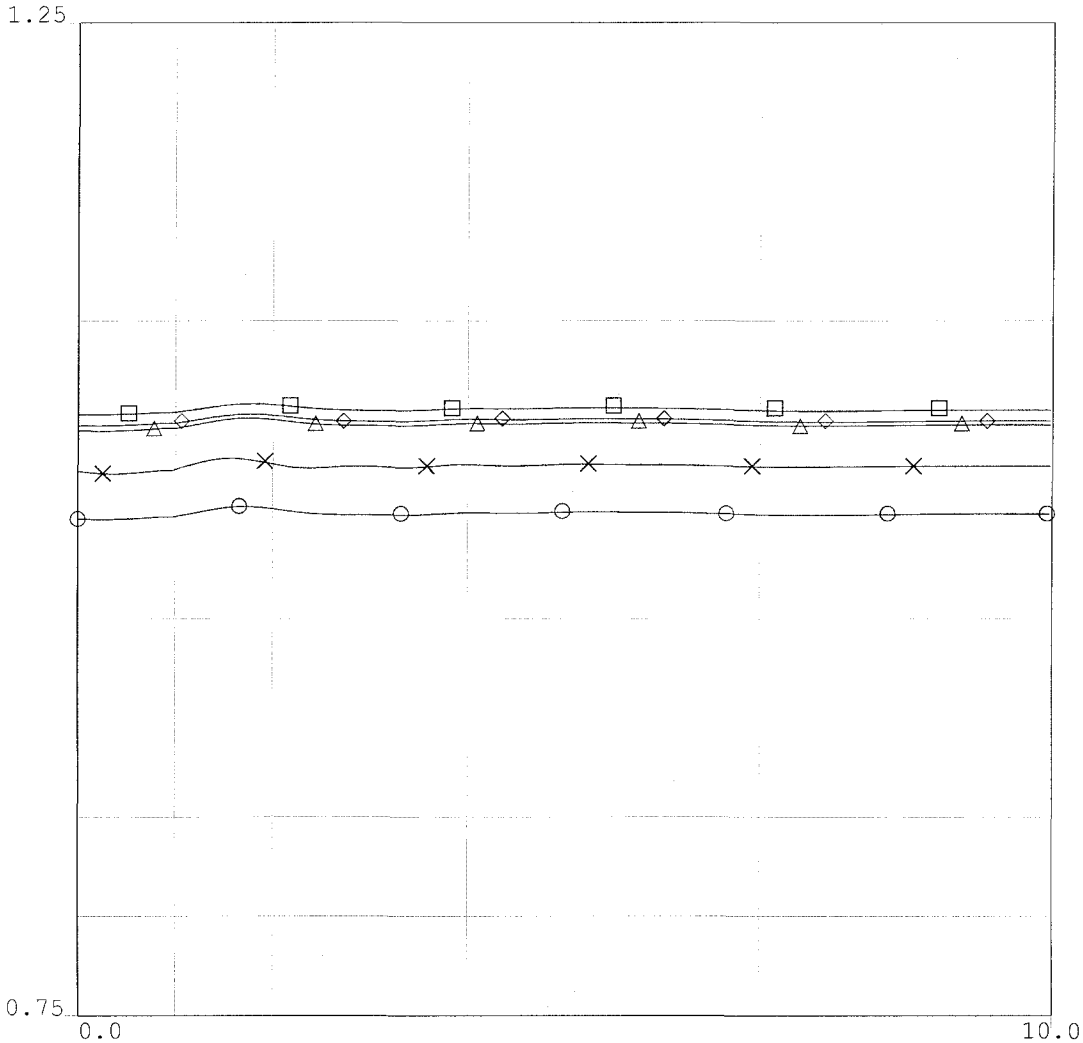
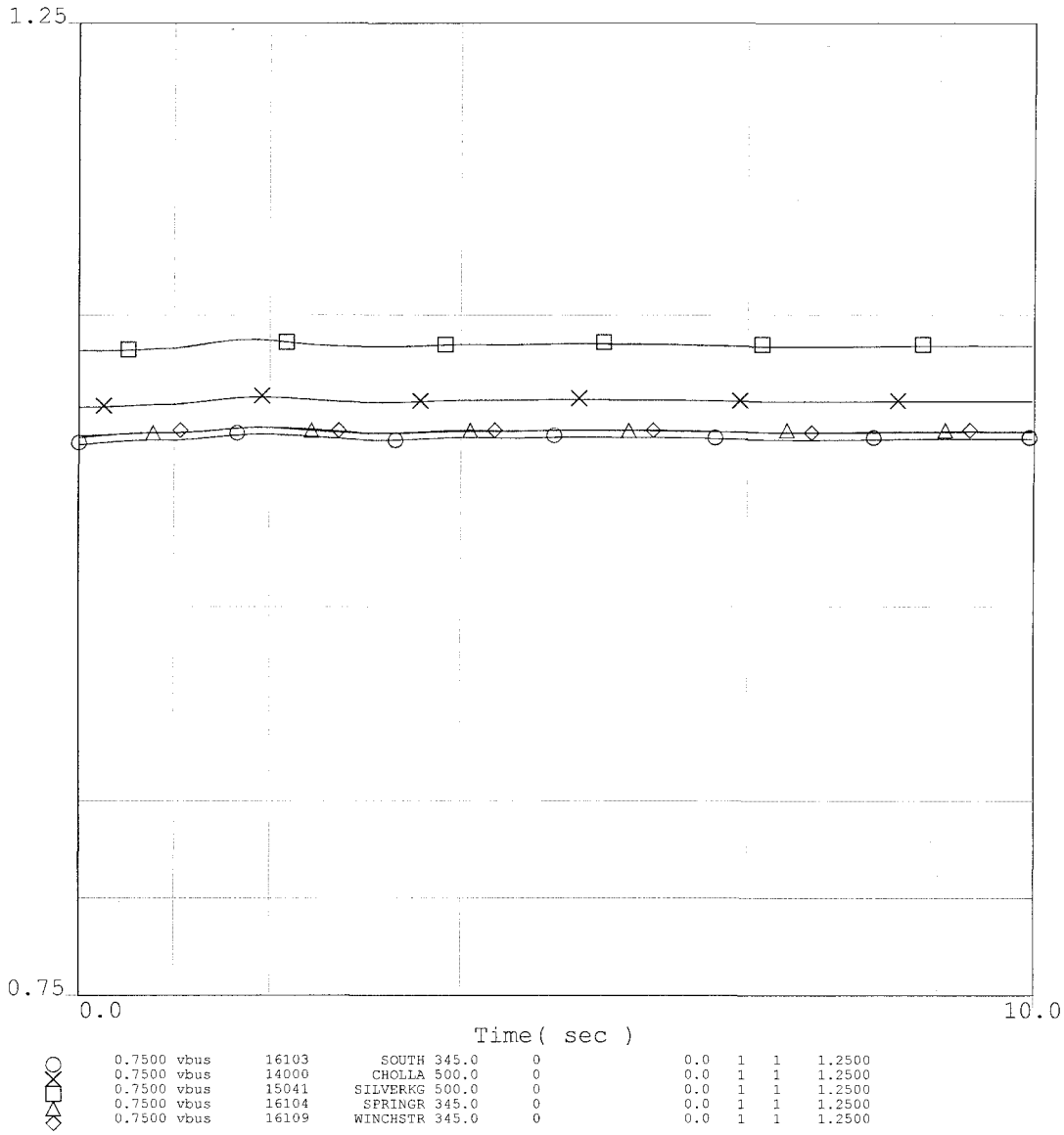
ARIZONA_voltages:



0.7500 vbul	14231	WESTWNGW 230.0	0	0.0	1	1	1.2500
0.7500 vbus	19011	MEAD N 230.0	0	0.0	1	1	1.2500
0.7500 vbus	15215	SILVERKG 230.0	0	0.0	1	1	1.2500
0.7500 vbul	14221	PPAPS W 230.0	0	0.0	1	1	1.2500
0.7500 vbus	15207	KYRENE 230.0	0	0.0	1	1	1.2500

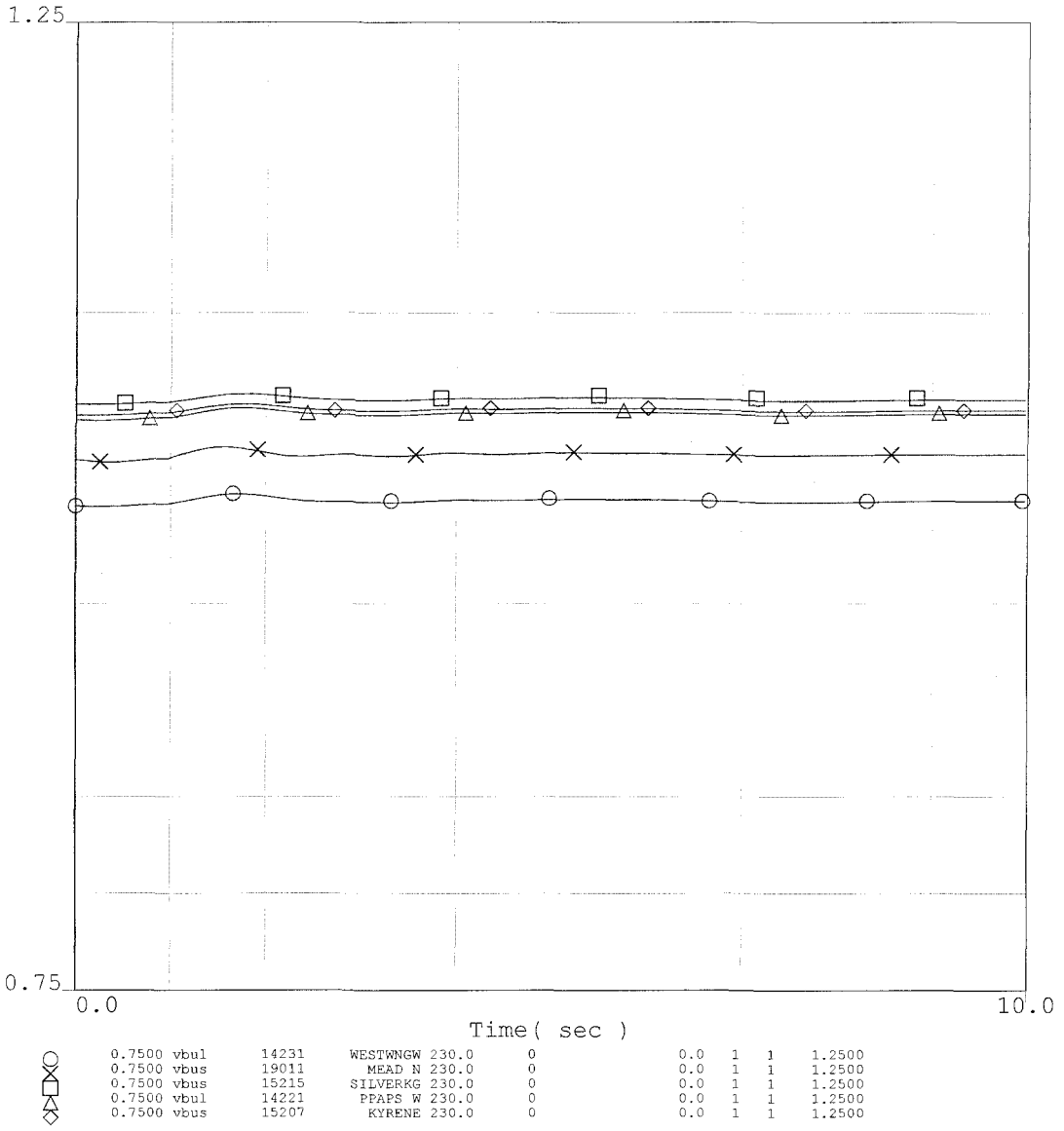
2014HS-UFSAR04:LOSS OF THE LARGEST PUMPING LOAD-840 MW OF EDMONT IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

ARIZONA_voltages:



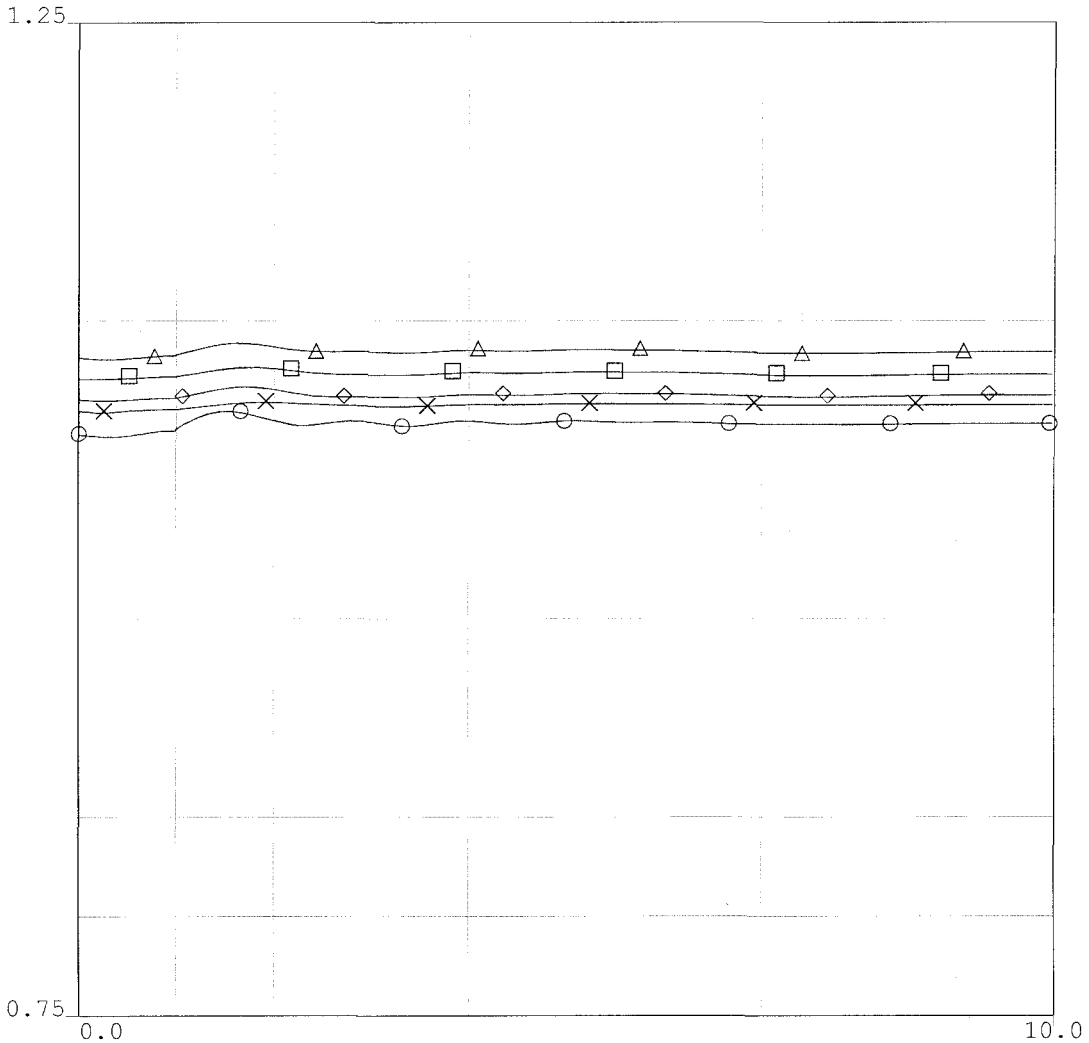
2014HS-UFSAR04:LOSS OF THE LARGEST PUMPING LOAD-840 MW OF EDMONT IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

ARIZONA_voltages:



2014HS-UFSAR04:LOSS OF THE LARGEST PUMPING LOAD-840 MW OF EDMONT IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

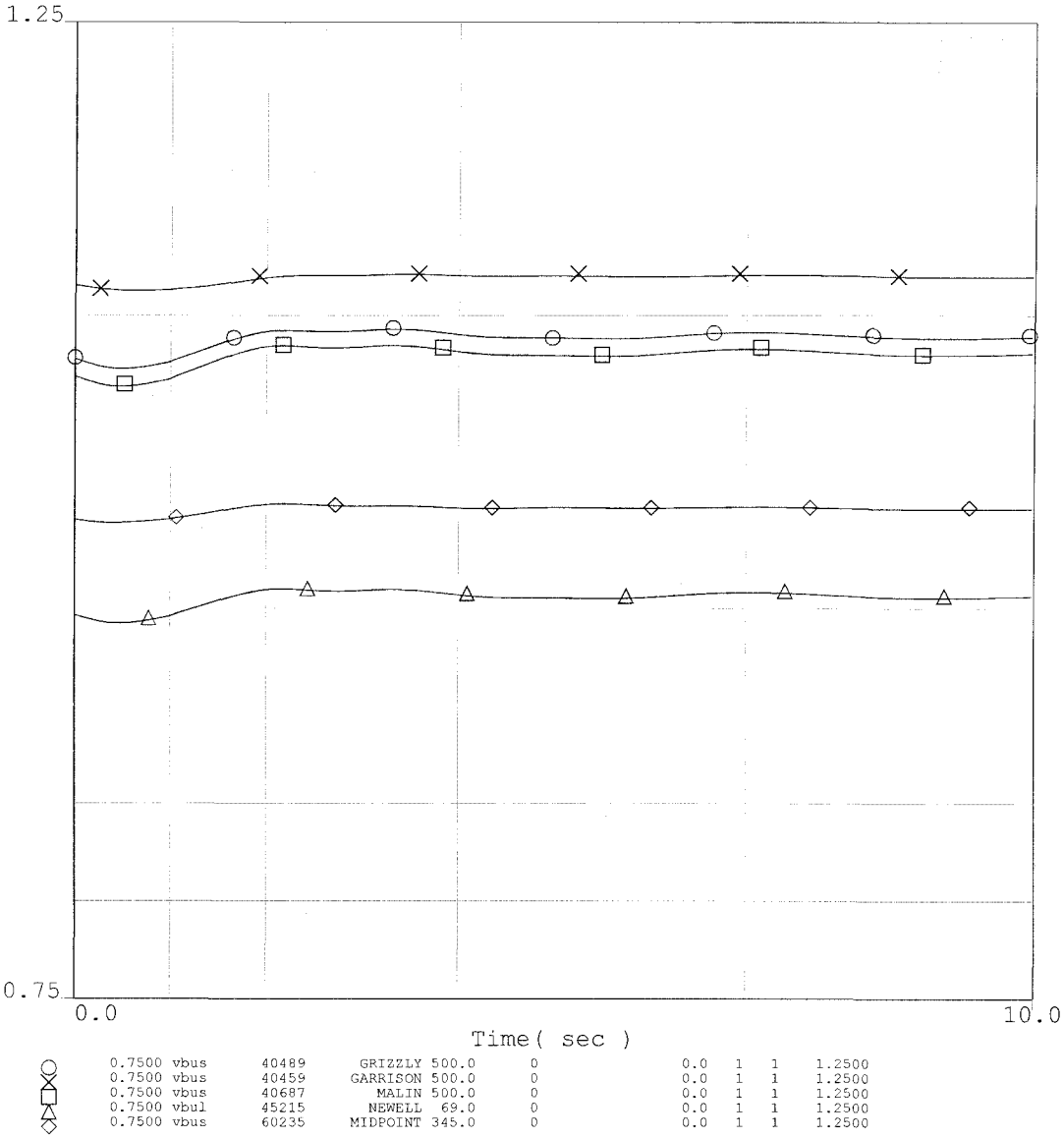
ARIZONA_voltages:



0.7500 vbus	26003	ADELANTO 500.0	0	0.0	1	1	1.2500
0.7500 vbus	14001	FOURCORN 500.0	0	0.0	1	1	1.2500
0.7500 vbus	15011	KYRENE 500.0	0	0.0	1	1	1.2500
0.7500 vbus	14003	NAVAJO 500.0	0	0.0	1	1	1.2500
0.7500 vbus	15021	PALOVRDE 500.0	0	0.0	1	1	1.2500

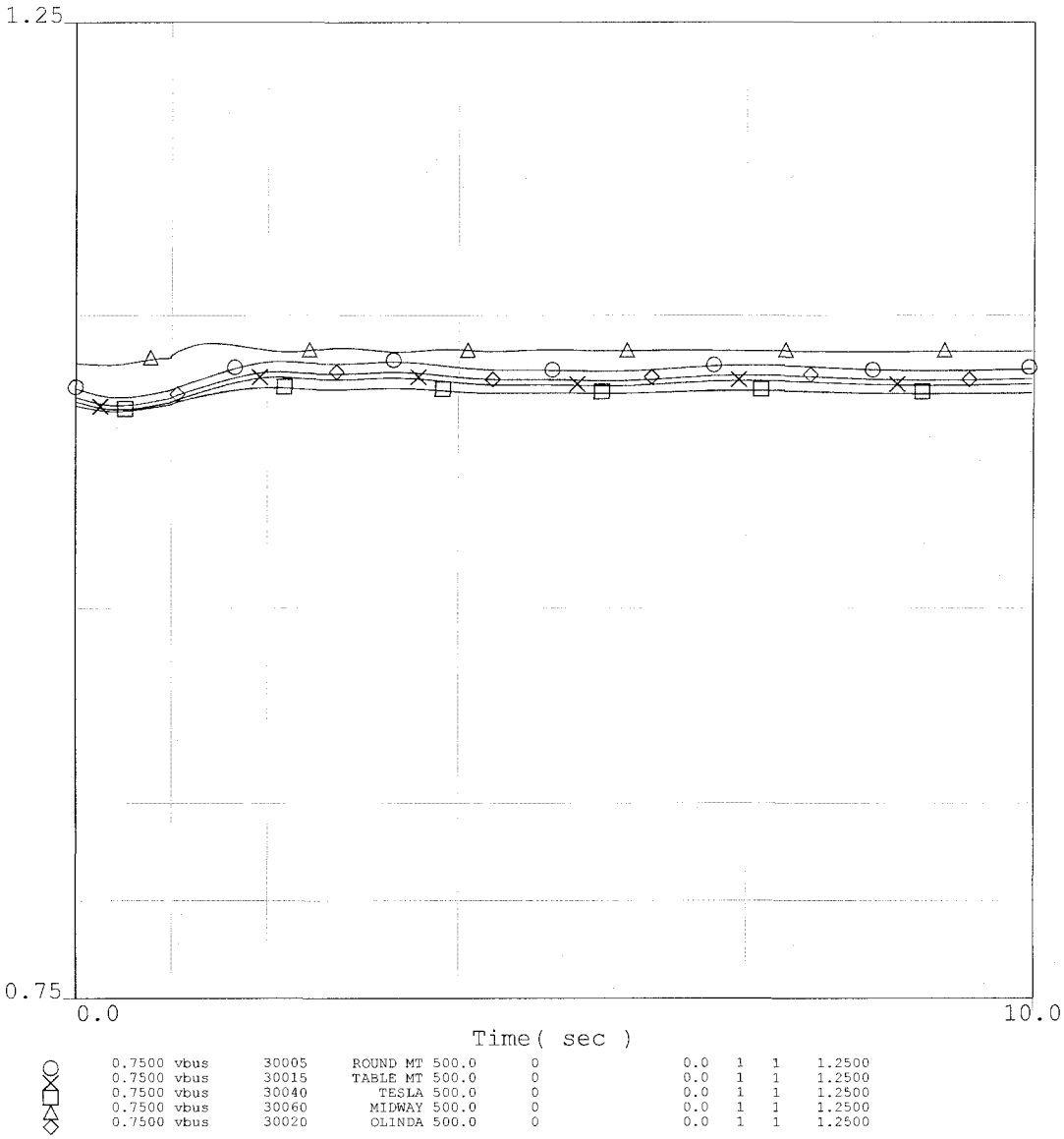
2014HS-UFSAR04:LOSS OF THE LARGEST PUMPING LOAD-840 MW OF EDMONT IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

NORTHWEST_voltages:



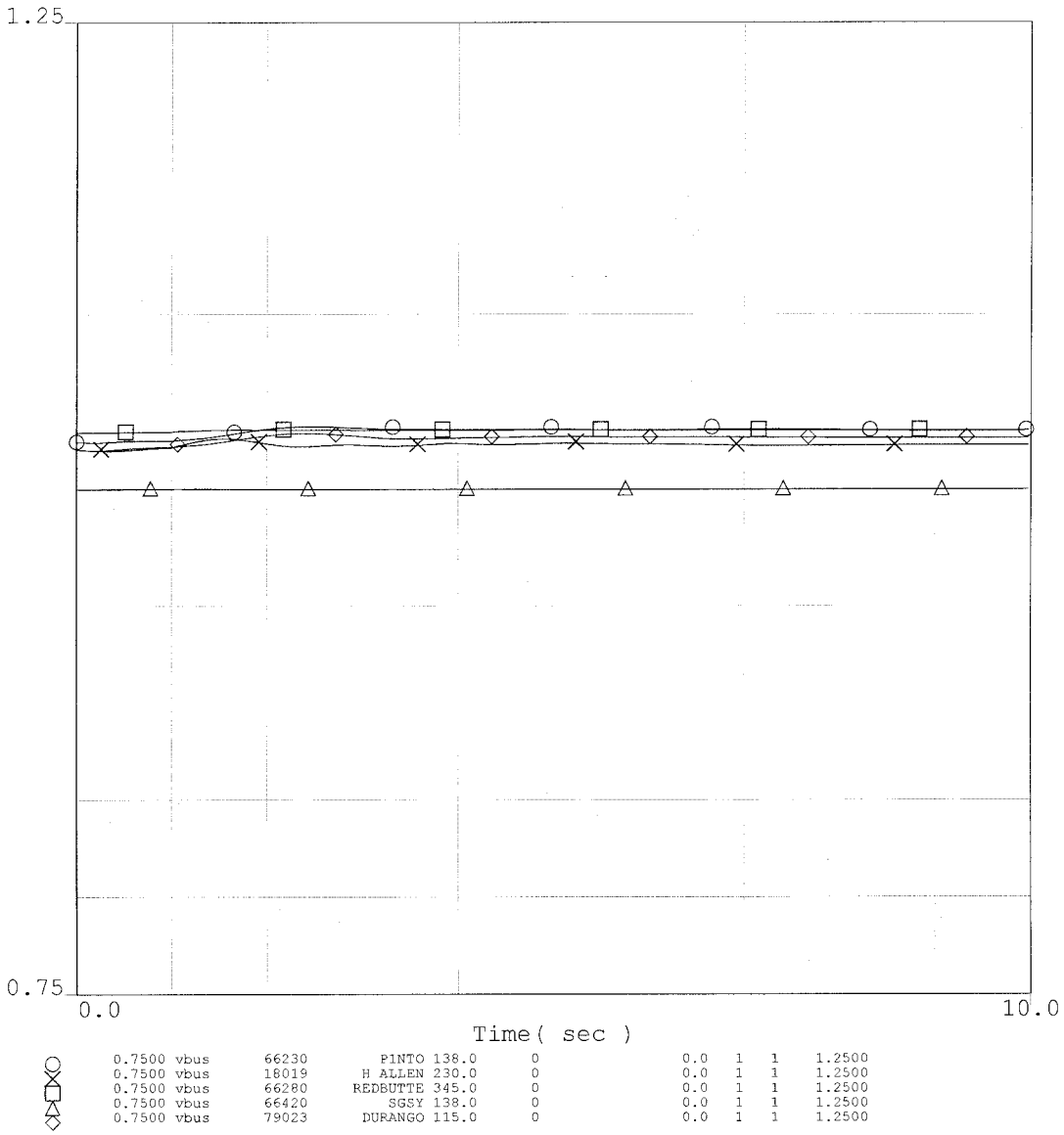
2014HS-UFSAR04:LOSS OF THE LARGEST PUMPING LOAD-840 MW OF EDMONT IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

CALIFORNIA_voltages:



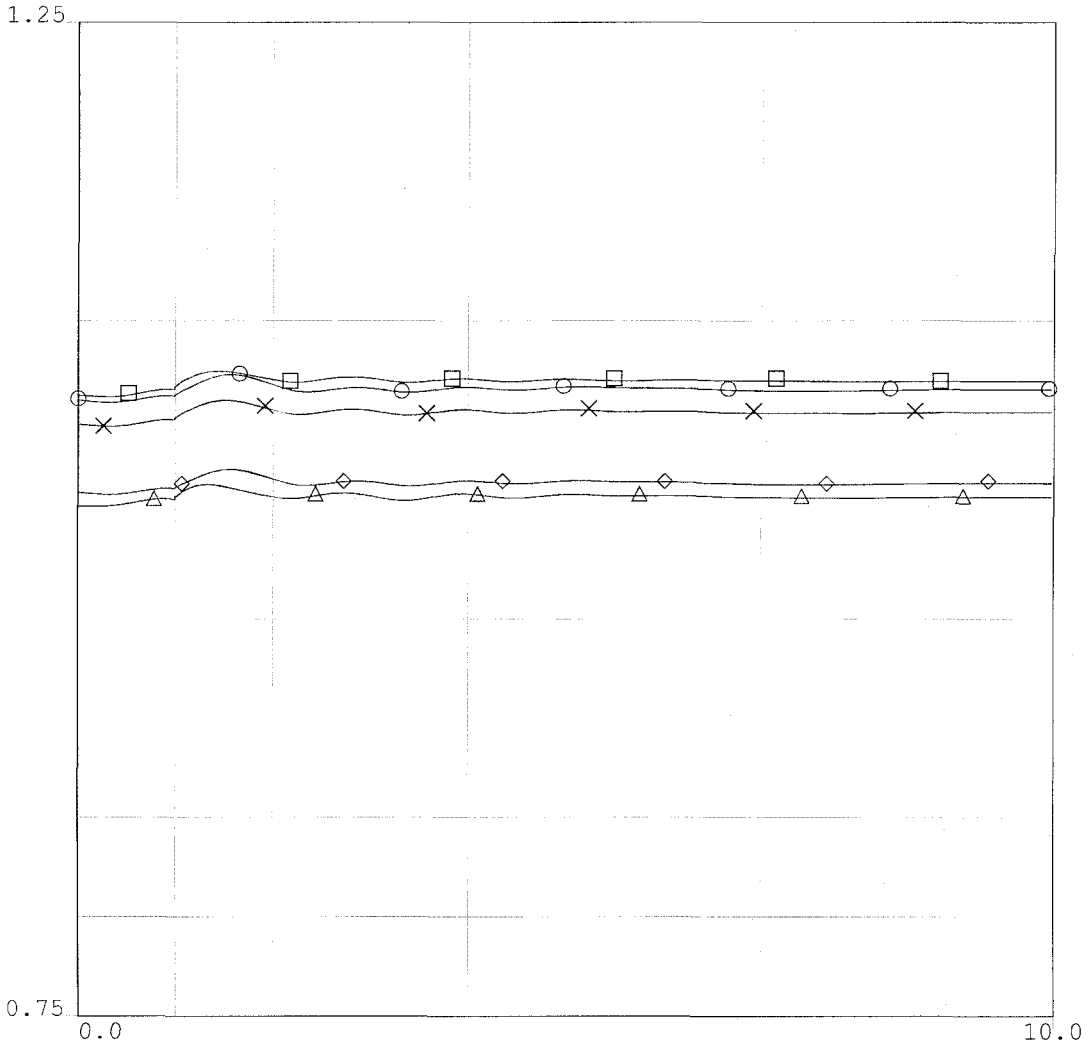
2014HS-UFSAR04:LOSS OF THE LARGEST PUMPING LOAD-840 MW OF EDMONT IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

UTAH_voltages:



2014HS-UFSAR04:LOSS OF THE LARGEST PUMPING LOAD-840 MW OF EDMONT IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

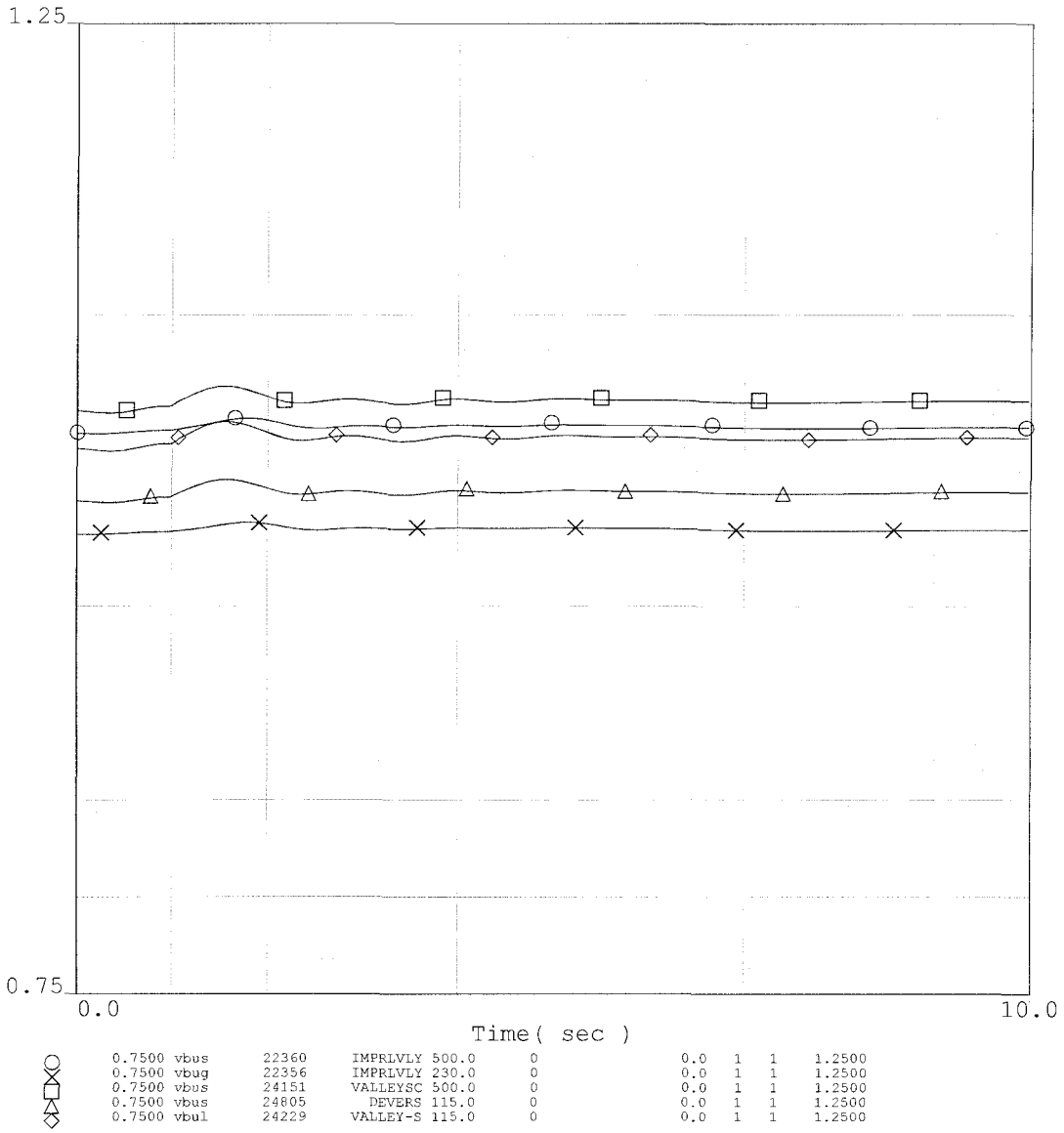
CALIFORNIA_voltages:



0.7500 vbus	24801	DEVERS 500.0	0	0.0	1	1	1.2500
0.7500 vbus	24086	LUGO 500.0	0	0.0	1	1	1.2500
0.7500 vbus	24156	VINCENT 500.0	0	0.0	1	1	1.2500
0.7500 vbus	26094	SYLMARLA 230.0	0	0.0	1	1	1.2500
0.7500 vbus	24804	DEVERS 230.0	0	0.0	1	1	1.2500

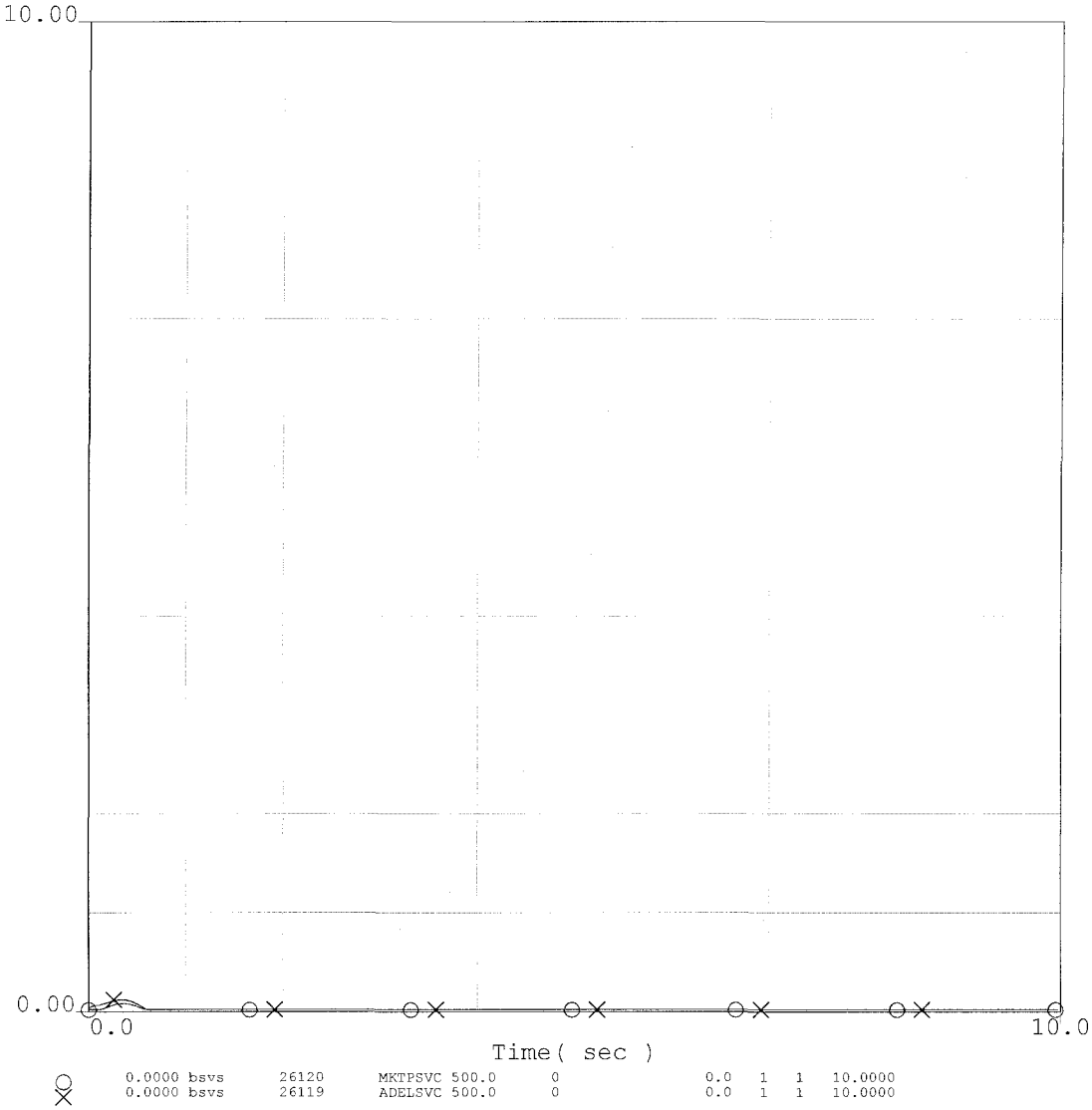
2014HS-UFSAR04:LOSS OF THE LARGEST PUMPING LOAD~840 MW OF EDMONT IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

CALIFORNIA_voltages:



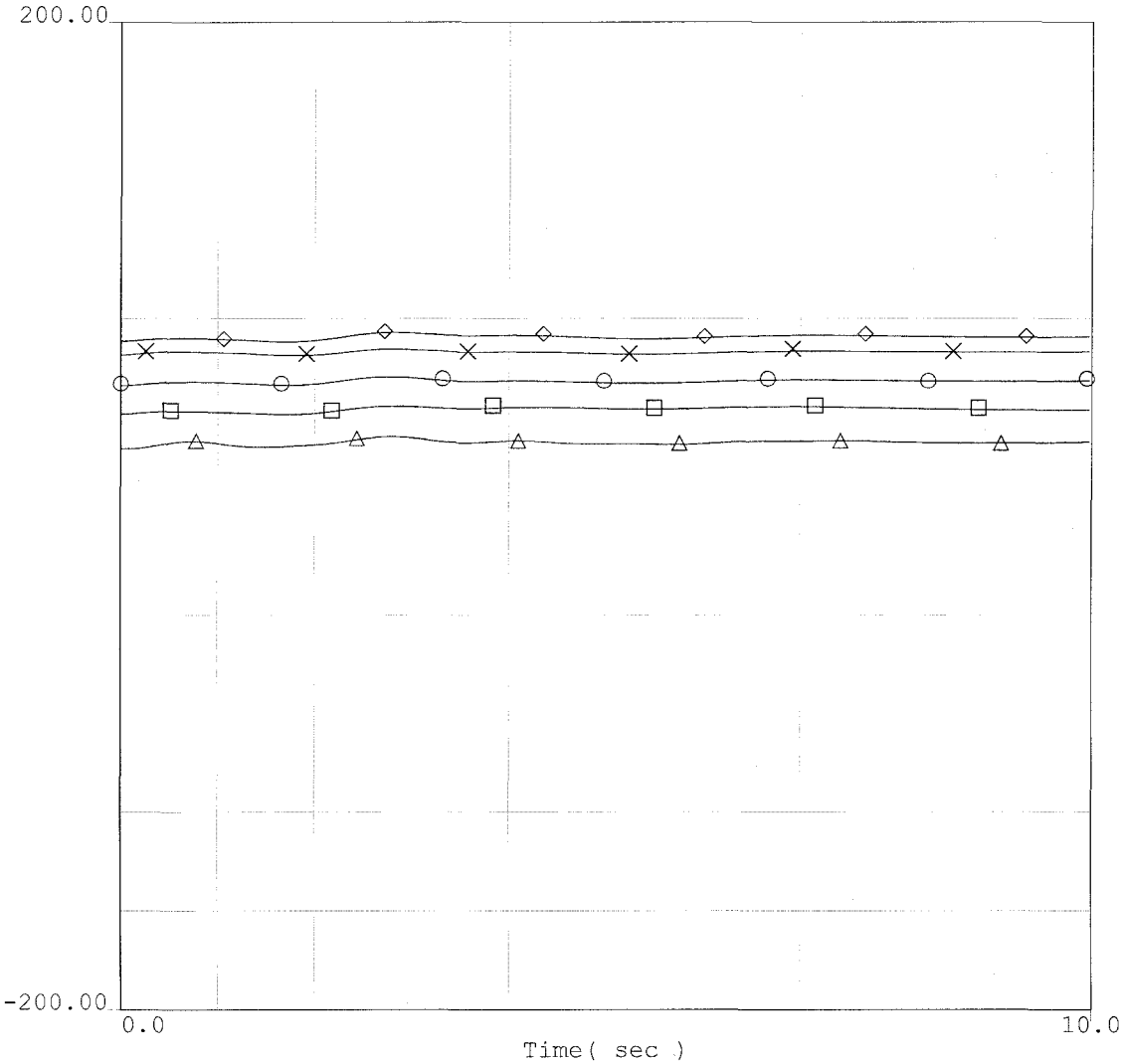
2014HS-UFSAR04:LOSS OF THE LARGEST PUMPING LOAD-840 MW OF EDMONT IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

SVC_output



2014HS-UFSAR04:LOSS OF THE LARGEST PUMPING LOAD-840 MW OF EDMONT IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

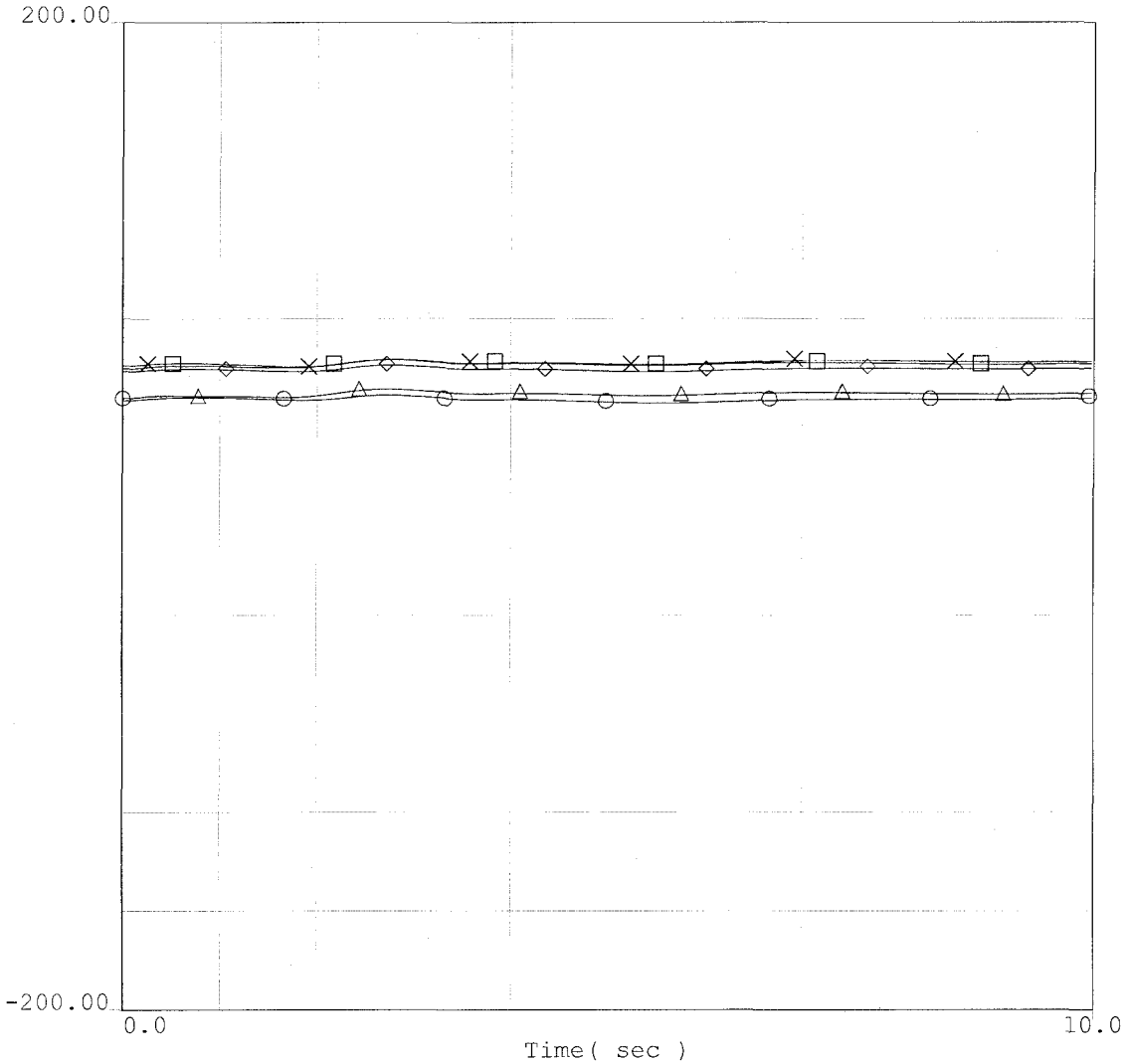
SYSTEM_Rotorangles



-200.0000 ang	16500	SPR GEN1	19.0	0	0.0	1	1	200.0000
-200.0000 ang	10321	SJUAN_G4	22.0	0	0.0	1	1	200.0000
-200.0000 ang	14942	SAGUARO2	15.5	0	0.0	1	1	200.0000
-200.0000 ang	17024	APACHCT1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	16518	SPR GEN3	21.0	0	0.0	1	1	200.0000

2014HS-UFSAR04:LOSS OF THE LARGEST PUMPING LOAD-840 MW OF EDMONT IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

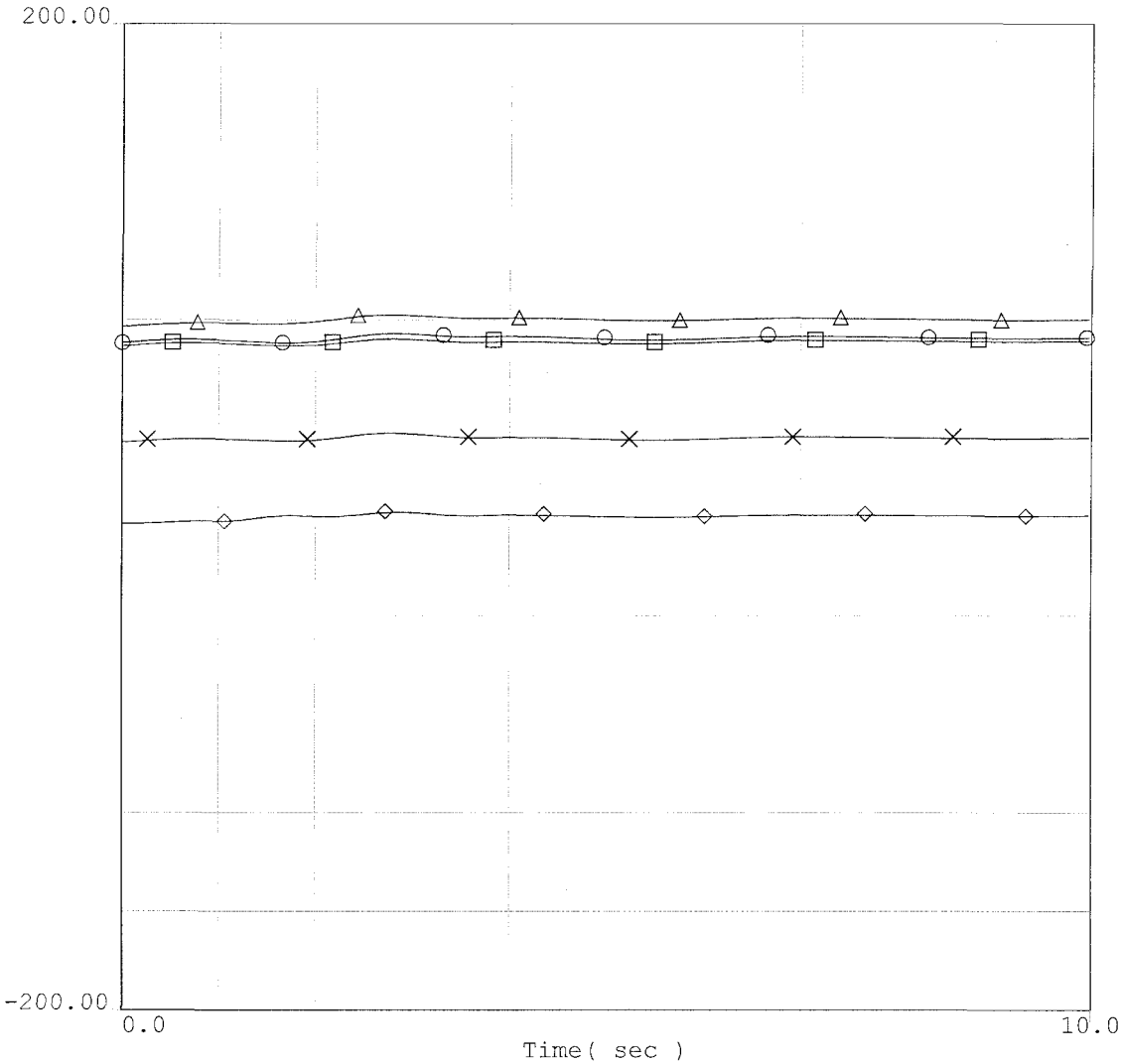
SYSTEM_Rotorangles



-200.0000 ang	15140	DBG-CT1	18.0	0	0.0	1	1	200.0000
-200.0000 ang	14945	SAG. CT3	13.8	0	0.0	1	1	200.0000
-200.0000 ang	14902	CHOLLA3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	15921	SANTAN 1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	14903	CHOLLA4	22.0	0	0.0	1	1	200.0000

2014HS-UFSAR04:LOSS OF THE LARGEST PUMPING LOAD-840 MW OF EDMONT IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

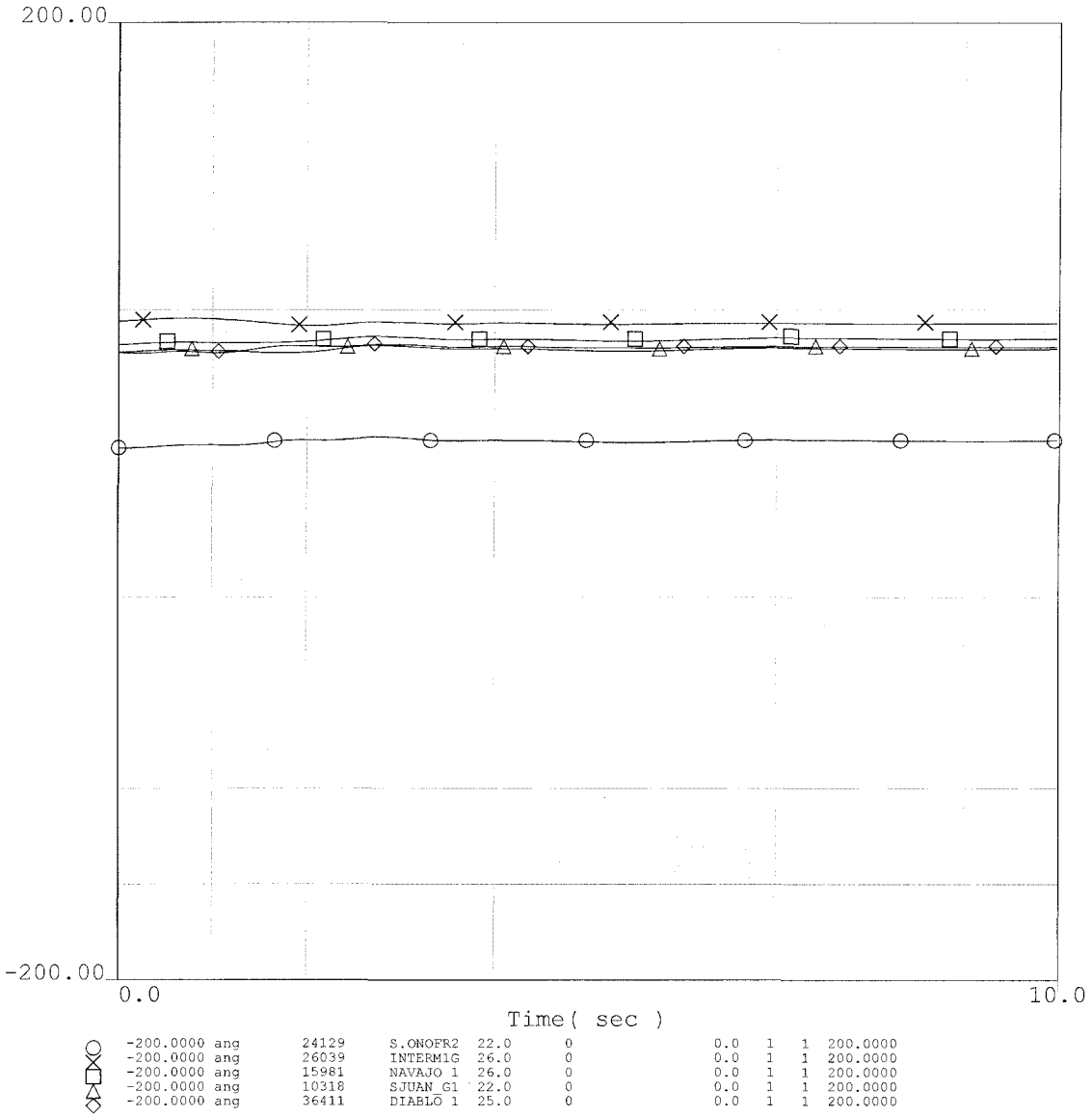
SYSTEM_Rotorangles



-200.0000 ang	16518	SPR GEN3	21.0	0	0.0	1	1	200.0000
-200.0000 ang	16503	SUNDTGE4	18.0	0	0.0	1	1	200.0000
-200.0000 ang	14914	FCNGN4CC	22.0	0	0.0	H	1	200.0000
-200.0000 ang	14931	PALOVRD1	24.0	0	0.0	1	1	200.0000
-200.0000 ang	24004	ALAMT4 G	18.0	0	0.0	H	1	200.0000

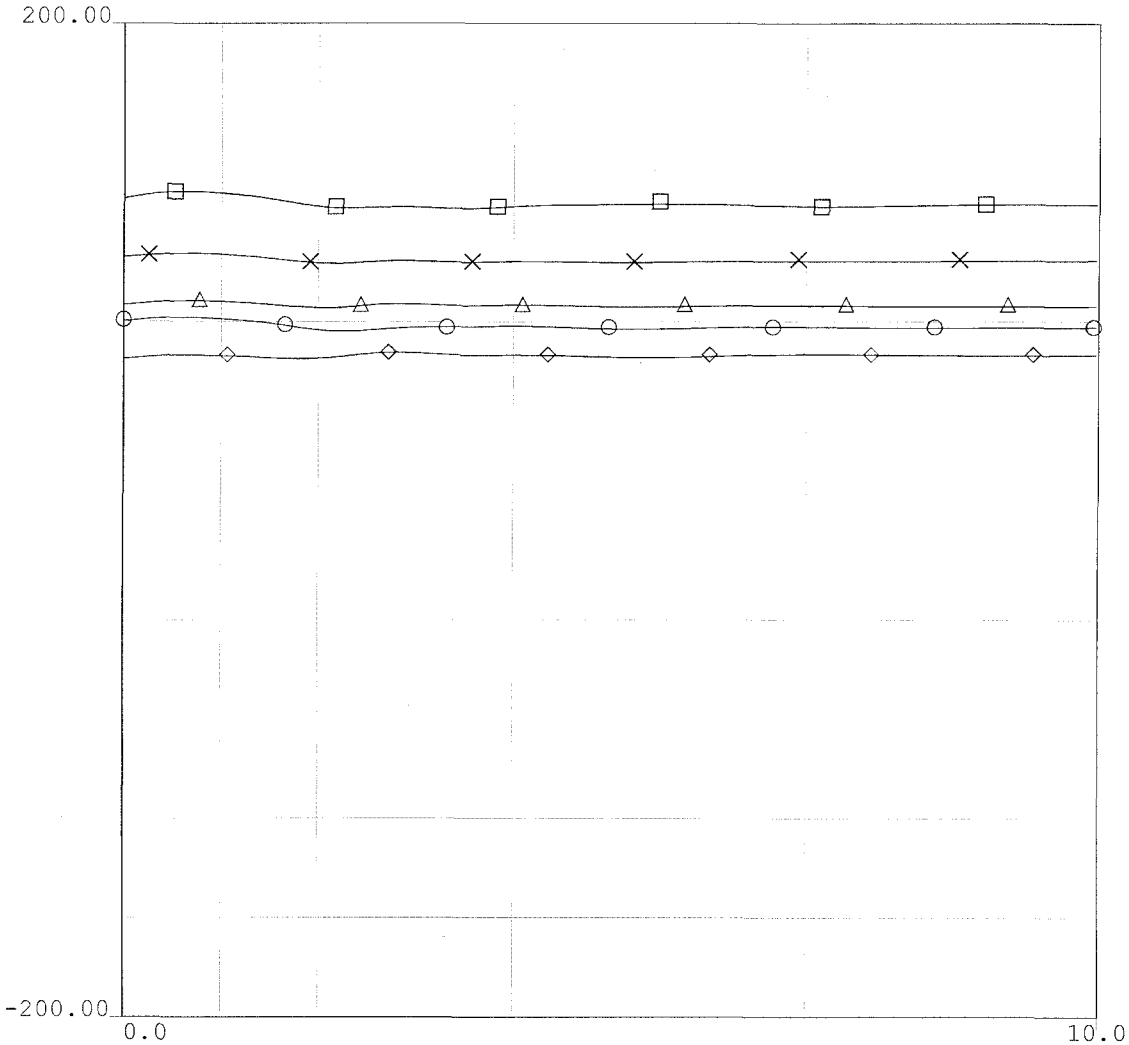
2014HS-UFSAR04:LOSS OF THE LARGEST PUMPING LOAD-840 MW OF EDMONT IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

SYSTEM_Rotorangles



2014HS-UFSAR04:LOSS OF THE LARGEST PUMPING LOAD-840 MW OF EDMONT IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

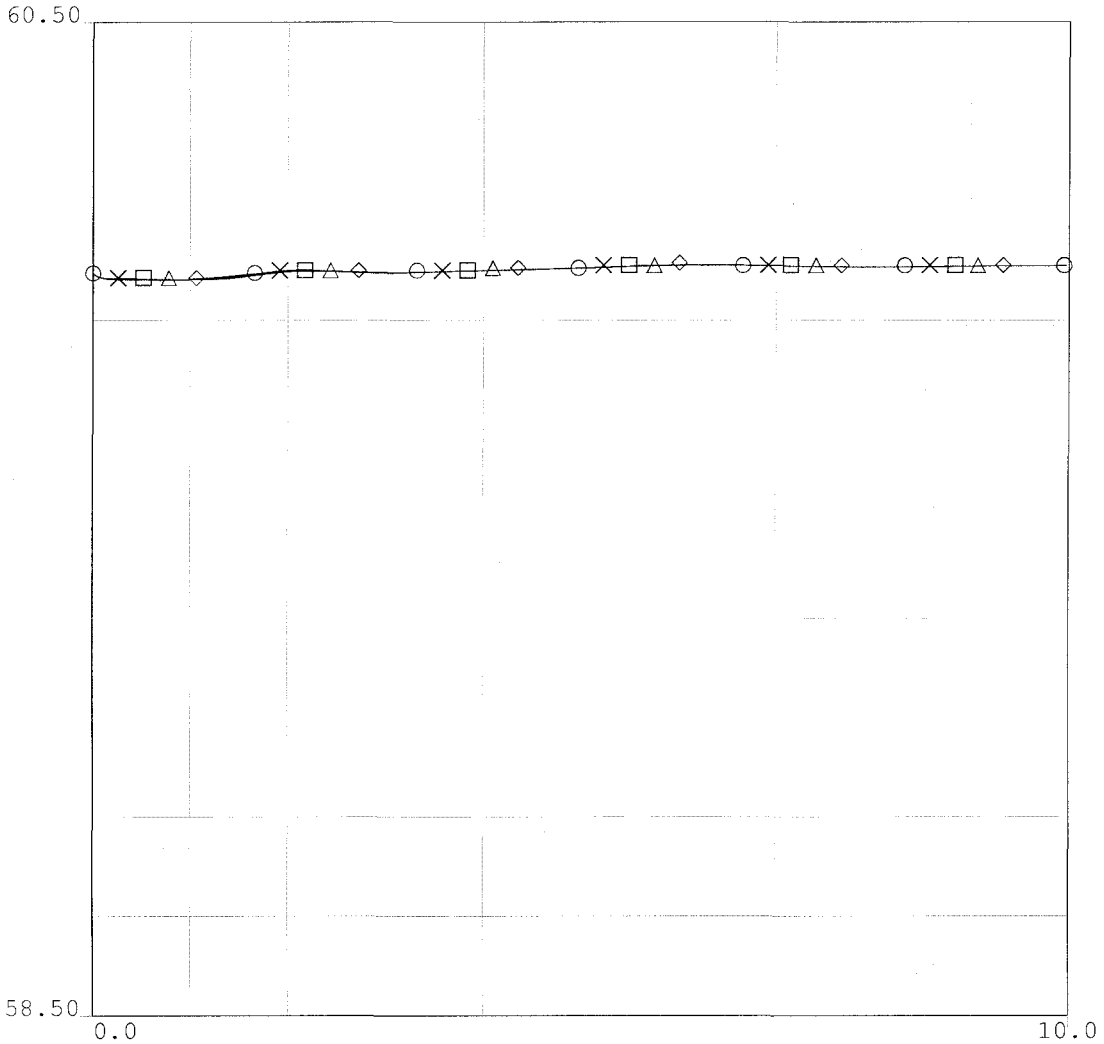
SYSTEM_Rotorangles



-200.0000 ang	73129	MBPP-1	24.0	0	0.0	1	1	200.0000
-200.0000 ang	60086	BRIDGER1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	62050	COLSTP 1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	65500	EHUNTR 3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	10321	SJUAN_G4	22.0	0	0.0	1	1	200.0000

2014HS-UFSAR04:LOSS OF THE LARGEST PUMPING LOAD-840 MW OF EDMONT IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

Frequencies:



58.5000 fbus	14003	NAVAJO 500.0	0	0.0	1	1	60.5000
58.5000 fbus	14005	WESTWING 500.0	0	0.0	1	1	60.5000
58.5000 fbus	14001	FOURCORN 500.0	0	0.0	1	1	60.5000
58.5000 fbus	14016	PNPKAPS 500.0	0	0.0	1	1	60.5000
58.5000 fbus	15021	PALOVRDE 500.0	0	0.0	1	1	60.5000

2014HS-UFSAR04:LOSS OF THE LARGEST PUMPING LOAD-840 MW OF EDMONT IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
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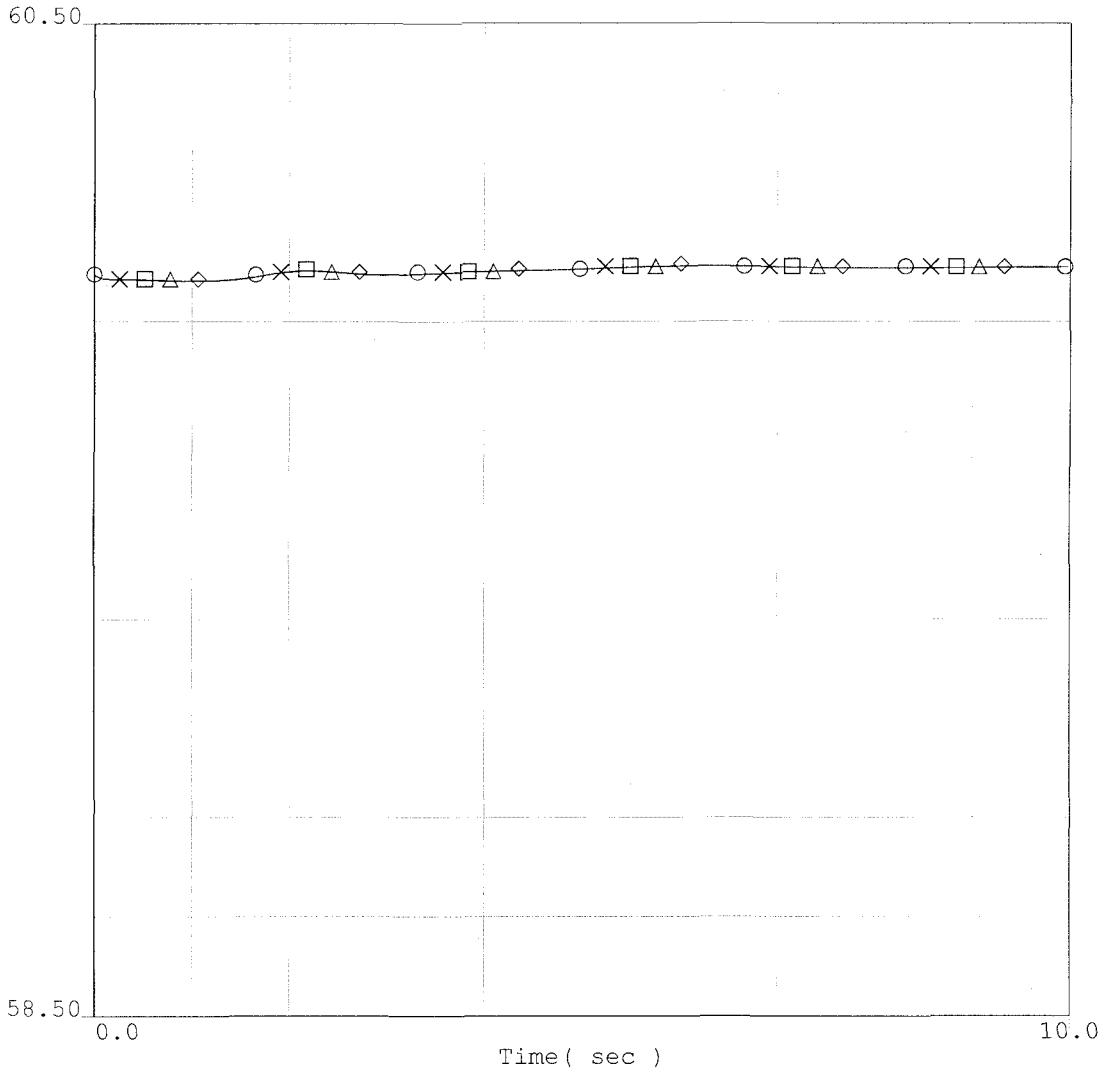
Frequencies:



○	58.5000	fbus	16000	TORTOLIT 500.0	0	0.0	1	1	60.5000
×	58.5000	fbus	16105	VAIL 345.0	0	0.0	1	1	60.5000
□	58.5000	fbus	16103	SOUTH 345.0	0	0.0	1	1	60.5000
△	58.5000	fbul	15001	CORONADO 500.0	0	0.0	1	1	60.5000
◇	58.5000	fbus	16109	WINCHSTR 345.0	0	0.0	1	1	60.5000

2014HS-UFSAR04:LOSS OF THE LARGEST PUMPING LOAD-840 MW OF EDMONT IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
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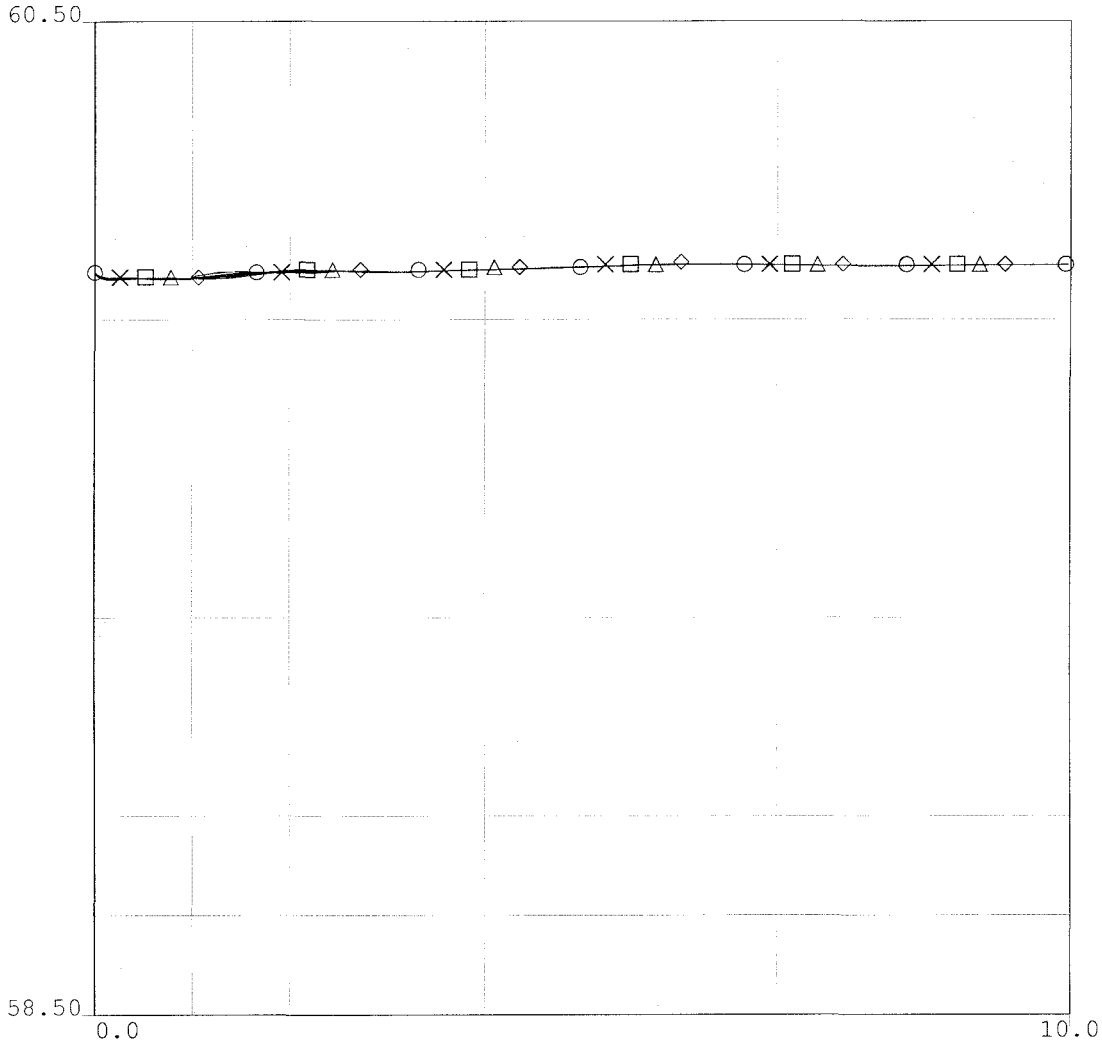
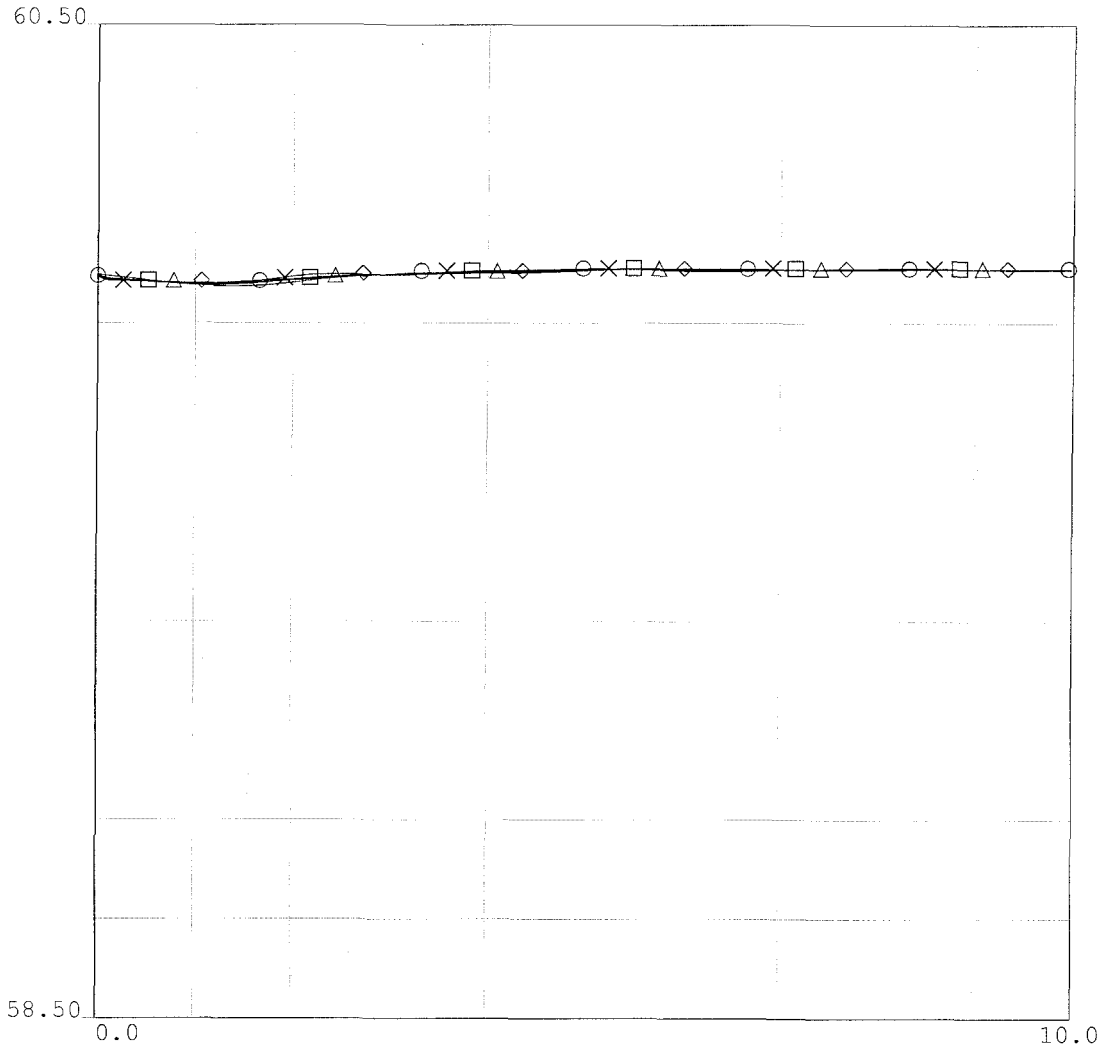
Frequencies:



58.5000 fbul	14231	WESTWNGW 230.0	0	0.0	1	1	60.5000
58.5000 fbus	26003	ADELANTO 500.0	0	0.0	1	1	60.5000
58.5000 fbus	14001	FOURCORN 500.0	0	0.0	1	1	60.5000
58.5000 fbus	26048	MCCULLGH 500.0	0	0.0	1	1	60.5000
58.5000 fbus	14003	NAVAJO 500.0	0	0.0	1	1	60.5000

2014HS-UFSAR04:LOSS OF THE LARGEST PUMPING LOAD-840 MW OF EDMONT IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

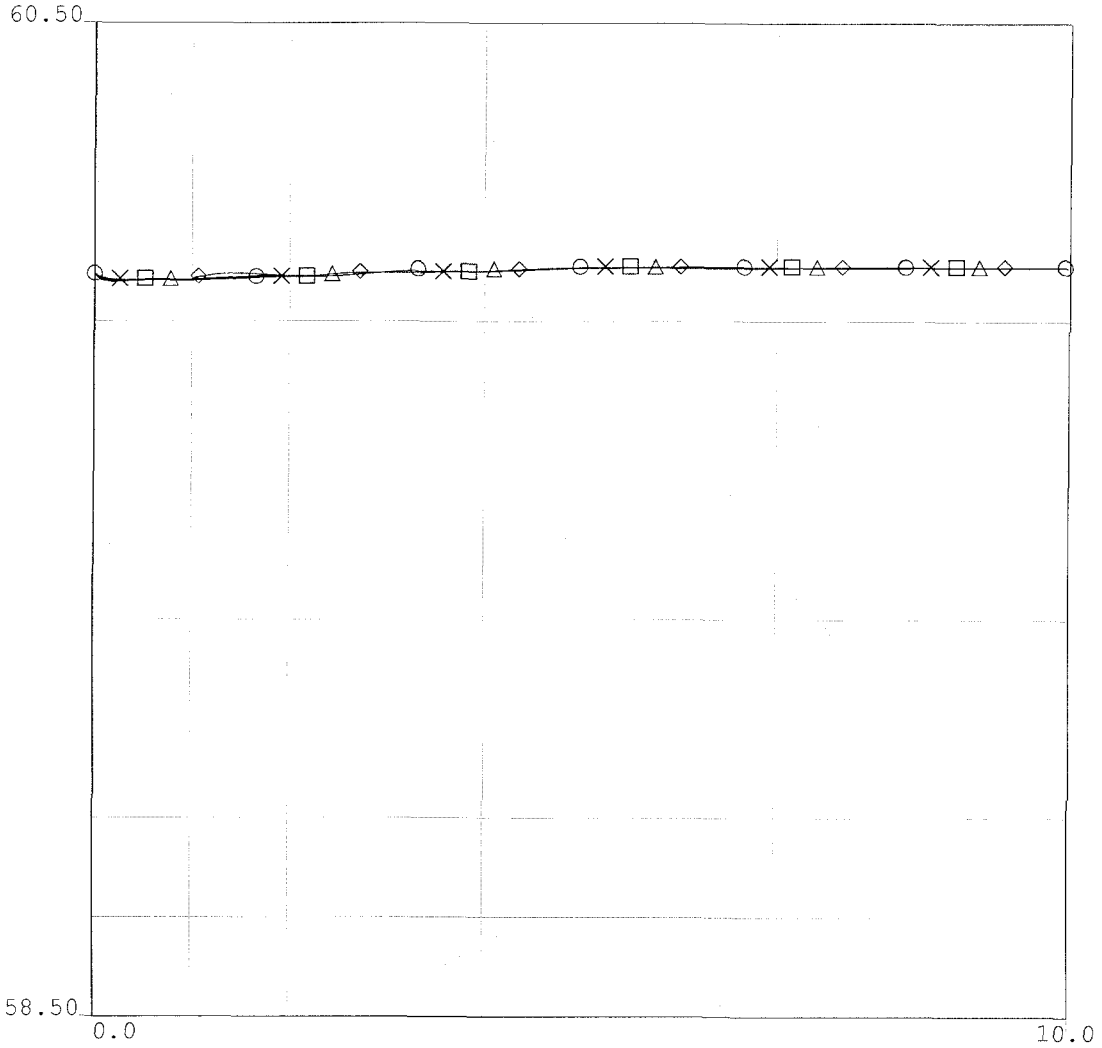
Frequencies:



○	58.5000	fbus	40489	GRIZZLY	500.0	0	0.0	1	1	60.5000
⊠	58.5000	fbus	40687	MALIN	500.0	0	0.0	1	1	60.5000
□	58.5000	fbus	40459	GARRISON	500.0	0	0.0	1	1	60.5000
△	58.5000	fbus	60235	MIDPOINT	345.0	0	0.0	1	1	60.5000
◇	58.5000	fbus	66230	PINTO	138.0	0	0.0	1	1	60.5000

2014HS-UFSAR04:LOSS OF THE LARGEST PUMPING LOAD-840 MW OF EDMONT IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

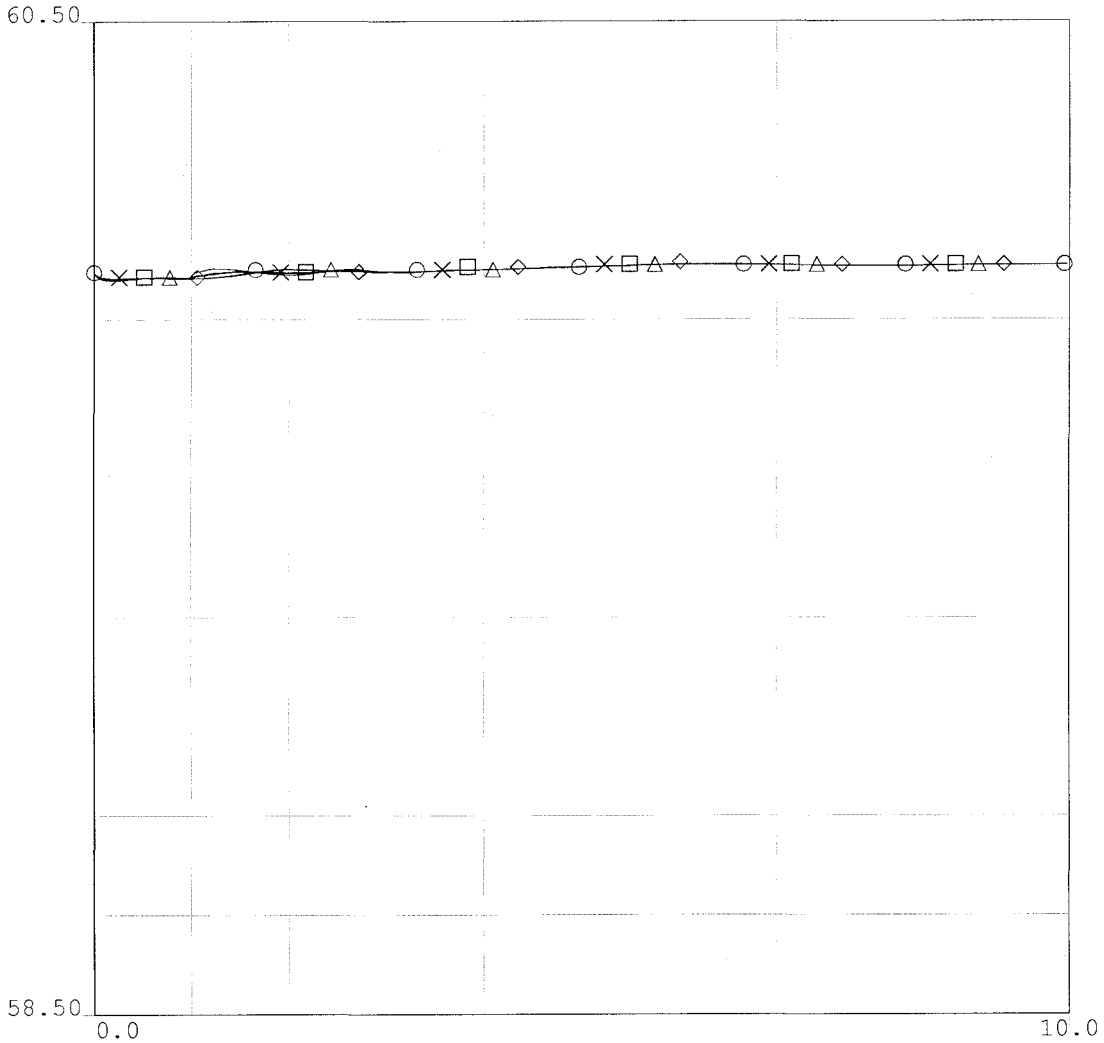
Frequencies:



58.5000 fbus	30005	ROUND MT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30015	TABLE MT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30035	TRACY 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30040	TESLA 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30060	MIDWAY 500.0	0	0.0	1	1	60.5000

2014HS-UFSAR04:LOSS OF THE LARGEST PUMPING LOAD-840 MW OF EDMONT IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

Frequencies:



58.5000 fbus	24801	DEVERS 500.0	0	0.0	1	1	60.5000
58.5000 fbus	24086	LUGO 500.0	0	0.0	1	1	60.5000
58.5000 fbus	26094	SYLMARLA 230.0	0	0.0	1	1	60.5000
58.5000 fbus	22468	MIGUEL 500.0	0	0.0	1	1	60.5000
58.5000 fbus	22536	N.GILA 500.0	0	0.0	1	1	60.5000

2014HS-UFSAR04:LOSS OF THE LARGEST PUMPING LOAD-840 MW OF EDMONT IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

HIGHEST VOLTAGE DIP

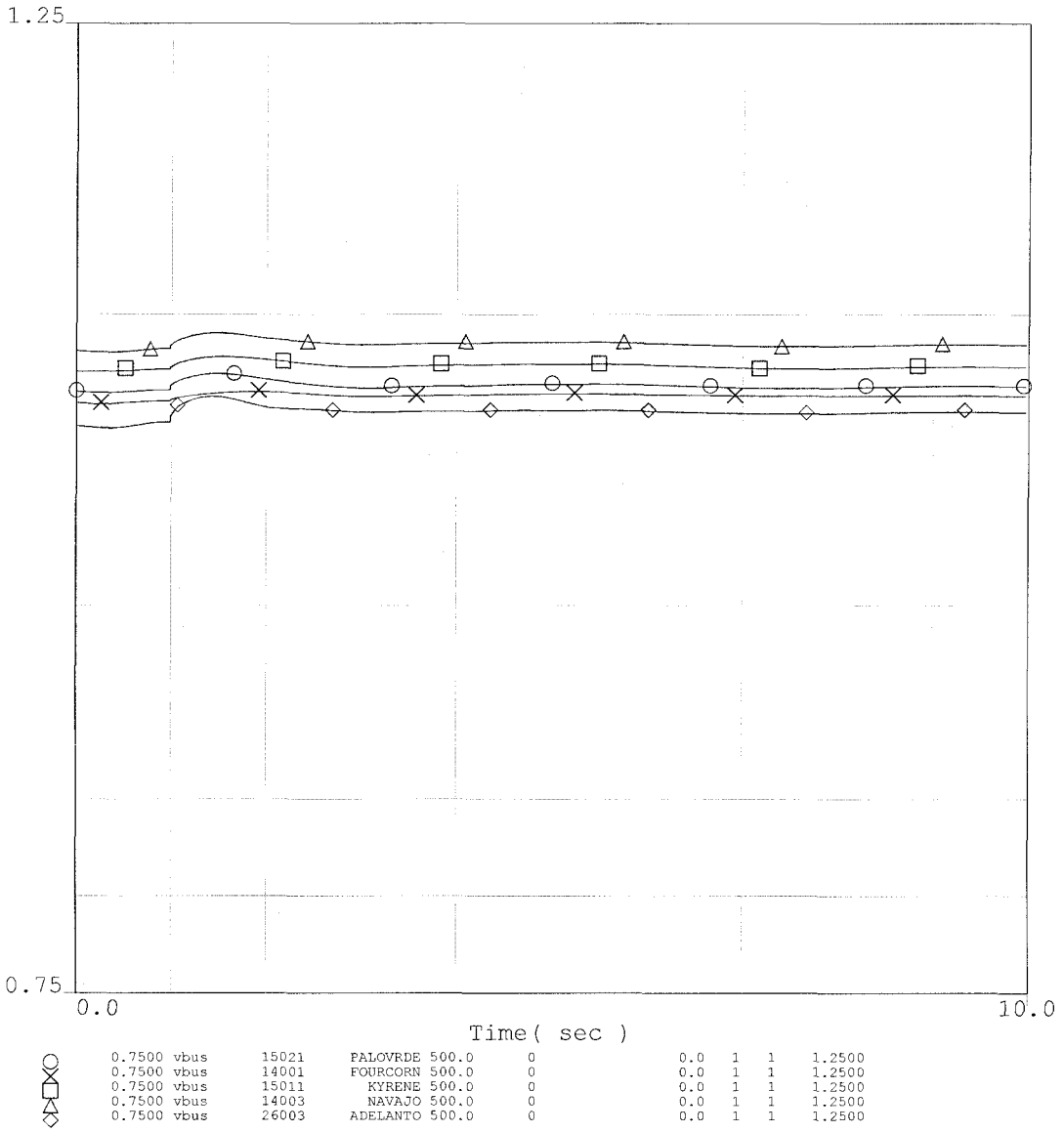
AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct	@time
40	STATELIN	69	vbul	1.003	0.987	1.7	1.533
40	VANSYCLE	69	vbus	1.005	0.988	1.7	1.533
40	ENTERPRS	69	vbug	1.036	1.031	0.5	1.533

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
54	LONGLK10	25	fbul	59.953	2.358
24	PITMAN	33.5	fbus	59.939	1.908
24	PORTAL	4.8	fbug	59.937	1.908

There were 0 violations of MORC criteria 1 (25% Voltage Dip) !
There were 0 violations of MORC criteria 2 (20% Voltage Dip for 20 Cycles)!
There were 0 violations of MORC criteria 3 (59.6 HZ for 6 Cycles)!

ARIZONA_voltages:



2014HS-UFSAR05:LOSS OF THE LARGEST BUS LOAD-1147 MW OFVALLEY S IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

14hs_q3m_fs-v1.chf

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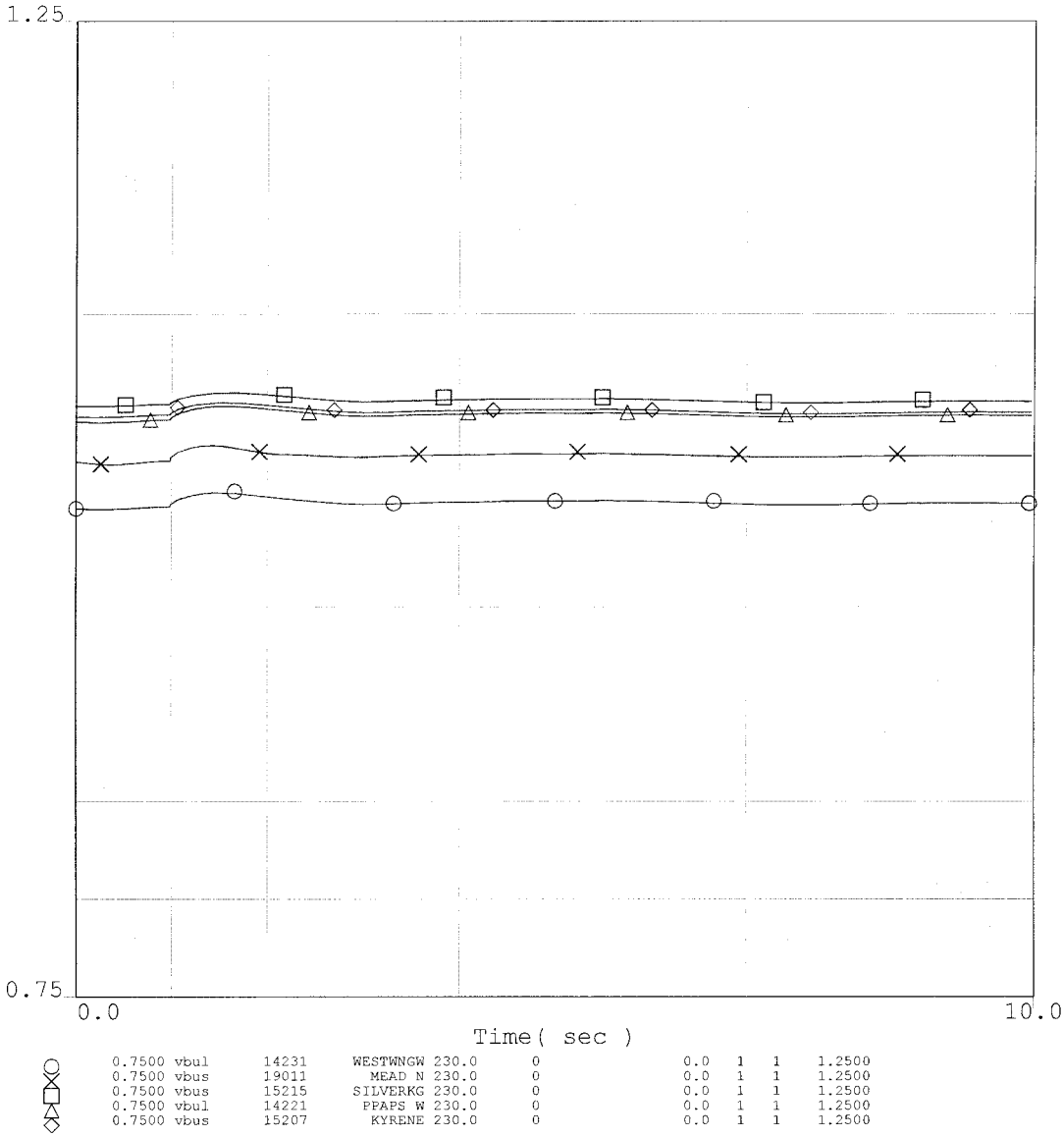
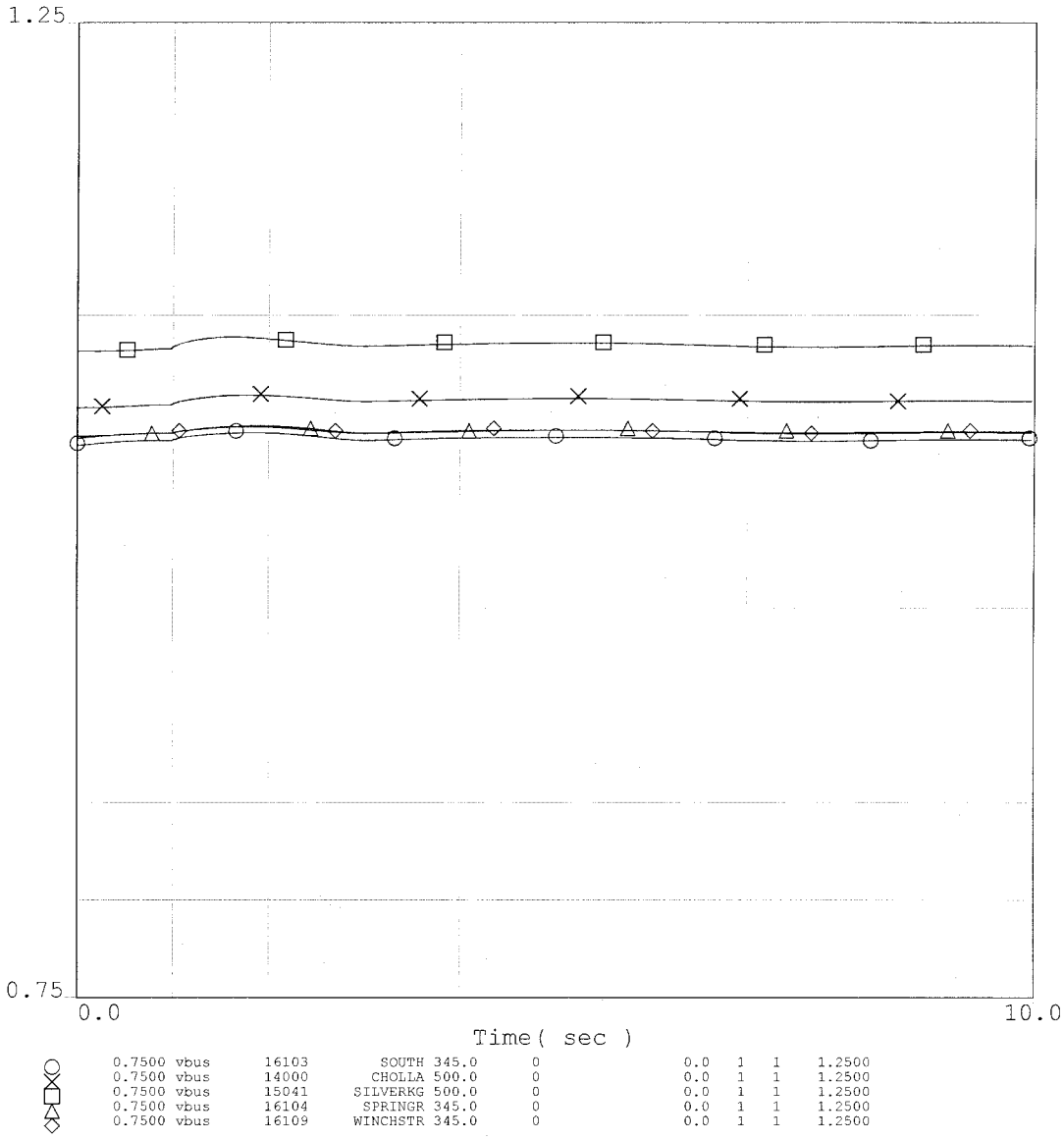
Tue Apr 05 07:41:18 2011

ARIZONA_voltages:



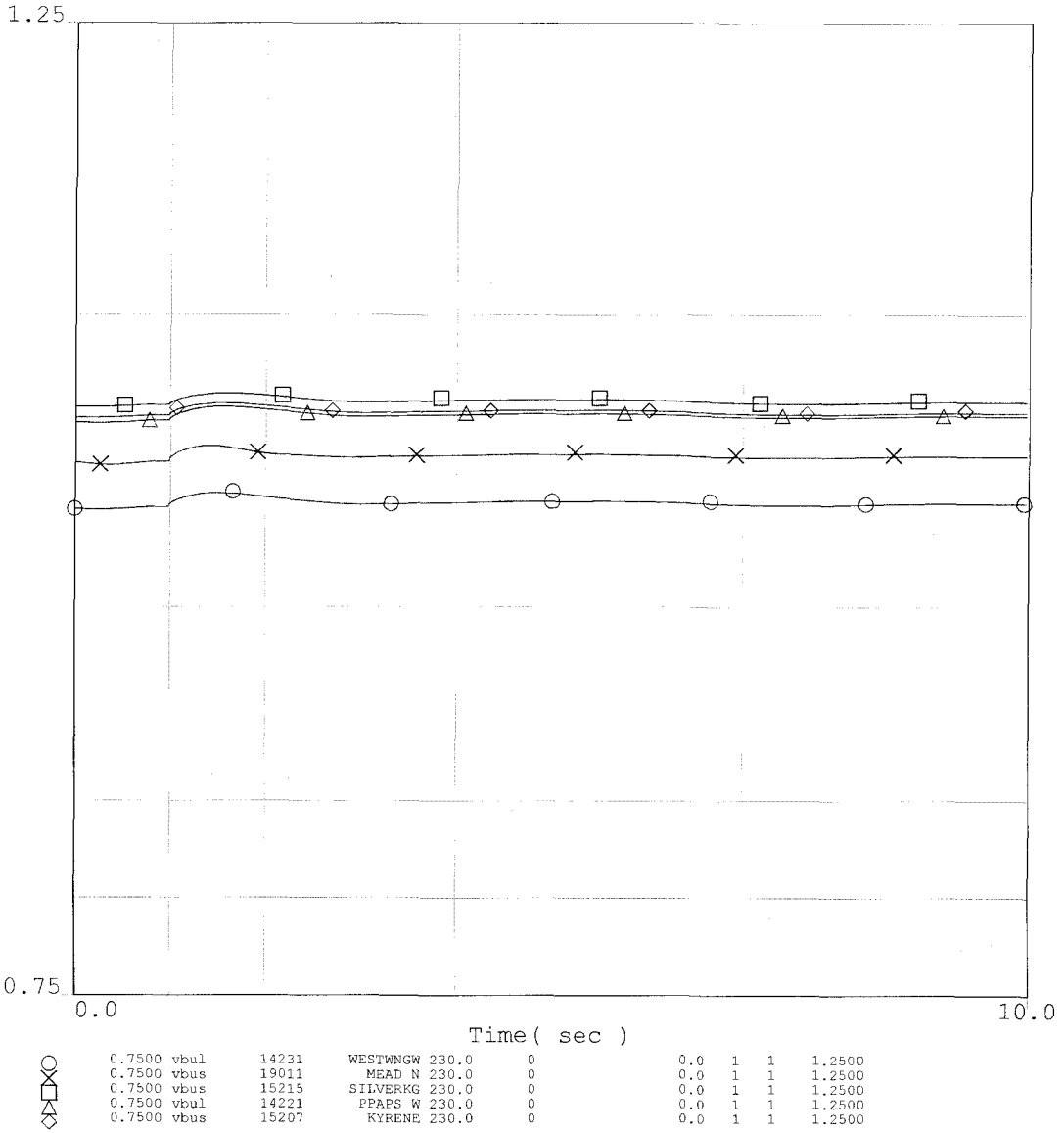
2014HS-UFSAR05:LOSS OF THE LARGEST BUS LOAD-1147 MW OFVALLEY S IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

ARIZONA_voltages:



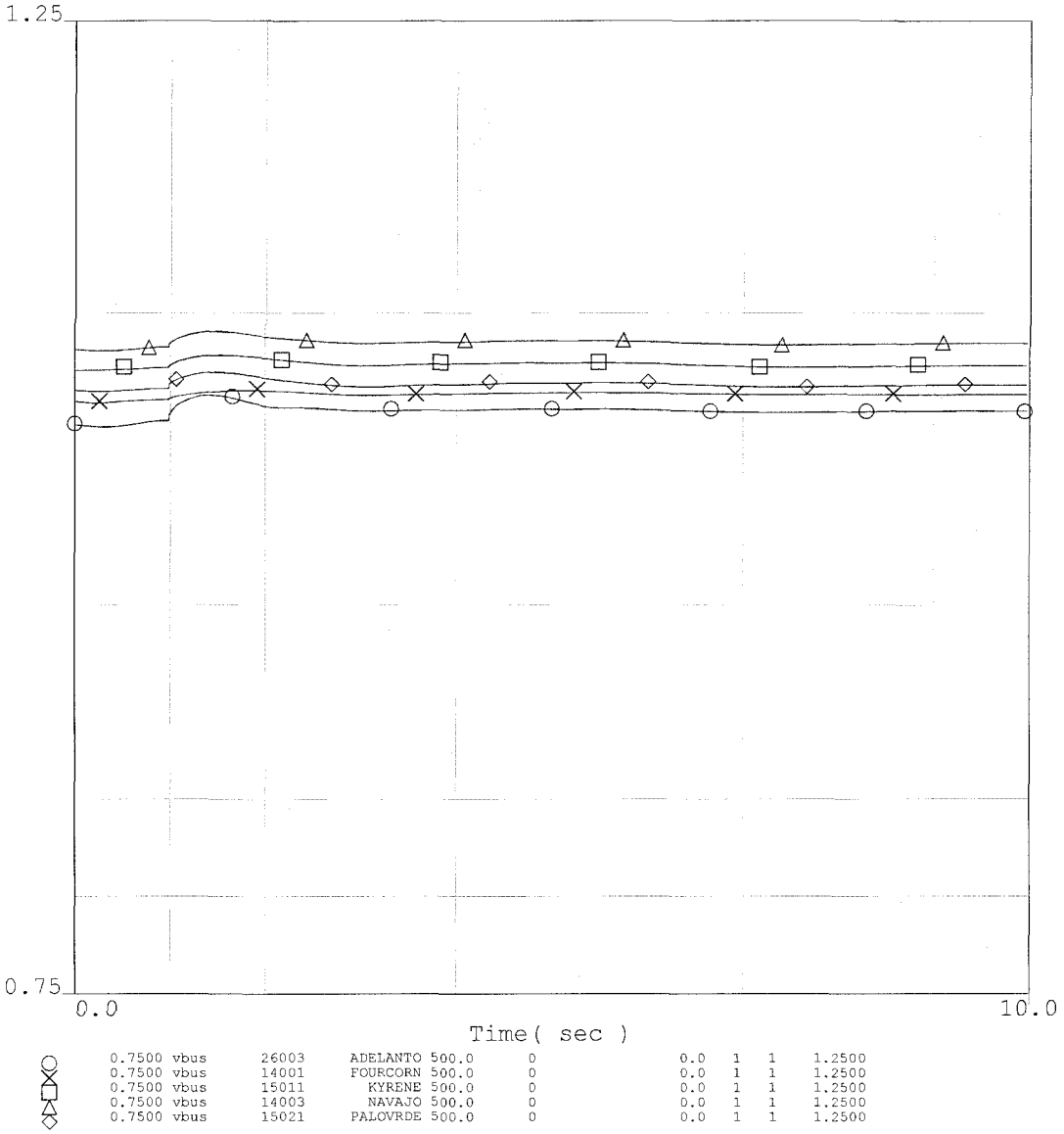
2014HS-UFSAR05:LOSS OF THE LARGEST BUS LOAD-1147 MW OFVALLEY S IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

ARIZONA_voltages:



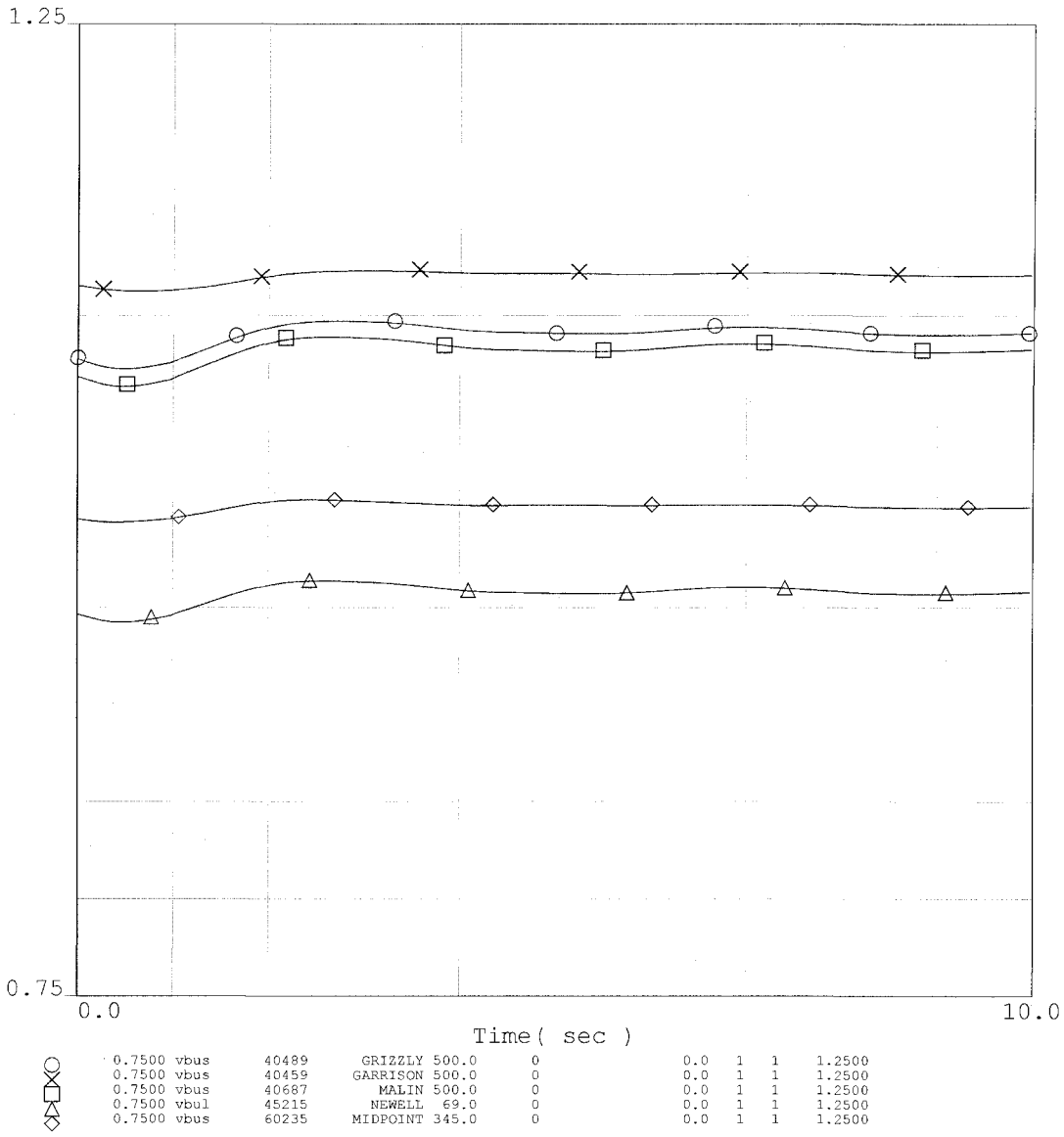
2014HS-UFSAR05:LOSS OF THE LARGEST BUS LOAD-1147 MW OFVALLEY S IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

ARIZONA_voltages:



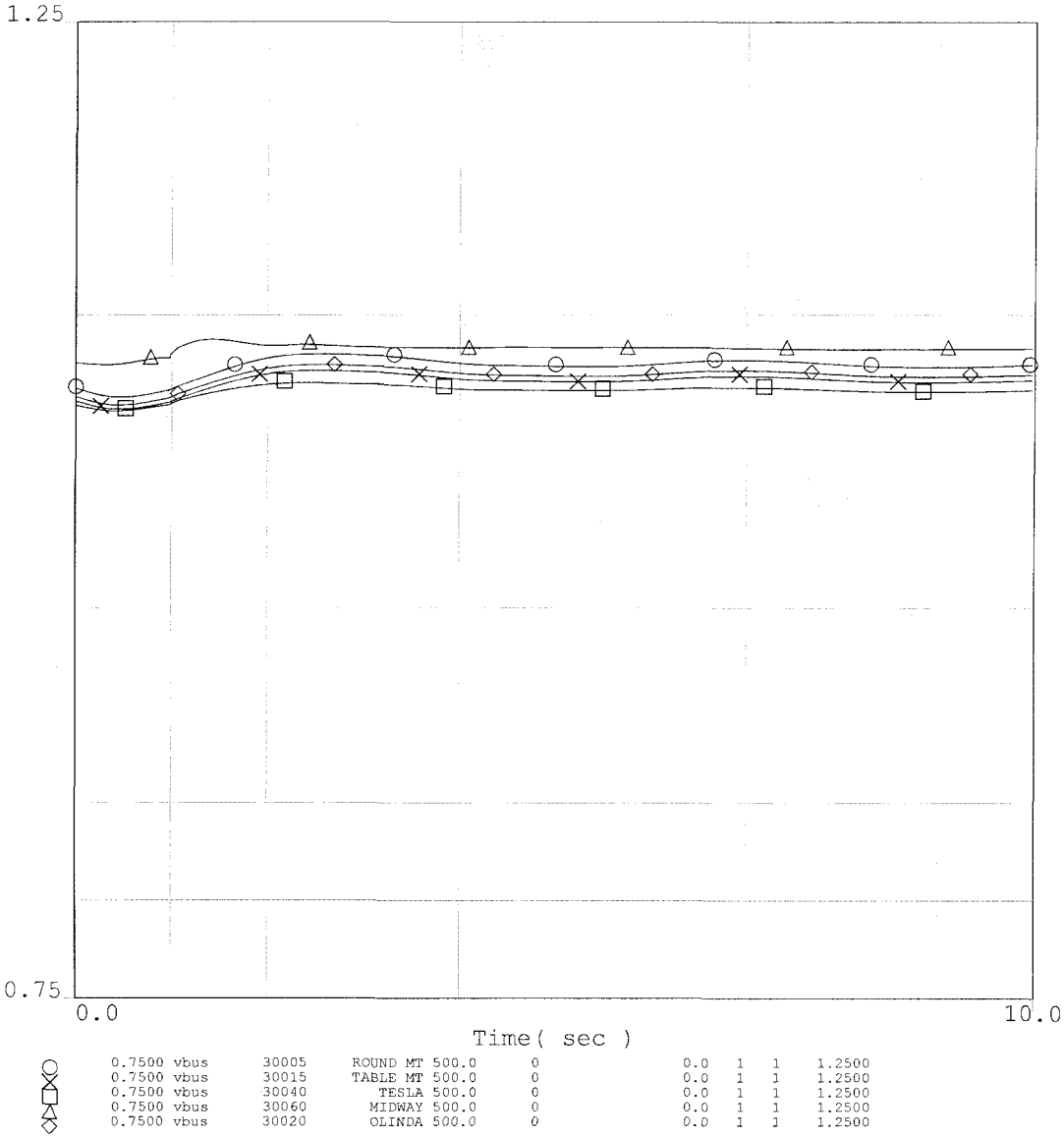
2014HS-UFSAR05:LOSS OF THE LARGEST BUS LOAD-1147 MW OFVALLEY S IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

NORTHWEST_voltages:



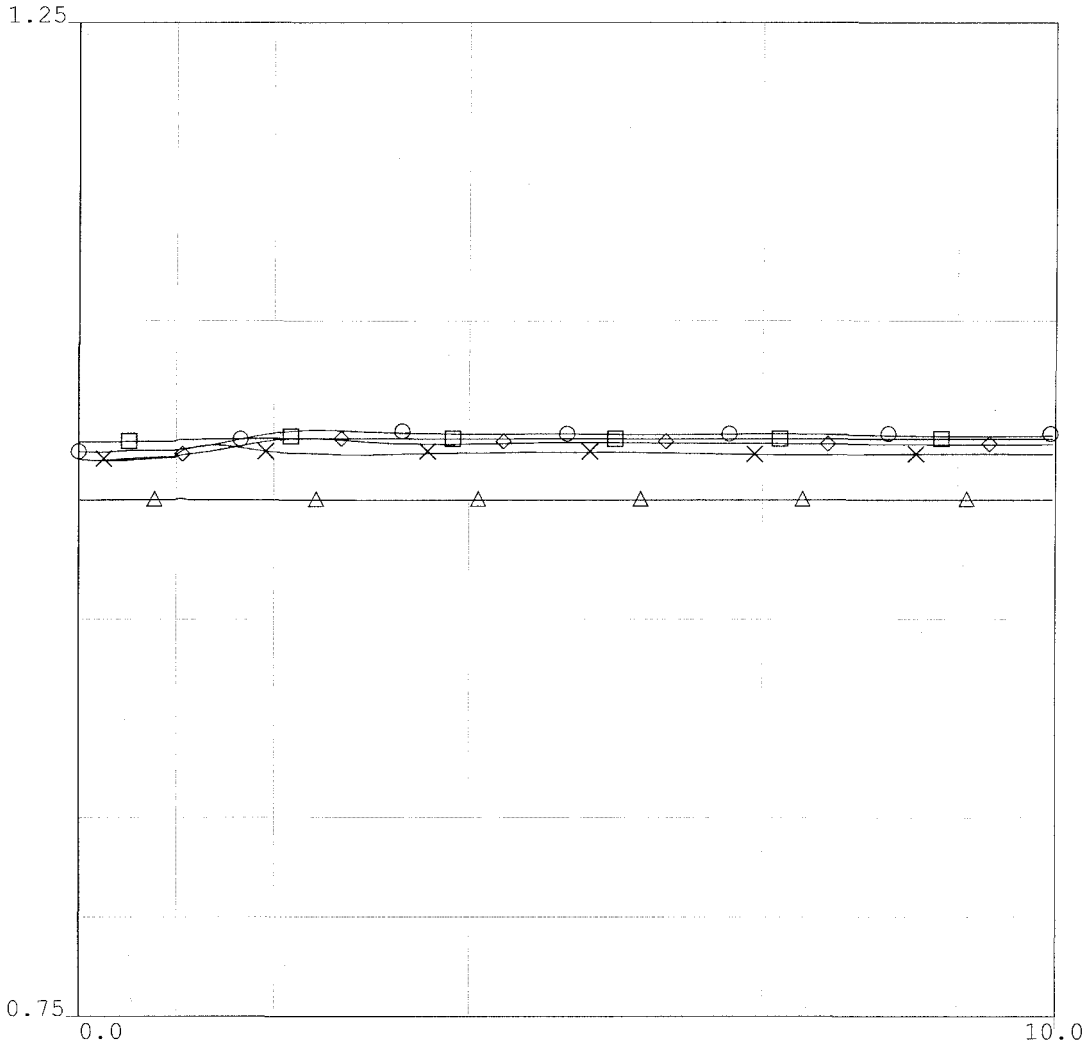
2014HS-UFSAR05:LOSS OF THE LARGEST BUS LOAD-1147 MW OFVALLEY S IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

CALIFORNIA_voltages:



2014HS-UFSAR05:LOSS OF THE LARGEST BUS LOAD-1147 MW OFVALLEY S IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

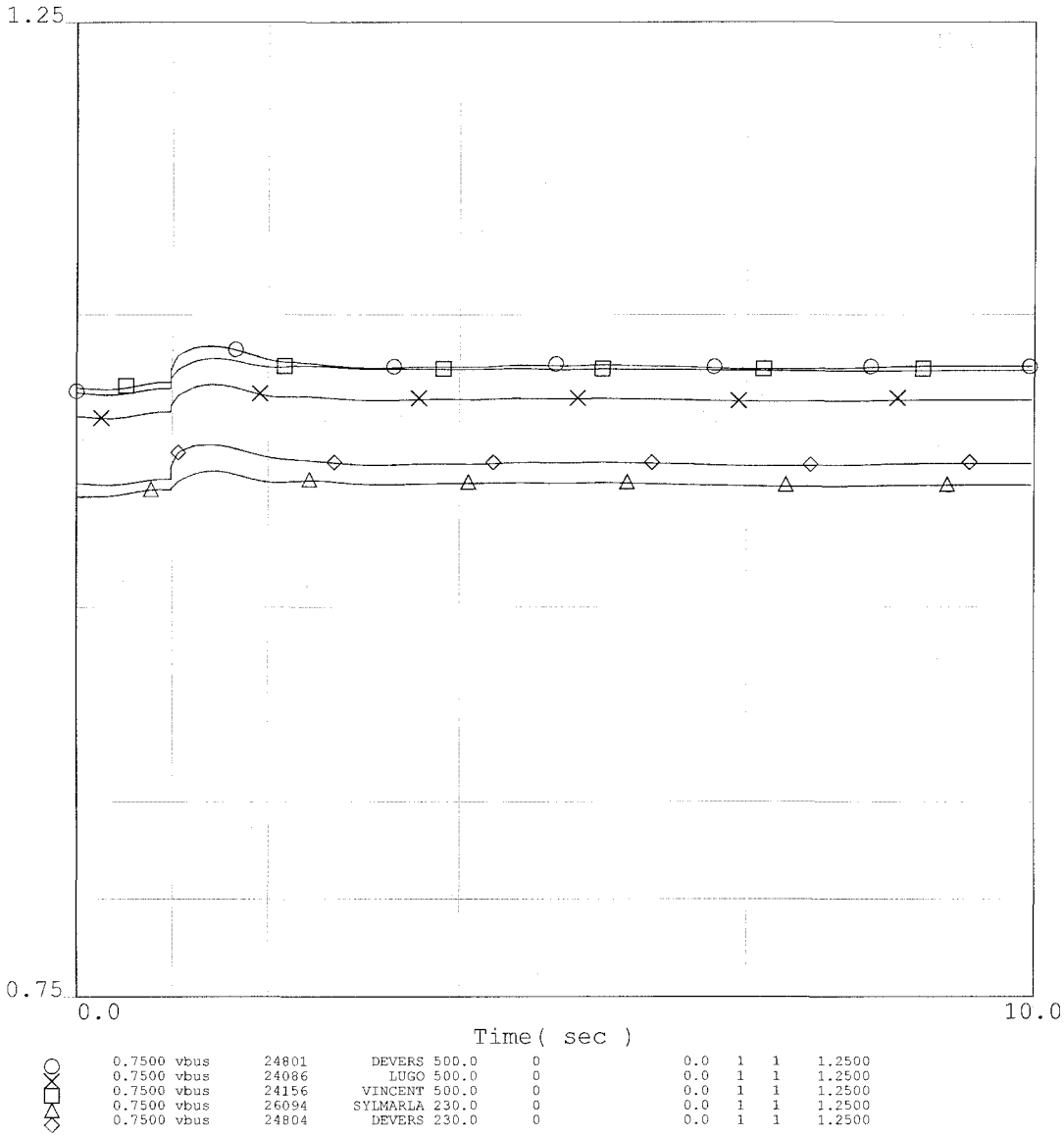
UTAH_voltages:



0.7500 vbus	66230	PINTO 138.0	0	0.0	1	1	1.2500
0.7500 vbus	18019	H ALLEN 230.0	0	0.0	1	1	1.2500
0.7500 vbus	66280	REDBUTTE 345.0	0	0.0	1	1	1.2500
0.7500 vbus	66420	SGSY 138.0	0	0.0	1	1	1.2500
0.7500 vbus	79023	DURANGO 115.0	0	0.0	1	1	1.2500

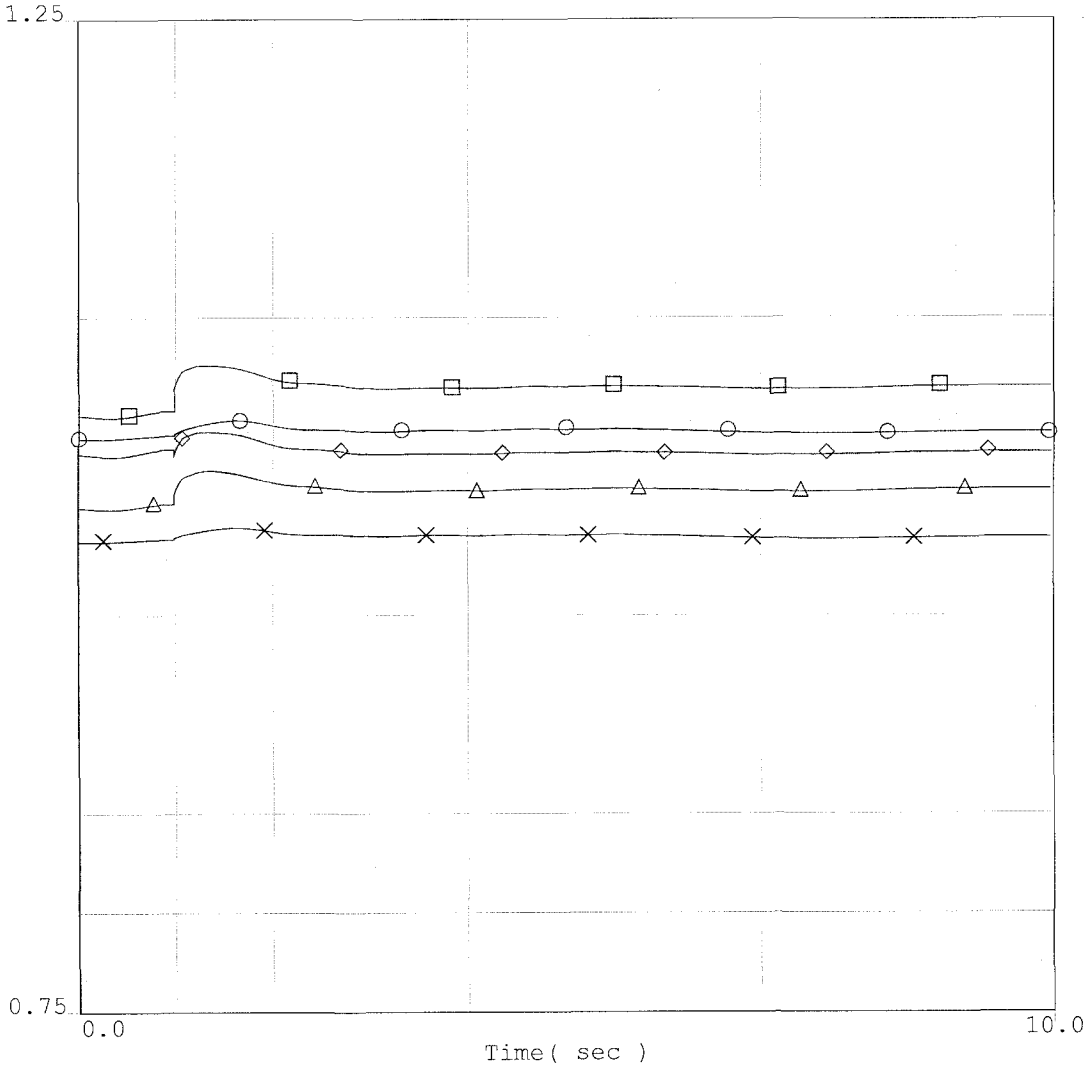
2014HS-UFSAR05:LOSS OF THE LARGEST BUS LOAD-1147 MW OFVALLEY S IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

CALIFORNIA_voltages:



2014HS-UFSAR05:LOSS OF THE LARGEST BUS LOAD-1147 MW OFVALLEY S IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

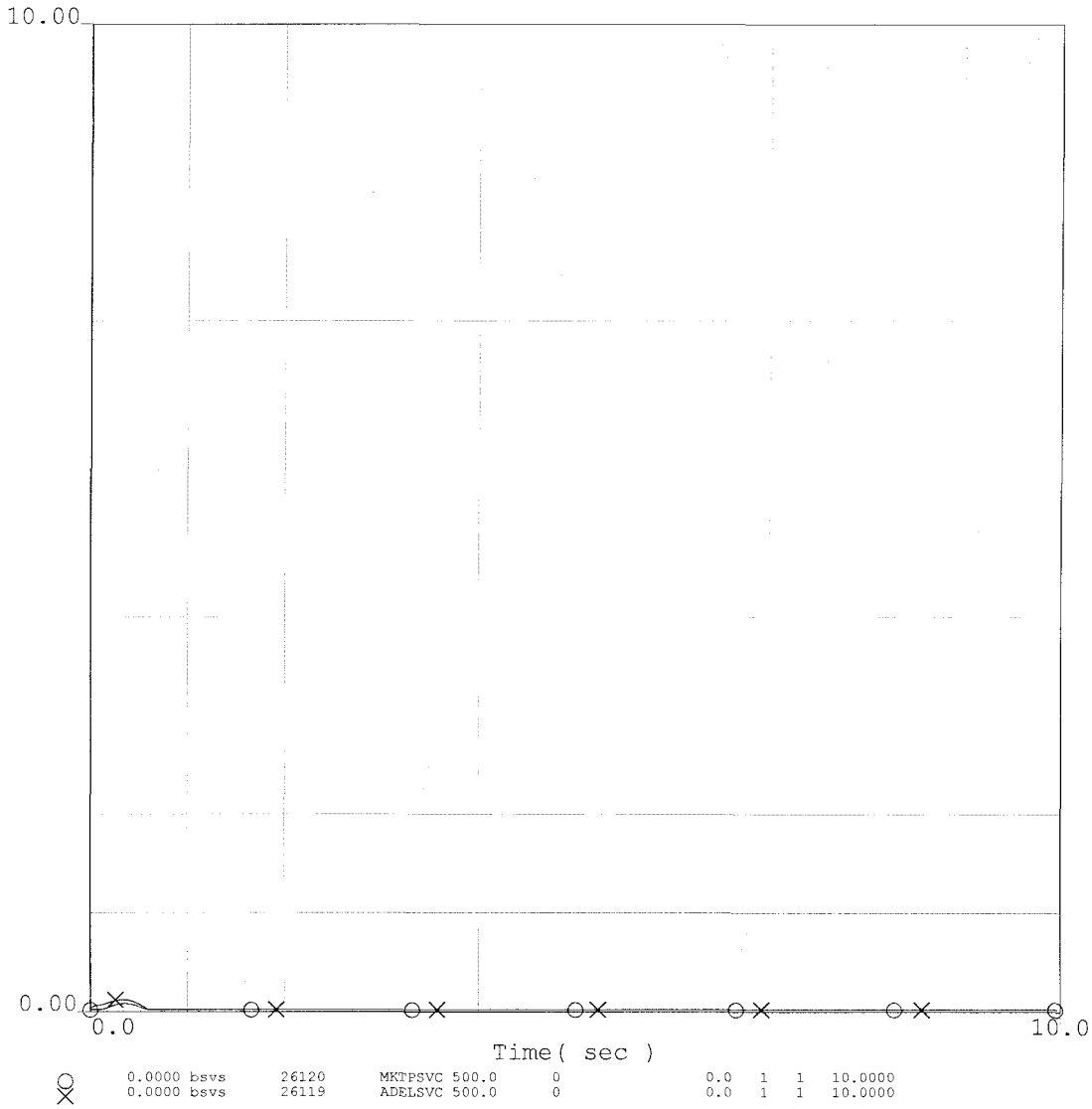
CALIFORNIA_voltages:



○	0.7500 vbus	22360	IMPRLVLY	500.0	0	0.0	1	1	1.2500
⊠	0.7500 vbug	22356	IMPRLVLY	230.0	0	0.0	1	1	1.2500
□	0.7500 vbus	24151	VALLEYSC	500.0	0	0.0	1	1	1.2500
△	0.7500 vbus	24805	DEVERS	115.0	0	0.0	1	1	1.2500
◇	0.7500 vbul	24229	VALLEY-S	115.0	0	0.0	1	1	1.2500

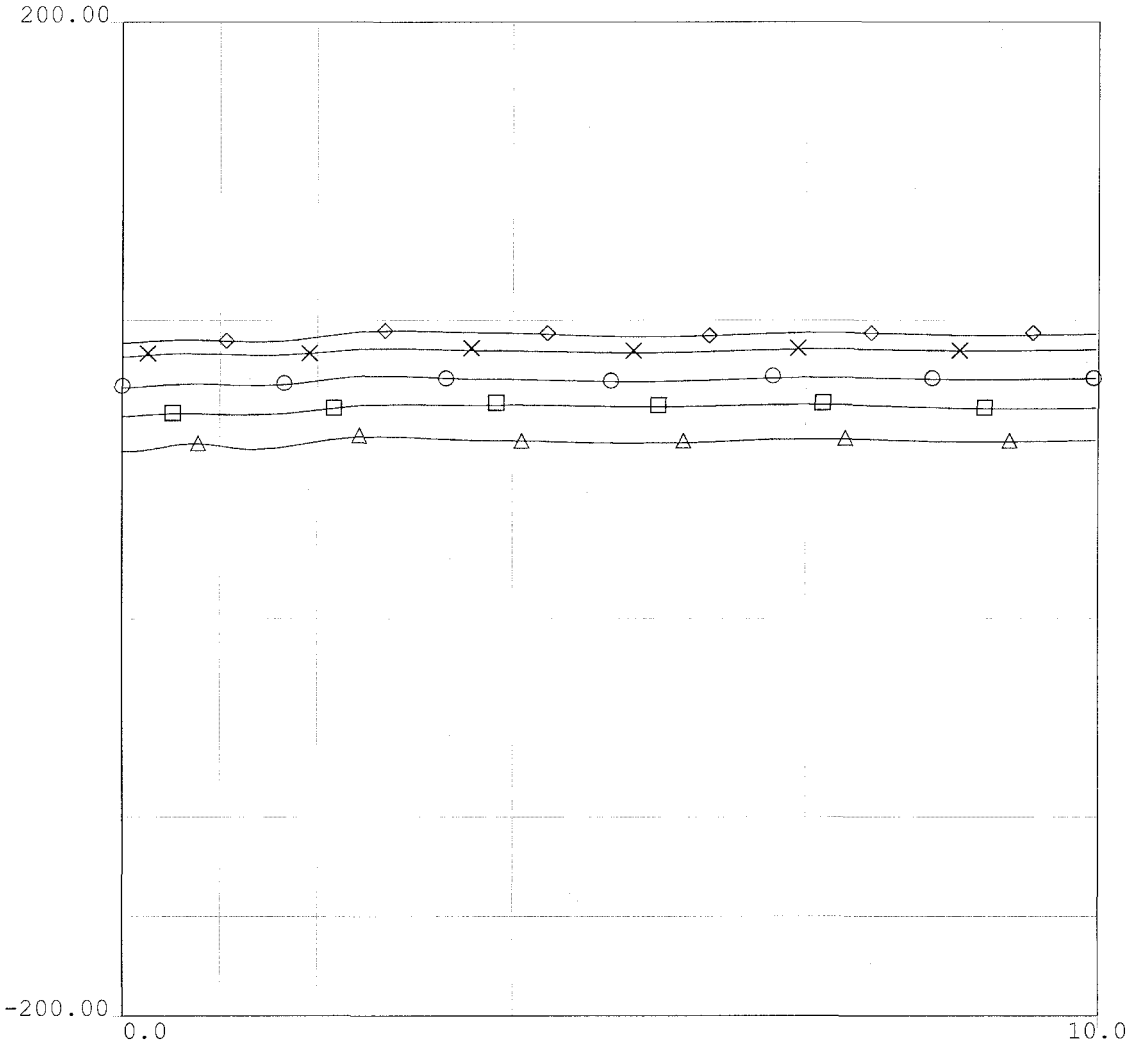
2014HS-UFSAR05:LOSS OF THE LARGEST BUS LOAD-1147 MW OFVALLEY S IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

SVC_output



2014HS-UFSAR05:LOSS OF THE LARGEST BUS LOAD-1147 MW OFVALLEY S IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

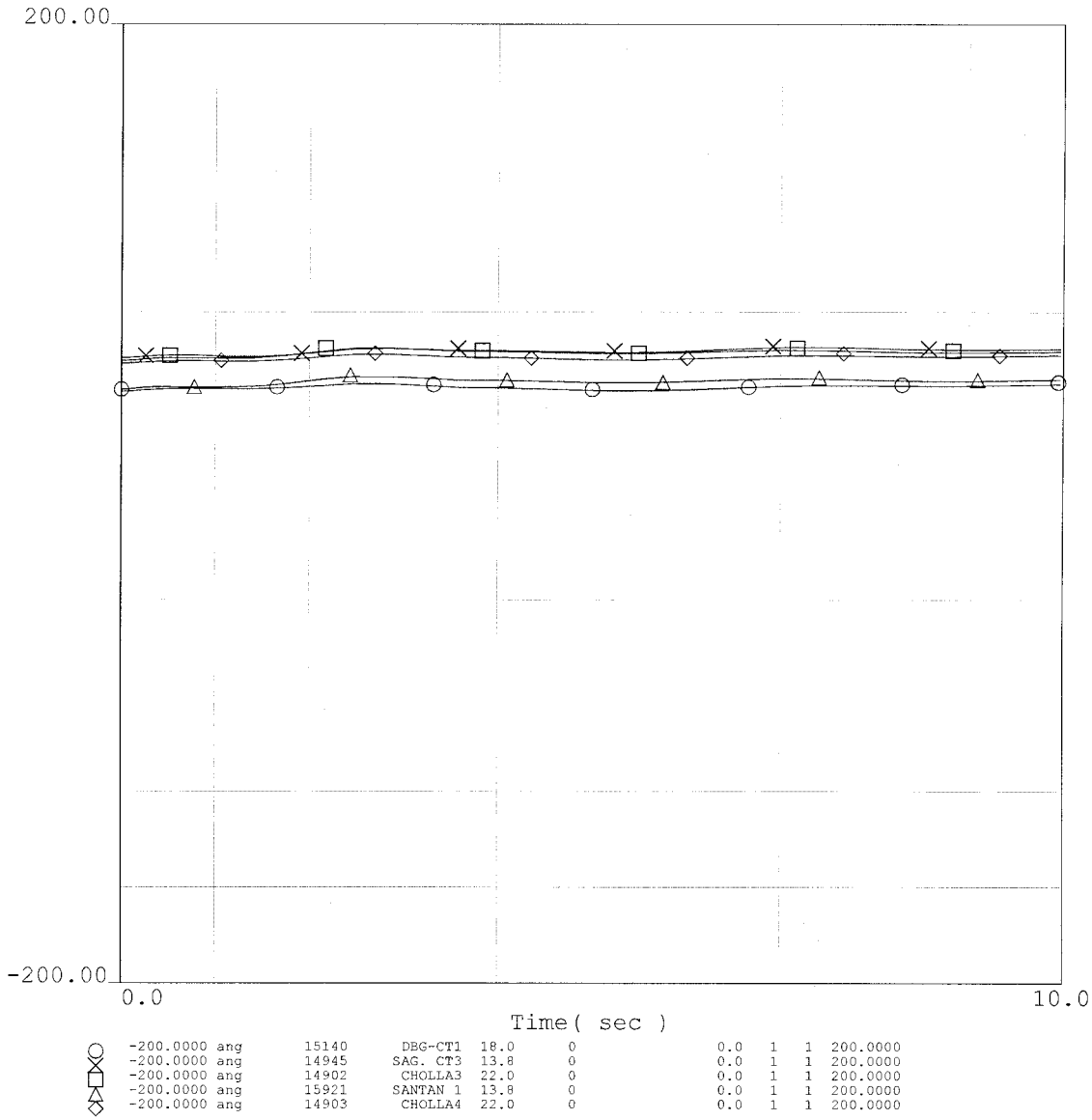
SYSTEM_Rotorangles



-200.0000 ang	16500	SPR GEN1	19.0	0	0.0	1	1	200.0000
-200.0000 ang	10321	SJUAN_G4	22.0	0	0.0	1	1	200.0000
-200.0000 ang	14942	SAGUAŘO2	15.5	0	0.0	1	1	200.0000
-200.0000 ang	17024	APACHCT1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	16518	SPR GEN3	21.0	0	0.0	1	1	200.0000

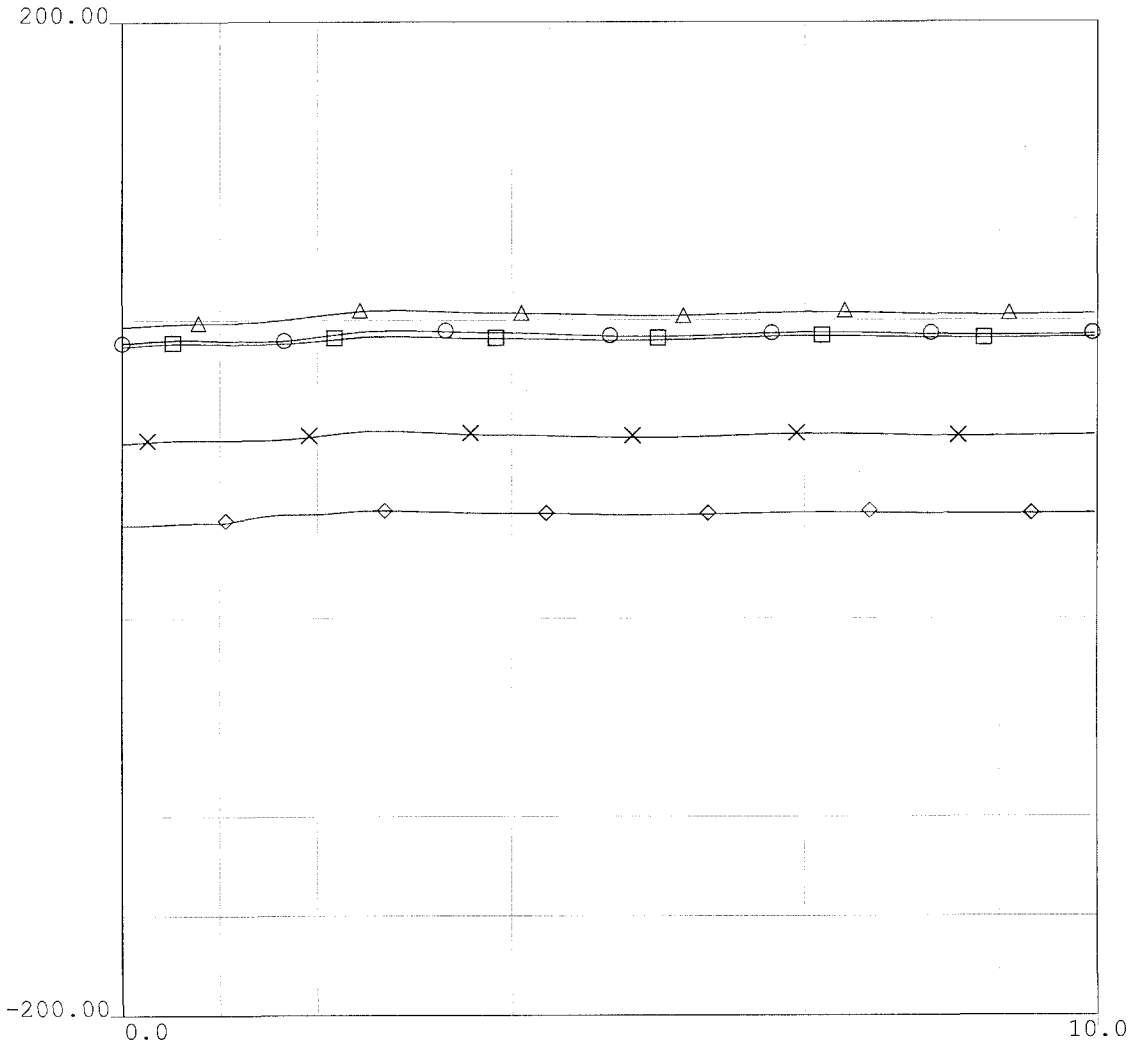
2014HS-UFSAR05:LOSS OF THE LARGEST BUS LOAD-1147 MW OFVALLEY S IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

SYSTEM_Rotorangles



2014HS-UFSAR05:LOSS OF THE LARGEST BUS LOAD-1147 MW OFVALLEY S IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

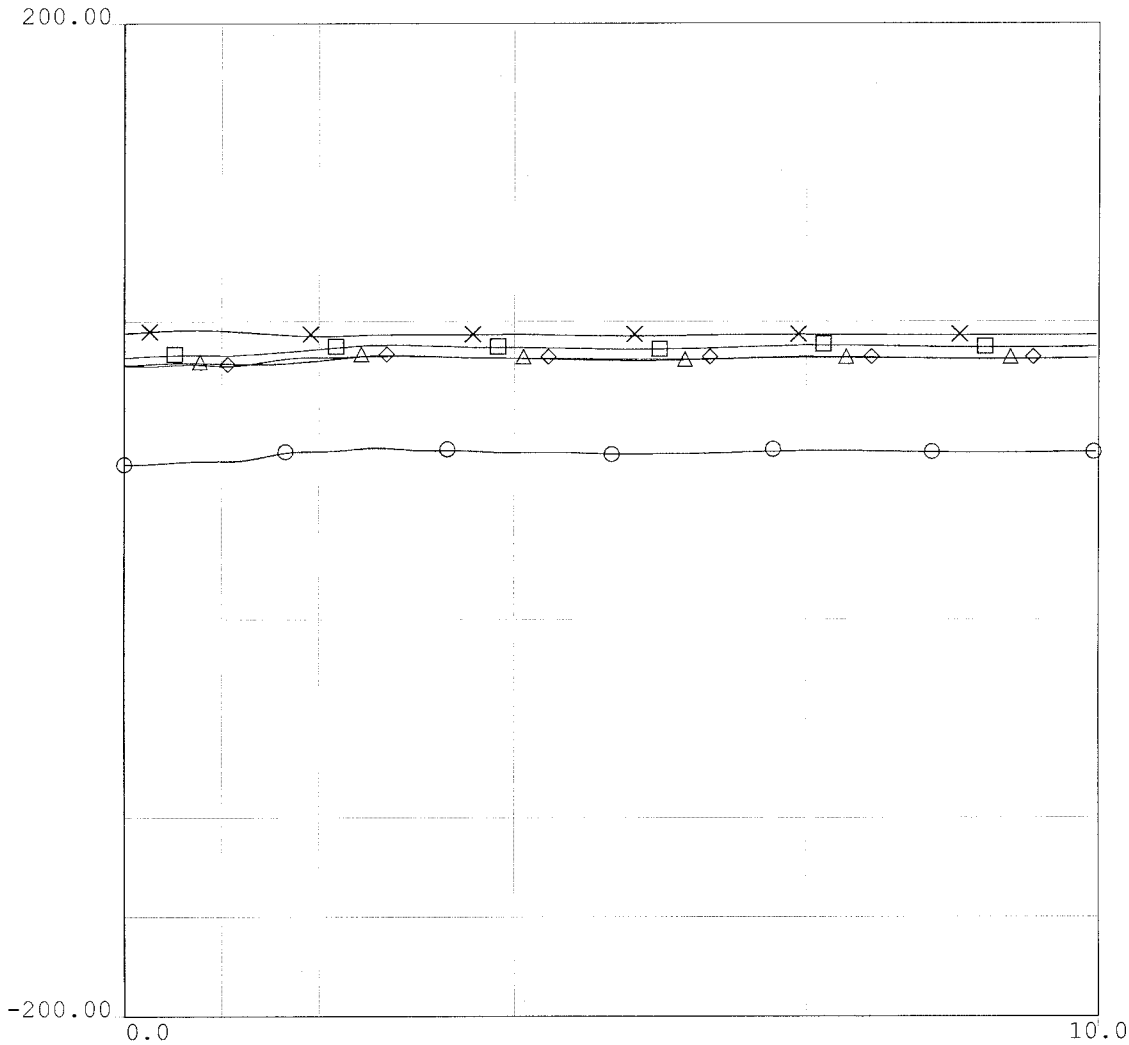
SYSTEM_Rotorangles



-200.0000 ang	16518	SPR GEN3	21.0	0	0.0	1	1	200.0000
-200.0000 ang	16503	SUNDTGE4	18.0	0	0.0	1	1	200.0000
-200.0000 ang	14914	FCNGN4CC	22.0	0	0.0	H	1	200.0000
-200.0000 ang	14931	PALOVRD1	24.0	0	0.0	1	1	200.0000
-200.0000 ang	24004	ALAMT4 G	18.0	0	0.0	H	1	200.0000

2014HS-UFSAR05:LOSS OF THE LARGEST BUS LOAD-1147 MW OFVALLEY S IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

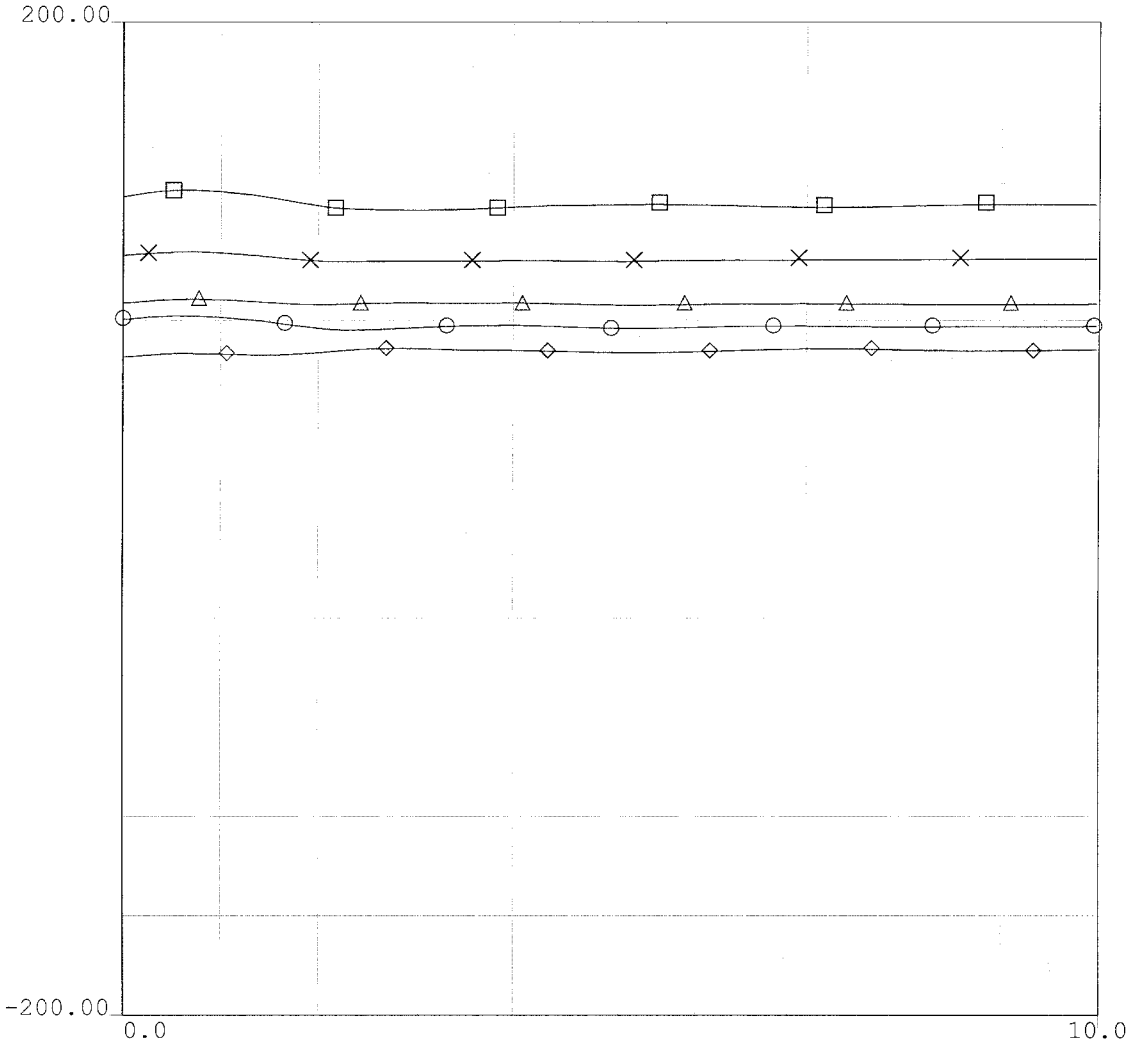
SYSTEM_Rotorangles



-200.0000 ang	24129	S.ONOFR2	22.0	0	0.0	1	1	200.0000
-200.0000 ang	26039	INTERM1G	26.0	0	0.0	1	1	200.0000
-200.0000 ang	15981	NAVAJO 1	26.0	0	0.0	1	1	200.0000
-200.0000 ang	10318	SJUAN_G1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	36411	DIABLO 1	25.0	0	0.0	1	1	200.0000

2014HS-UFSAR05:LOSS OF THE LARGEST BUS LOAD-1147 MW OFVALLEY S IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

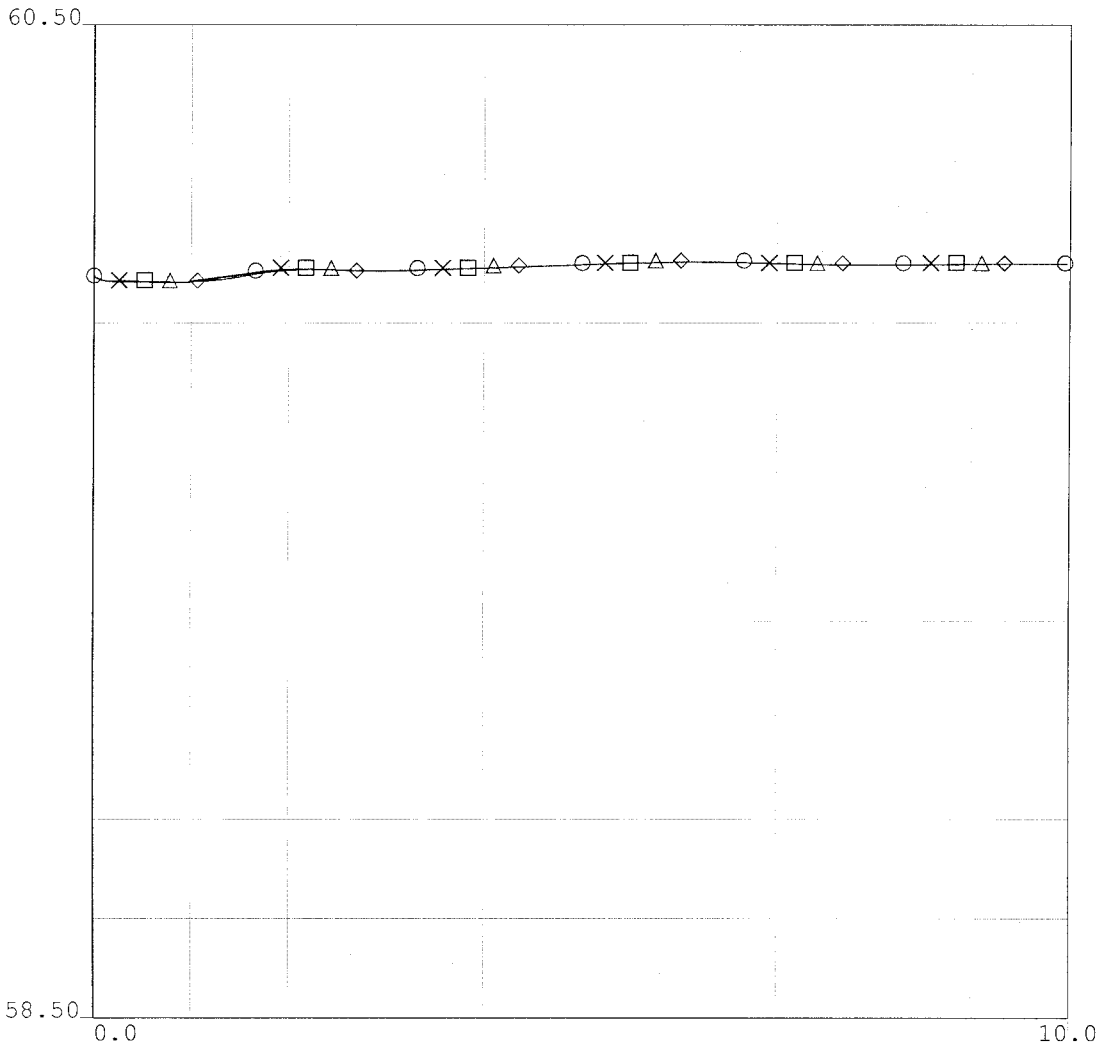
SYSTEM_Rotorangles



-200.0000 ang	73129	MBPP-1	24.0	0	0.0	1	1	200.0000
-200.0000 ang	60086	BRIDGER1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	62050	COLSTP 1	22.0	0	0.0	1	1	200.0000
-200.0000 ang	65500	EHUNTR 3	22.0	0	0.0	1	1	200.0000
-200.0000 ang	10321	SJUAN_G4	22.0	0	0.0	1	1	200.0000

2014HS-UFSAR05:LOSS OF THE LARGEST BUS LOAD-1147 MW OFVALLEY S IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

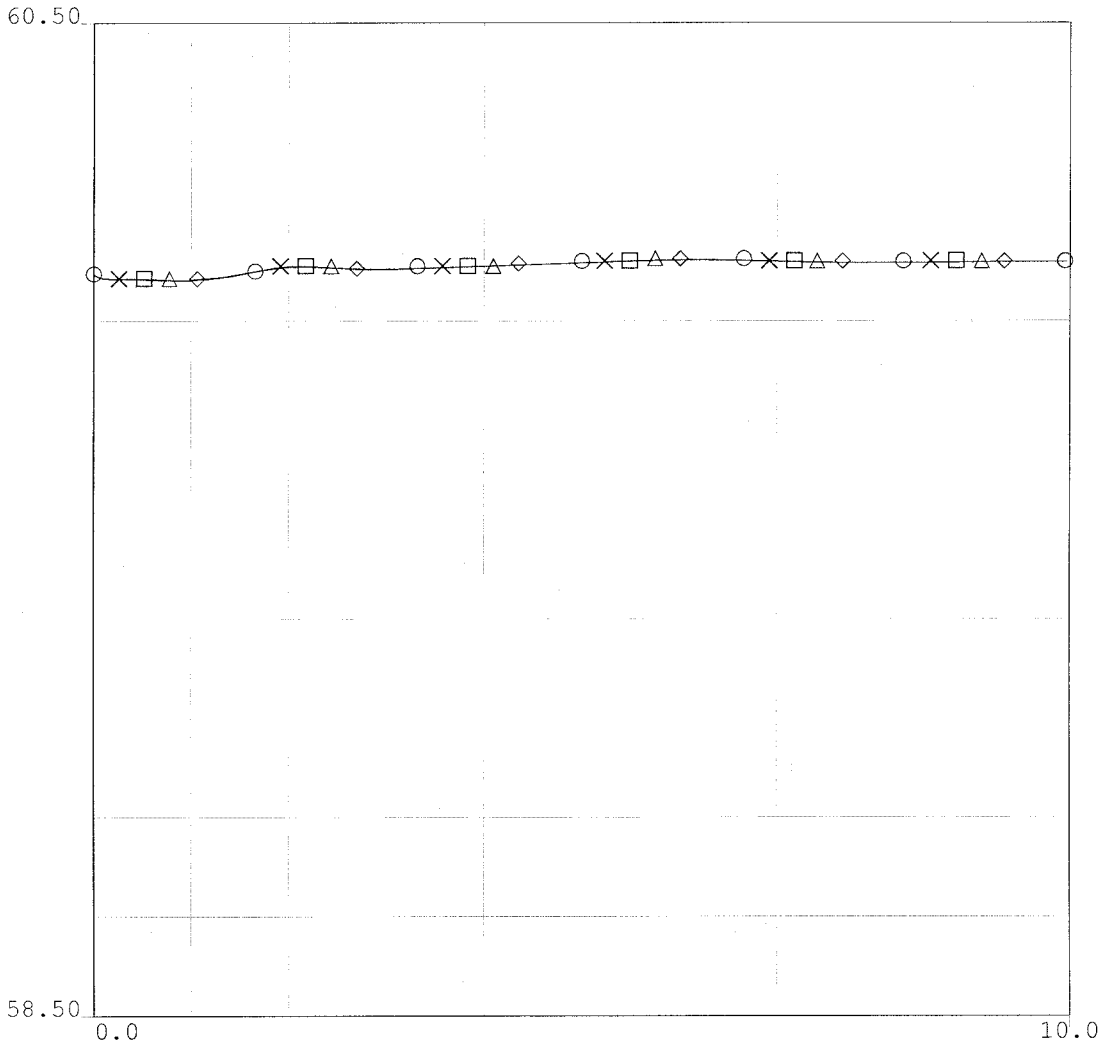
Frequencies:



58.5000	fbus	14003	NAVAJO 500.0	0	0.0	1	1	60.5000
58.5000	fbus	14005	WESTWING 500.0	0	0.0	1	1	60.5000
58.5000	fbus	14001	FOURCORN 500.0	0	0.0	1	1	60.5000
58.5000	fbus	14016	PNPKAPS 500.0	0	0.0	1	1	60.5000
58.5000	fbus	15021	PALOVRDE 500.0	0	0.0	1	1	60.5000

2014HS-UFSAR05:LOSS OF THE LARGEST BUS LOAD-1147 MW OFVALLEY S IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

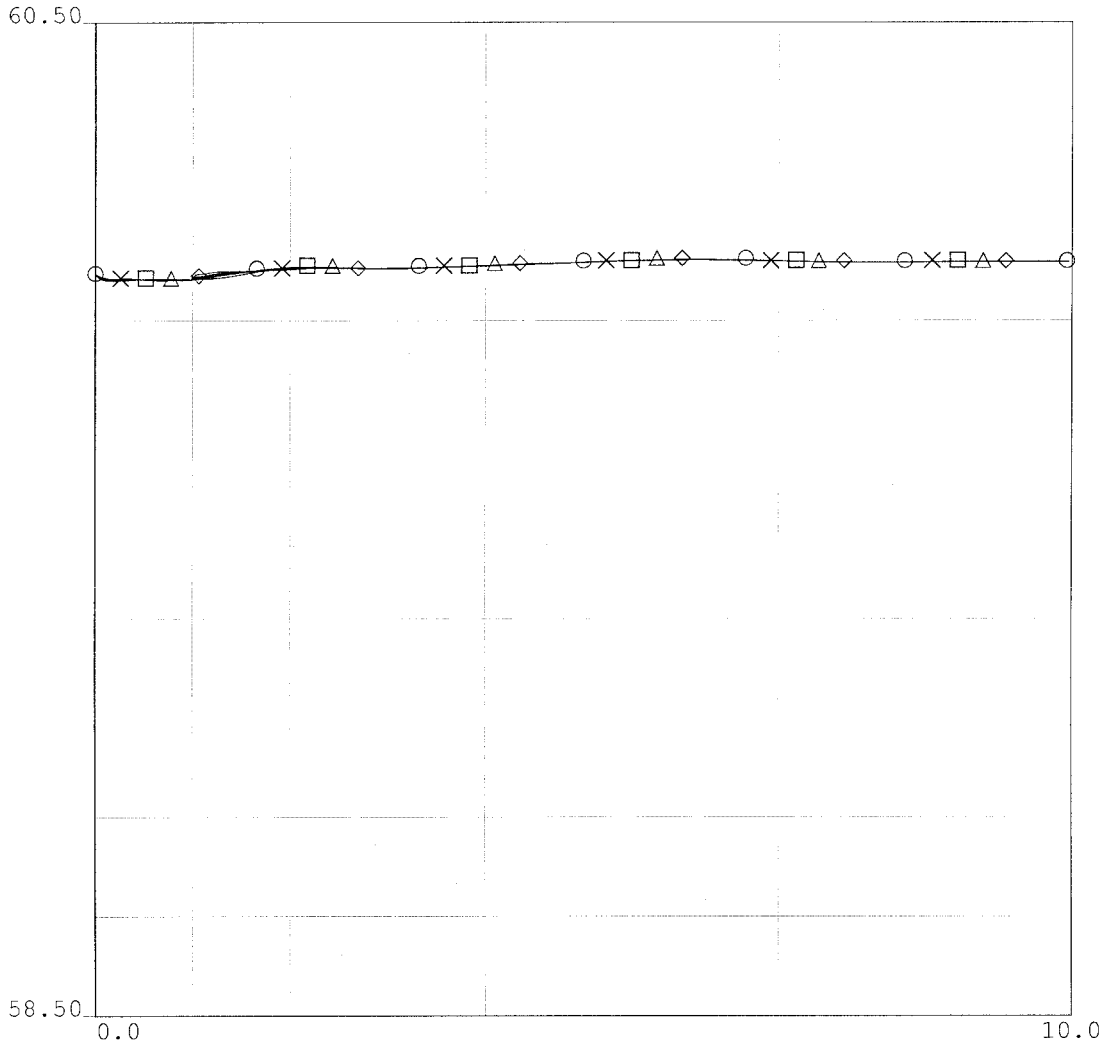
Frequencies:



58.5000 fbus	16000	TORTOLIT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	16105	VAIL 345.0	0	0.0	1	1	60.5000
58.5000 fbus	16103	SOUTH 345.0	0	0.0	1	1	60.5000
58.5000 fbul	15001	CORONADO 500.0	0	0.0	1	1	60.5000
58.5000 fbus	16109	WINCHSTR 345.0	0	0.0	1	1	60.5000

2014HS-UFSAR05:LOSS OF THE LARGEST BUS LOAD-1147 MW OFVALLEY S IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

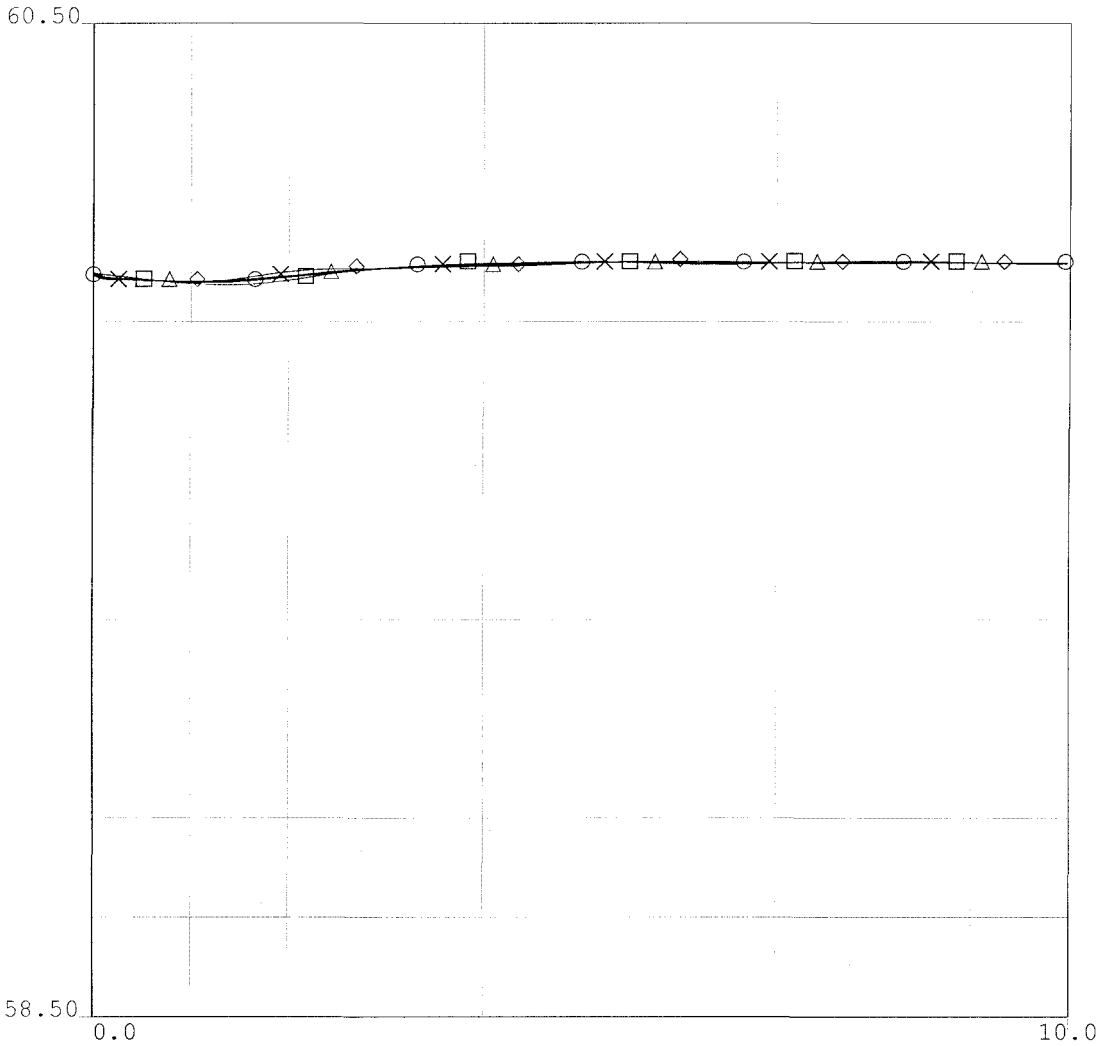
Frequencies:



58.5000	fbul	14231	WESTWNGW	230.0	0	0.0	1	1	60.5000
58.5000	fbus	26003	ADELANTO	500.0	0	0.0	1	1	60.5000
58.5000	fbus	14001	FOURCORN	500.0	0	0.0	1	1	60.5000
58.5000	fbus	26048	MCCULLGH	500.0	0	0.0	1	1	60.5000
58.5000	fbus	14003	NAVAJO	500.0	0	0.0	1	1	60.5000

2014HS-UFSAR05:LOSS OF THE LARGEST BUS LOAD-1147 MW OFVALLEY S IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

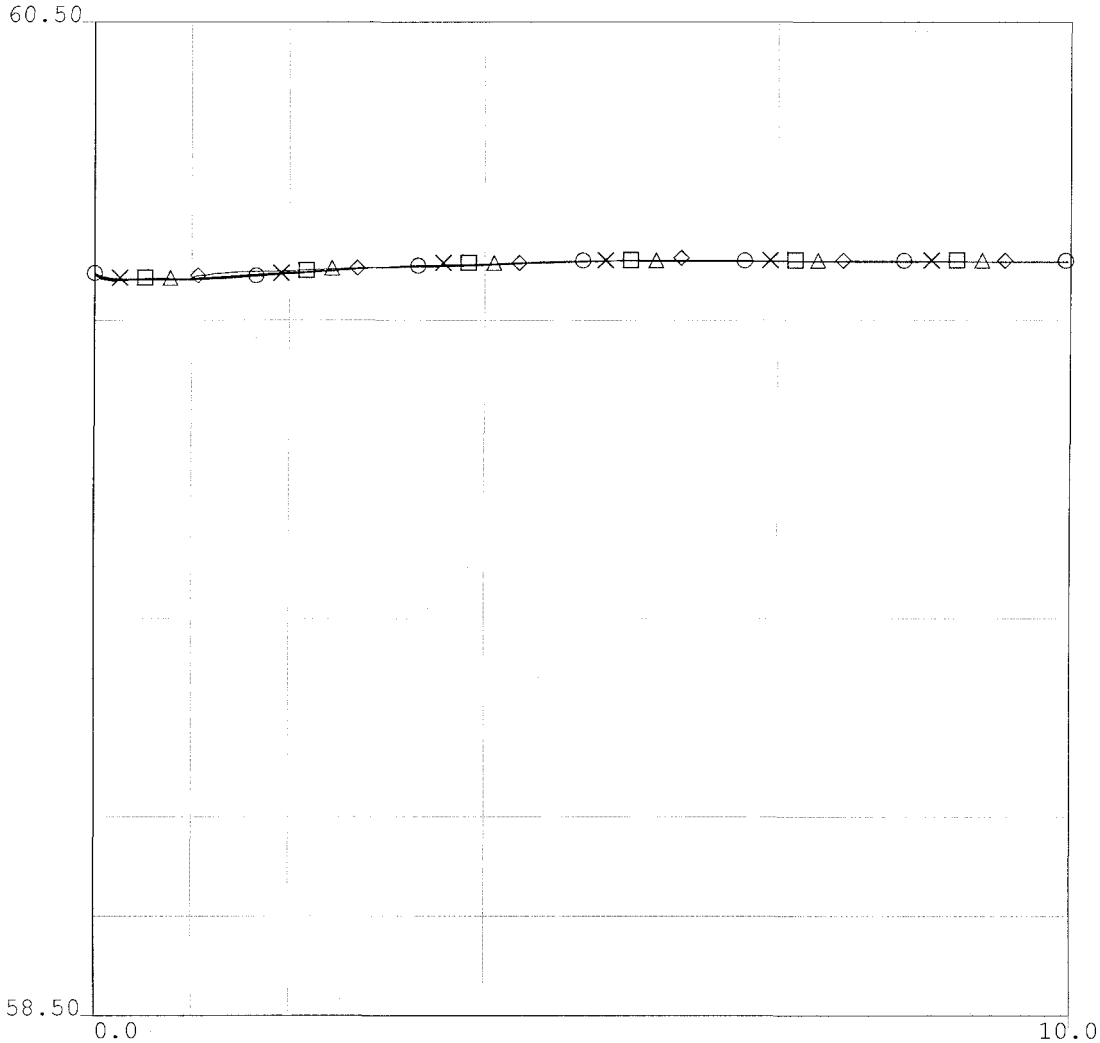
Frequencies:



58.5000 fbus	40489	GRIZZLY 500.0	0	0.0	1	1	60.5000
58.5000 fbus	40687	MALIN 500.0	0	0.0	1	1	60.5000
58.5000 fbus	40459	GARRISON 500.0	0	0.0	1	1	60.5000
58.5000 fbus	60235	MIDPOINT 345.0	0	0.0	1	1	60.5000
58.5000 fbus	66230	PINTO 138.0	0	0.0	1	1	60.5000

2014HS-UFSAR05:LOSS OF THE LARGEST BUS LOAD-1147 MW OFVALLEY S IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

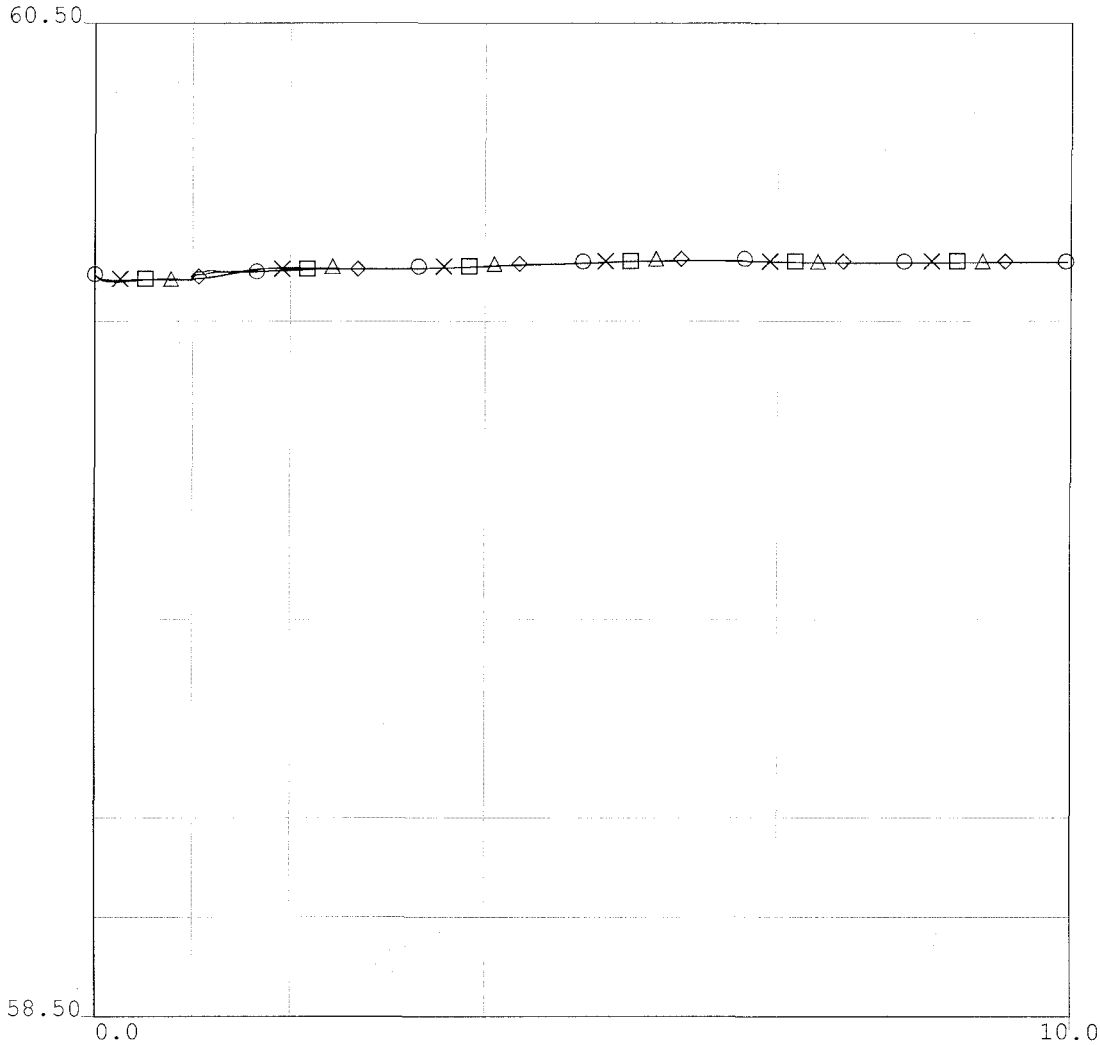
Frequencies:



58.5000 fbus	30005	ROUND MT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30015	TABLE MT 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30035	TRACY 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30040	TESLA 500.0	0	0.0	1	1	60.5000
58.5000 fbus	30060	MIDWAY 500.0	0	0.0	1	1	60.5000

2014HS-UFSAR05:LOSS OF THE LARGEST BUS LOAD-1147 MW OFVALLEY S IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

Frequencies:



58.5000 fbus	24801	DEVERS 500.0	0	0.0	1	1	60.5000
58.5000 fbus	24086	LUGO 500.0	0	0.0	1	1	60.5000
58.5000 fbus	26094	SYLMARLA 230.0	0	0.0	1	1	60.5000
58.5000 fbus	22468	MIGUEL 500.0	0	0.0	1	1	60.5000
58.5000 fbus	22536	N.GILA 500.0	0	0.0	1	1	60.5000

2014HS-UFSAR05:LOSS OF THE LARGEST BUS LOAD-1147 MW OFVALLEY S IN SCE
PALO VERDE FINAL SAFETY ANALYSIS WITH ADDITION OF SONORA SOLAR(PV TYPE)
ADDED 7% PALO VERDE GENERATION MARGIN WITH PV BUCKING 810 MVARS(4/5/11)

HIGHEST VOLTAGE DIP

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct	@time
40	STATELIN	69	vbul	1.003	0.987	1.6	1.529
40	VANSYCLE	69	vbus	1.005	0.988	1.7	1.529
50	BRL 66G1	66	vbug	1.007	1.002	0.5	1.529

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
54	LONGLK10	25	fbul	59.954	2.354
54	MUSKEG2	240	fbus	59.954	2.354
54	MUSKEG6	13.8	fbug	59.953	2.354

There were 0 violations of MORC criteria 1 (25% Voltage Dip) !
There were 0 violations of MORC criteria 2 (20% Voltage Dip for 20 Cycles)!
There were 0 violations of MORC criteria 3 (59.6 HZ for 6 Cycles)!

APPENDIX C

Responses to Comments on the Sonoran Project Interconnection Study Report

PDS received the following written comments after conducting additional stability analysis distributing a draft report to WATS members for their review and comment. The responses are provided based on the chronological order in which the comments were received.

Comment Set 1

From: Nevada Energy Company
Received on: April 21, 2011

NEVADA 1 - The appendices don't address area 18 (NVE South), e.g., see Appendix A, while providing results for areas 30, 40, 65, etc. Could you add Harry Allen 500 kV bus to the plots and voltage dip analysis for area 18?

Response: The stability analysis program scanned the entire WECC system and recorded the severe voltage dips that were discovered in the Areas 30, 40 and 65 in addition to Arizona and Southern California areas. The results showed there was not any significant transient voltage dips were detected in the Nevada system (Area 18) under the critical disturbance cases. In response to this comment, the voltage plots for some of the Nevada 230 kV, 138 kV and 69 kV buses in addition to the Harry Allen 500 kV bus were included in this Appendix C.

NEVADA 2- Also, for outages like PV-Devers (Col River), Mead - Perkins, PV unit trip it is desirable to see Mead and Eldorado/MCC 500 kV buses plotted

Response: The requested voltage plots for the Mead, Eldorado and McCullough 500 kV buses for these three contingency outage cases are also attached to this Appendix C.

NEVADA 3- For IPPDC outage: please add plots for Gonder 345, 230 and 69 kV buses.

Response: The requested voltage plots for the Gonder 345, 230 and 69 kV buses for the IPPDC outage case are attached to this Appendix C.

NEVADA 4- Why for the PV-Devers outage (see Appendix A; p. 6) the N. California buses (Malin 500kV, etc.) dip 2.5 seconds later than other (close by) buses? Is there a RAS that is modeled (like a cap trip at Malin)? I wouldn't expect anything like it to be required for this outage.

Response: This phenomenon was familiar as observed in many of the past studies including EOR path rating studies, Hassayampa interconnection planning study and a number of Palo Verde operating studies; it usually took a longer time to have a remote transmission network bus respond than the close in bus fault in the vicinity of Palo Verde for the long term dynamic behavior. No RAS was modeled for this outage.

NEVADA 5- Reactive support requirements: the report doesn't address these studies, simply stating its intent to: "Use of variable reactive power control capability at the inverter station to achieve a desirable unit power factor or a minimum var interchange at the interconnection point". Are these inverters capable of producing dynamic VARs or just have to be pre-set at a factory for a fixed power factor? Can they be used in a voltage control mode? I suggest adding a "Reactive Capability" section in the report addressing these issues. Also, I believe that WATS previously used specific methodology, including reactive margin estimates, for reactive studies for a PV Project. I believe Chuck can provide those studies to be used as a template.

Responses:
(1) The reactive capability at the Inverters can be set at the PF in the range of (+/-0.95). At a minimum, these set points can be adjusted via the SCADA system, so the project would have the ability to adjust the site voltage/VAR/PF in open loop control if needed. Vendors are working on developing a site master control with closed loop Voltage/VAR/PF control.

(2) It should be mentioned that there was no significant transient voltage dip problem in the PVTS, Phoenix Metropolitan and Southern California load area, and therefore, no specific dynamic reactive power support is required. PDS' understanding is that the assumption is based on variable var control capability and is unlike synchronous condenser but discrete step segments for voltage control that will satisfy normal operating practice and the requirements of interconnection agreement. It is always necessary to keep a minimum impact; i.e. near zero var interchange at the interconnection point under normal base case conditions and no significant voltage deviations under steady-state nor severe transient voltage dip during the transient state to the interconnected system for any critical outages.

NEVADA 6- During the meetings, to my recollection, we had discussed the PV variability issue, e.g., what would happen if the farm output drops precipitously (say, 70% in 30sec-1min), the report doesn't address this issue – do you consider it just a business arrangement?

Response: The impact study used the worst case scenario for the maximum farm output.

Comment Set 2

From: Southern California Edison Company
Received on: April 25, 2011

SCE 1- The category B contingency list (page 8) Palo Verde - Devers 500 kV Line, change this to Palo Verde - Colorado 500 kV Line

Response: Report updated to Palo Verde - Colorado 500 kV Line as requested.

SCE 2- Was a light load base case evaluated?

Response: No. The generator interconnection impact study was based on the system heavy loading conditions with all possible generators on line in the Palo Verde transmission network hub.

SCE 3- What was EOR/WOR Flow?

Response: The EOR flow was 6288 MW and WOR flow was 7077 MW, respectively in the Post-Project base case.

SCE 4- My below comment was based on an analysis performed for a 2014 heavy summer condition. However, in the introduction section of the report, it states commercial operation date of December 2012. The in-service date for the Colorado River is during 2013. If the in-service date for SSEP is during 2014, then the contingency should be Palo Verde - Colorado River. If the project is scheduled for 2012, then it's correct to state Palo Verde - Devers 500 kV line. But, the study results discuss the lowest voltage dip at Colorado River 500 kV bus.

Response: Yes. The entire report should be consistent to reflect the 2014 heavy summer operating condition.

Comment Set 3

From: Public Service Company of New Mexico
Received on: April 25, 2011

PNM 1- Will the report contain language addressing low voltage ride through? PNM had previously drafted and sent to the group language regarding LVRT for PV interconnections. The reliability risk associated with the loss of a large amount of PV generation due to a fault on the transmission system is no different than the reliability risk associated with loss of a large amount of wind generation. PNM evaluates LVRT during the system impact study and does not treat solar technology any different than wind technology. Because the interconnection studies only provide an indication of risk and because modeling data can be insufficient or unavailable for PV, it is stated in the study report that it remains the Interconnection Customer's responsibility to design their project to meet LVRT requirements. Please see the attached for the suggested criteria.

<u>Voltage Ride-Through Requirement</u>

Solar Photovoltaic (PV) generating facilities connected to the Palo Verde Transmission System (PVTS) are required to meet the voltage ride-through requirements similar to that of conventional generation connected to the bulk system. FERC Order 661A instructed utilities to modify their Open Access Transmission Tariff's (OATT) to incorporate low voltage ride-

through (LVRT) requirements for large wind generation interconnections. Large amounts of PV facilities interconnecting to the grid require similar criteria to that of wind so that the reliability of the interconnected grid can be maintained. The LVRT criteria for PV interconnections are as follows:

- Generating facilities are required to withstand 3-phase faults (clearing time up to 9 cycles) and single-line-to-ground faults with delayed clearing at the Point of Interconnection (POI).
- Generating facilities are required to remain connected to the system during the voltage recovery period to pre fault voltage unless clearing the fault effectively disconnects the generator from the system.

It should be noted that positive-sequence, reduced-order simulation models for PV facilities do not allow for a detailed evaluation of voltage ride-through. The interconnection studies only provide an indication of risk, and it remains the Interconnection Customer's responsibility to design the Project to meet the LVRT requirement.

Response: As PNM points out and SSEP also recognizes that Low Voltage Ride Through (LVRT) or Fault Ride Through (FRT) is one of the challenging requirements for grid connection of large wind power or solar power plants, SSEP has made a study effort to investigate this situation and determined its impact to comply with fault through requirements.

The stability plots contained in the back of the attachments illustrated an evaluation of a three phase fault on the Jojoba 500kV bus (POI) with a subsequent trip of both the Jojoba-Kyrene and the Hassayampa-Pinal West 500 kV lines after a fault cleared in 4 cycles. This was considered to be the most critical disturbance event to the SSEP with respect to the LVRT concern. The stability simulation results showed the system remained stable and SSEP was able to be integrated into the interconnected system to support system frequency in the event of this critical network fault and to stabilize the voltage after the fault was cleared.

In the end, understanding that even the best photovoltaic plants have only fair voltage regulation, such problems with voltage regulation of large photovoltaic facilities can be managed based on known system limitations and transfer requirements.

Comment Set 4

From: Salt River Project
Received on: April 25, 2011

Comments and Responses: SRP made some minor changes and editorial comments to the draft report that have been incorporated in the final draft report.

Attachments

Additional stability plots for the following contingency outages:

TS1-3 PH FLT PV-DV_NV_NW_AZ Analysis

TS9-3 PH FLT PK-MD_NV_NW_AZ Analysis

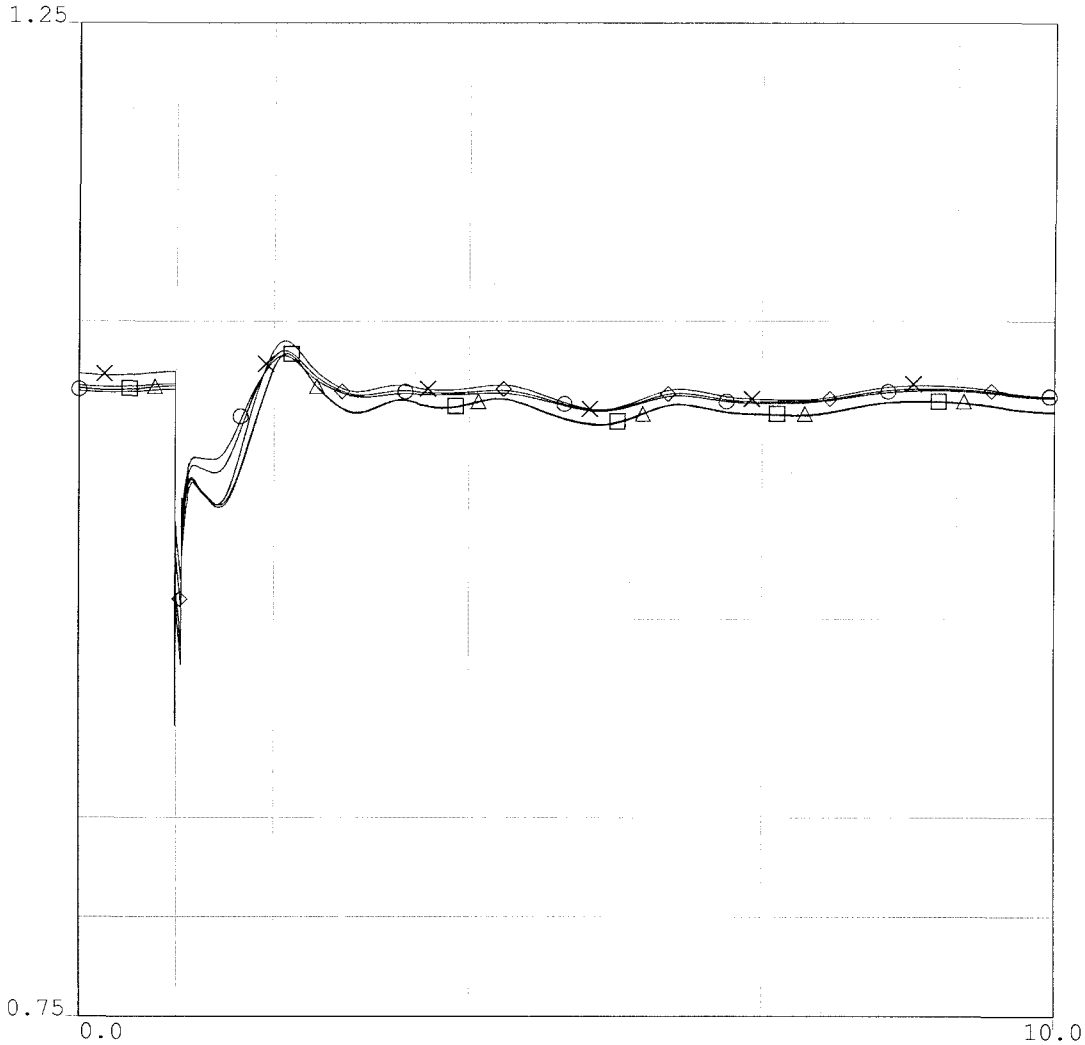
TS12-IPP DC BIPOLAR BLOCK_NV_NW_AZ Analysis

TS13-PALO VERDE G2 LOSS_NV_NW_AZ Analysis

TS16-3 PH FLT JOA-KYR & HAA-PW_SSEP LVRT Analysis

TS16-3 PH FLT JOA-KYR & HAA-PW_AZ LVRT Analysis

500 KV BUS_voltages:



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0.7500 vbus	19038	MEAD 500.0	0	0.0	1	1	1.2500
0.7500 vbus	26048	MCCULLGH 500.0	0	0.0	1	1	1.2500
0.7500 vbus	24042	ELDORDO 500.0	0	0.0	1	1	1.2500
0.7500 vbus	18453	SUNRISE 500.0	0	0.0	1	1	1.2500

2014HS-TS1:THREE PHASE NORMAL FAULT CLEARING ON PV-DEVERS 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV PLANT GENERATION&AUXILIARY MODEL/DATA(4/23/11)

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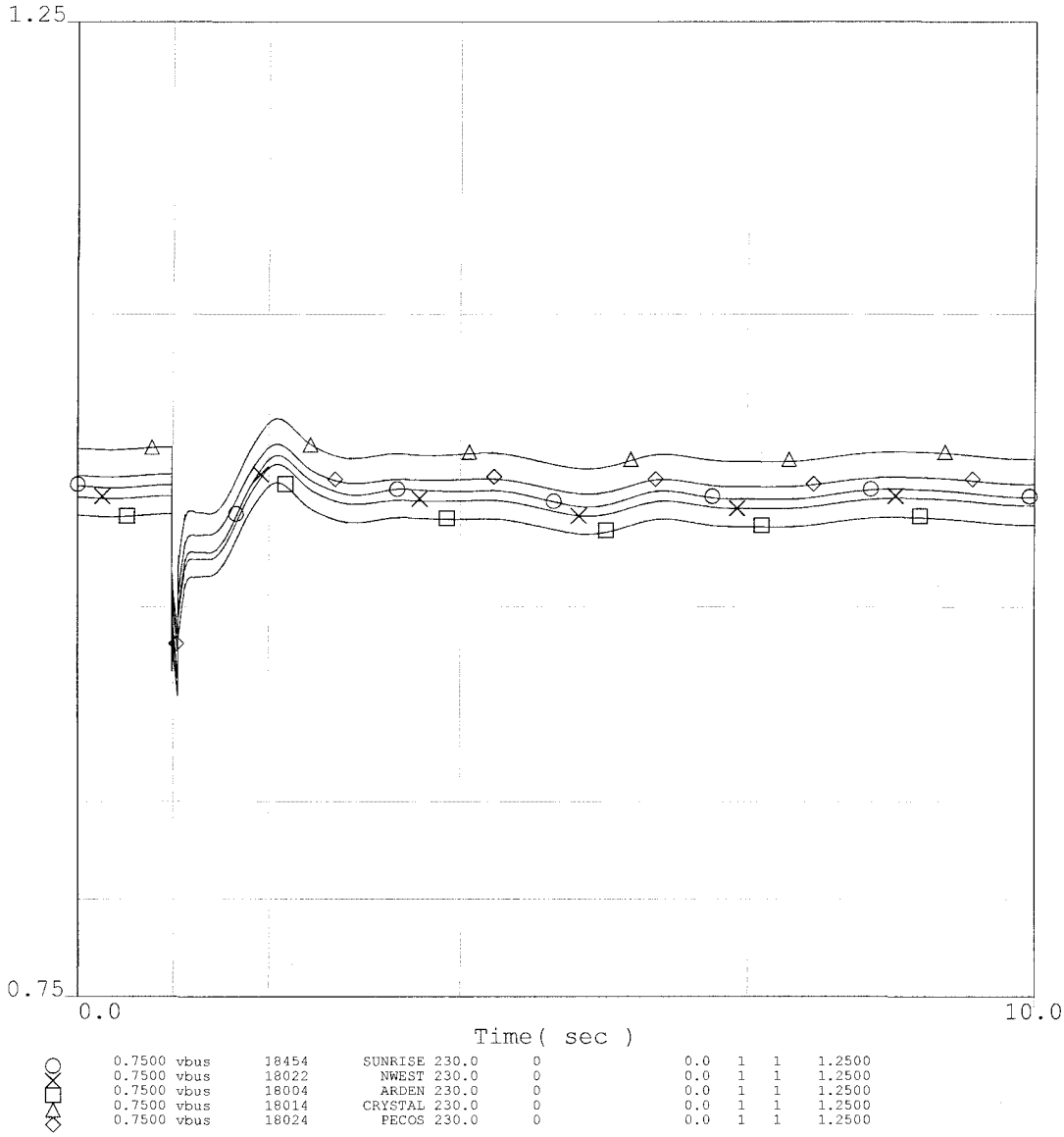

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Sun Apr 24 04:08:42 2011

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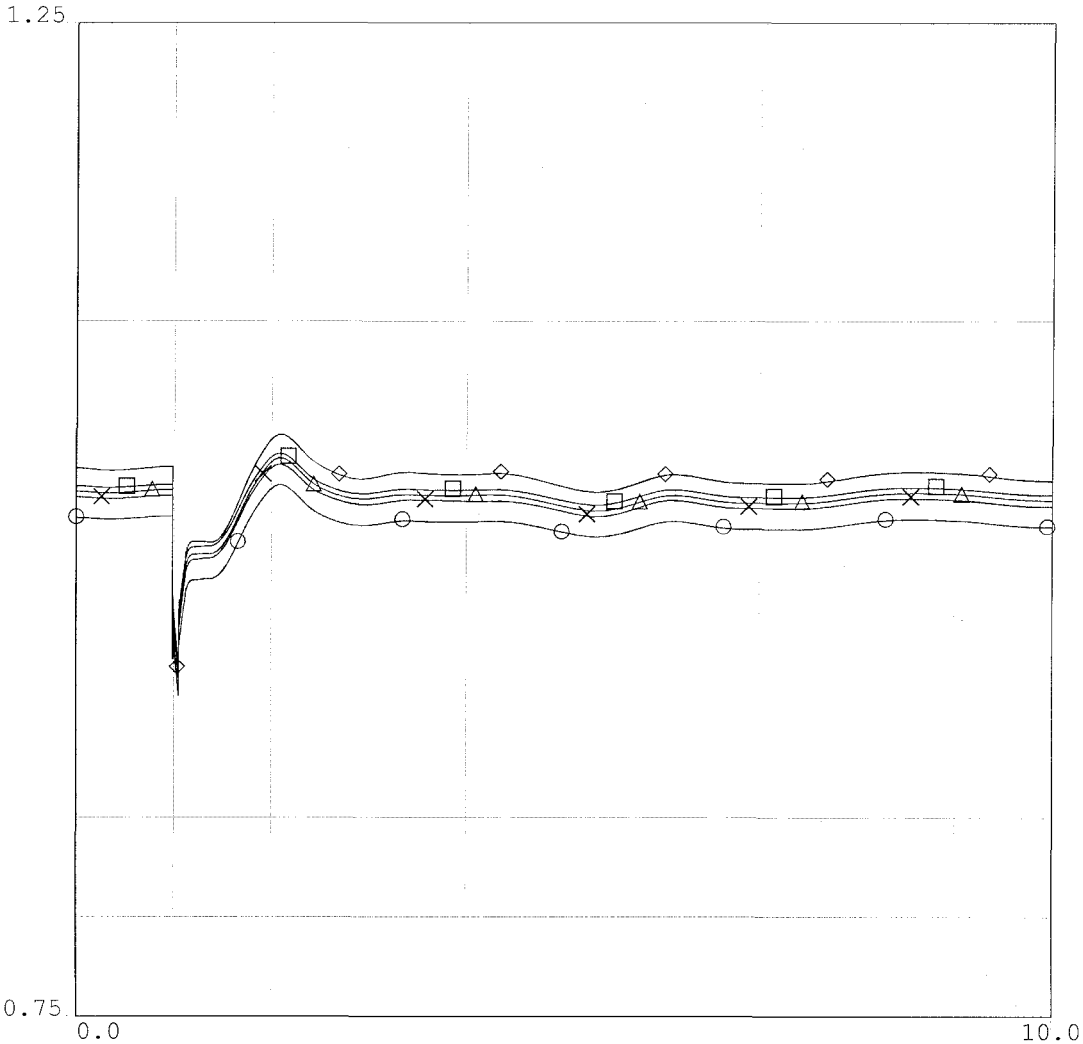

0.7500 vbul	18195	BROOKS 138.0	0	0.0	1	1	1.2500
0.7500 vbul	18068	HIGHLAND 138.0	0	0.0	1	1	1.2500
0.7500 vbul	18088	PECOS 138.0	0	0.0	1	1	1.2500
0.7500 vbul	18072	IRONMTN 138.0	0	0.0	1	1	1.2500
0.7500 vbul	18296	VISTA 138.0	0	0.0	1	1	1.2500

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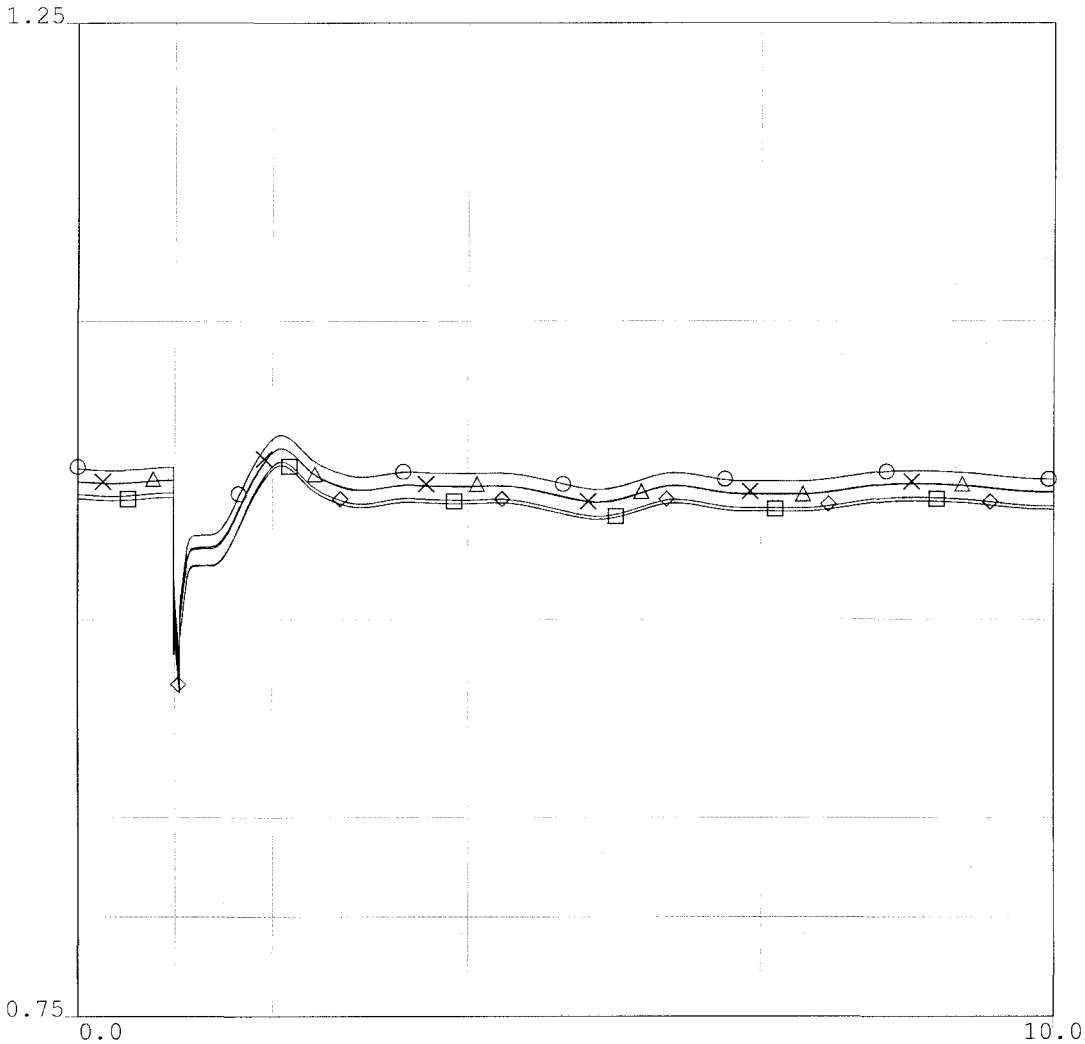

○	0.7500 vbul	18152	DECATURW	69.0	0	0.0	1	1	1.2500
×	0.7500 vbul	18167	LEWIS	69.0	0	0.0	1	1	1.2500
△	0.7500 vbul	18182	NCA2	69.0	0	0.0	1	1	1.2500
□	0.7500 vbul	18191	OLIVE	69.0	0	0.0	1	1	1.2500
◇	0.7500 vbul	18200	PEARL	69.0	0	0.0	1	1	1.2500

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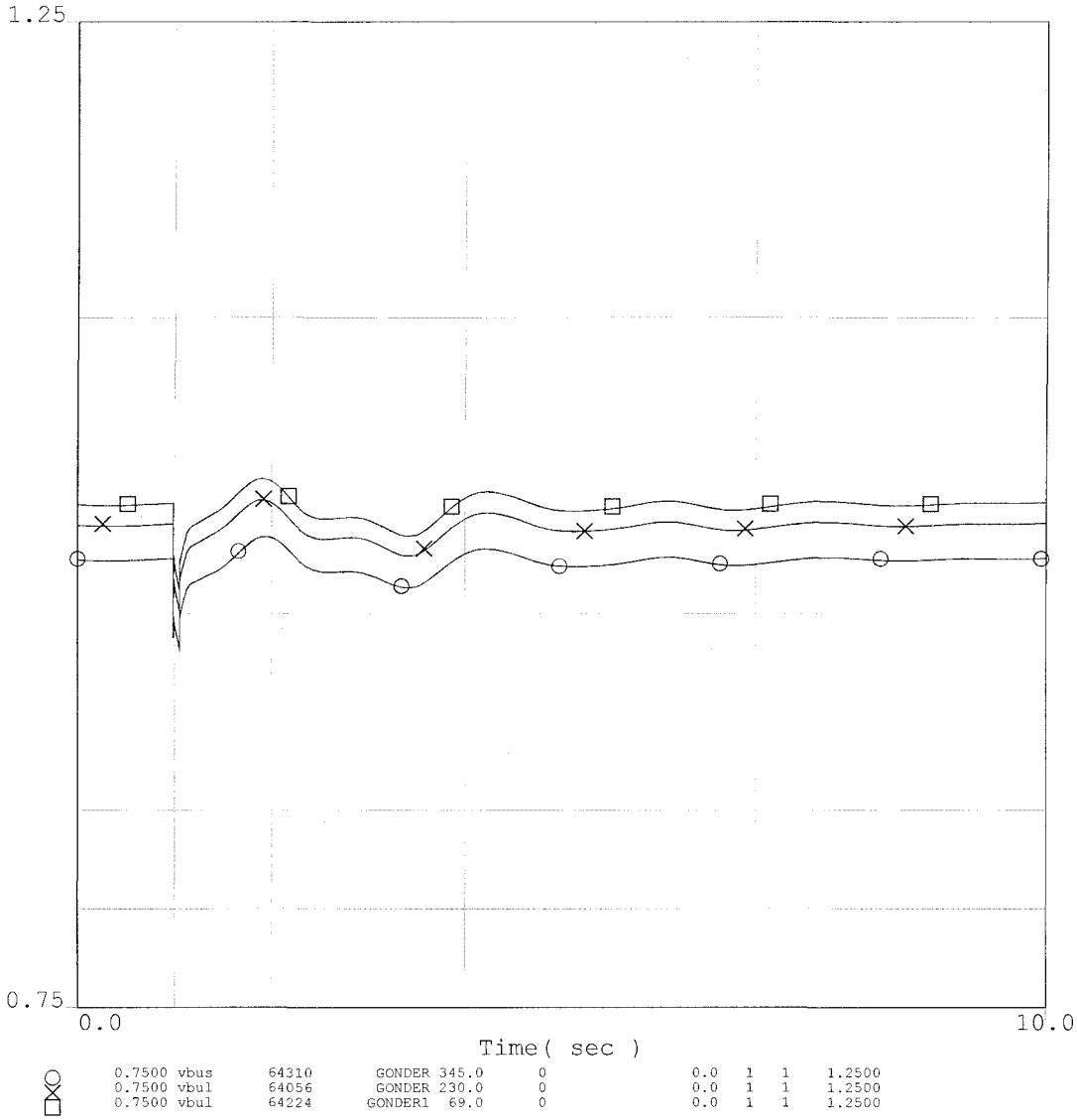

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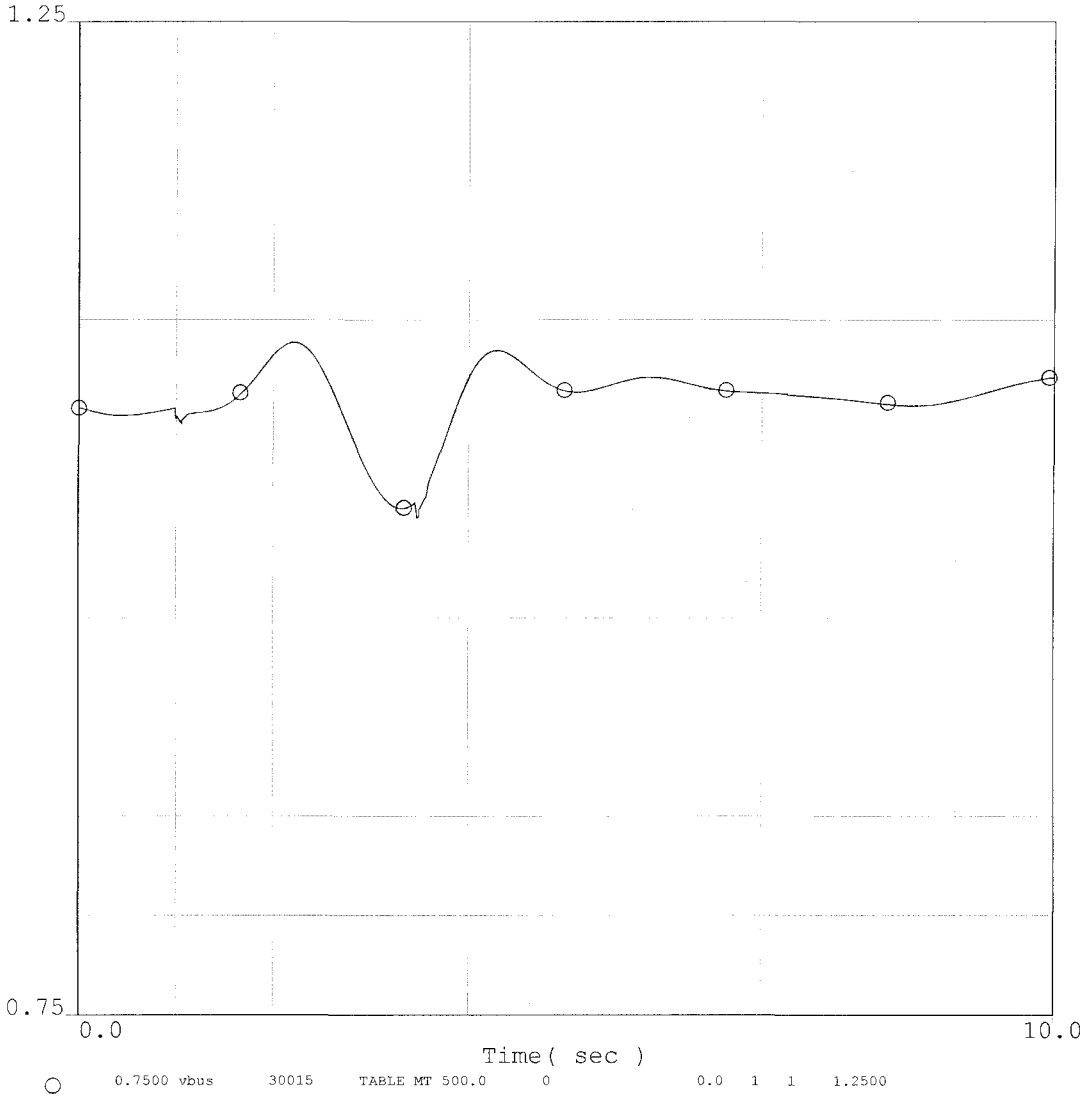

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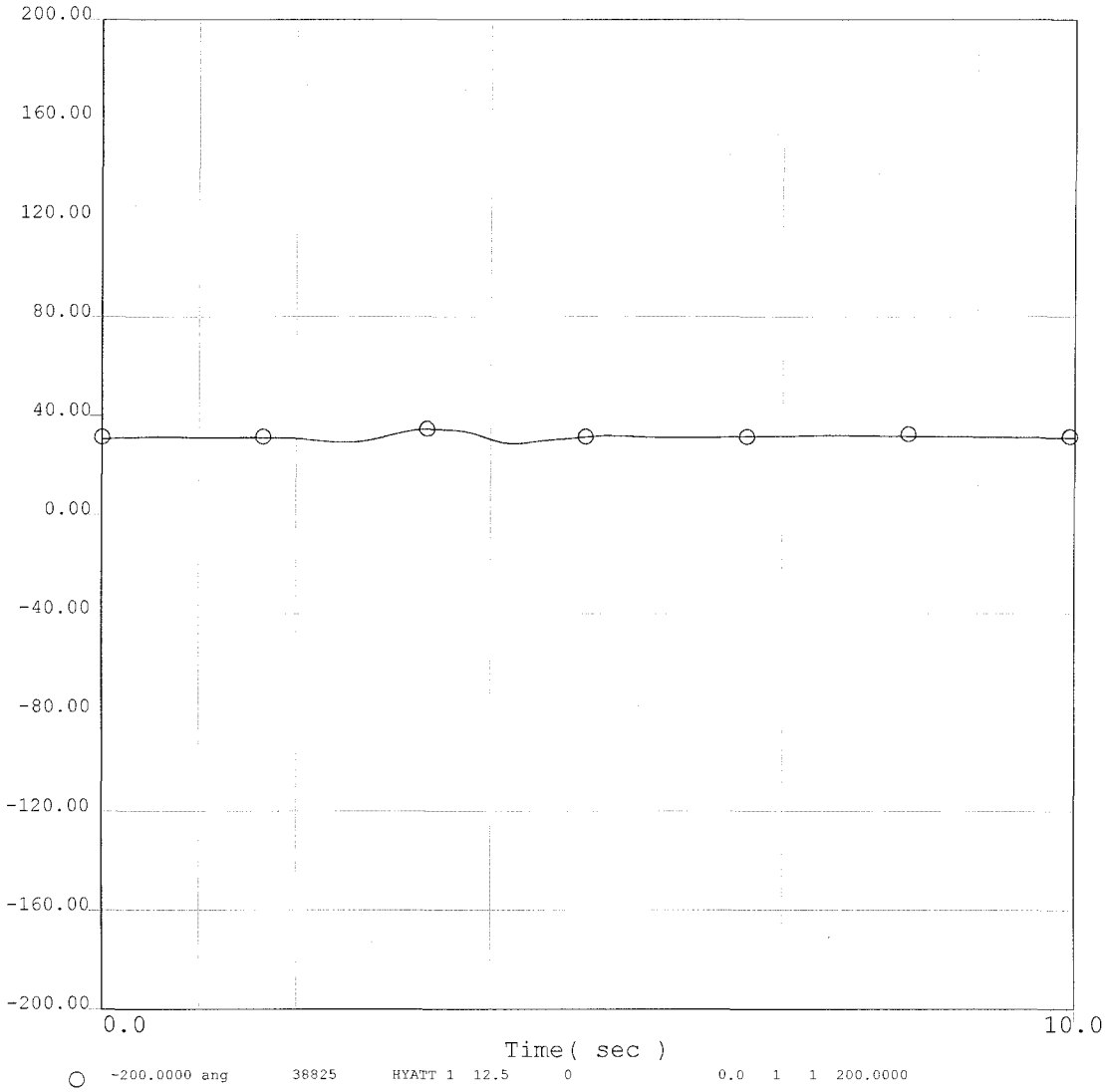
HYATT1_Rotorangles



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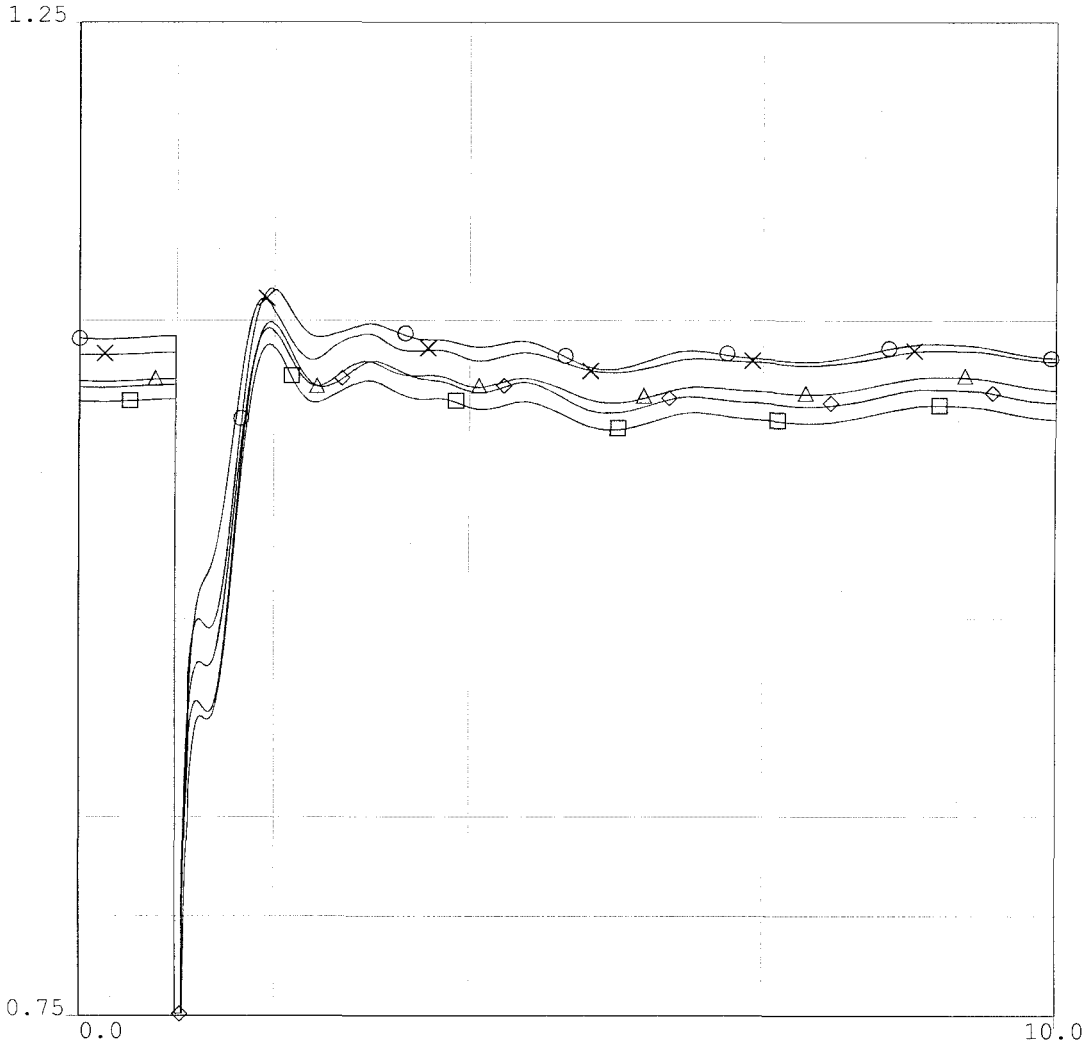
OTHERS_voltages:



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0.7500 vbus	15061	RUDD 500.0	0	0.0	1	1	1.2500
0.7500 vbus	15089	JOJOBA 500.0	0	0.0	1	1	1.2500
0.7500 vbus	15088	PINAL_W 500.0	0	0.0	1	1	1.2500

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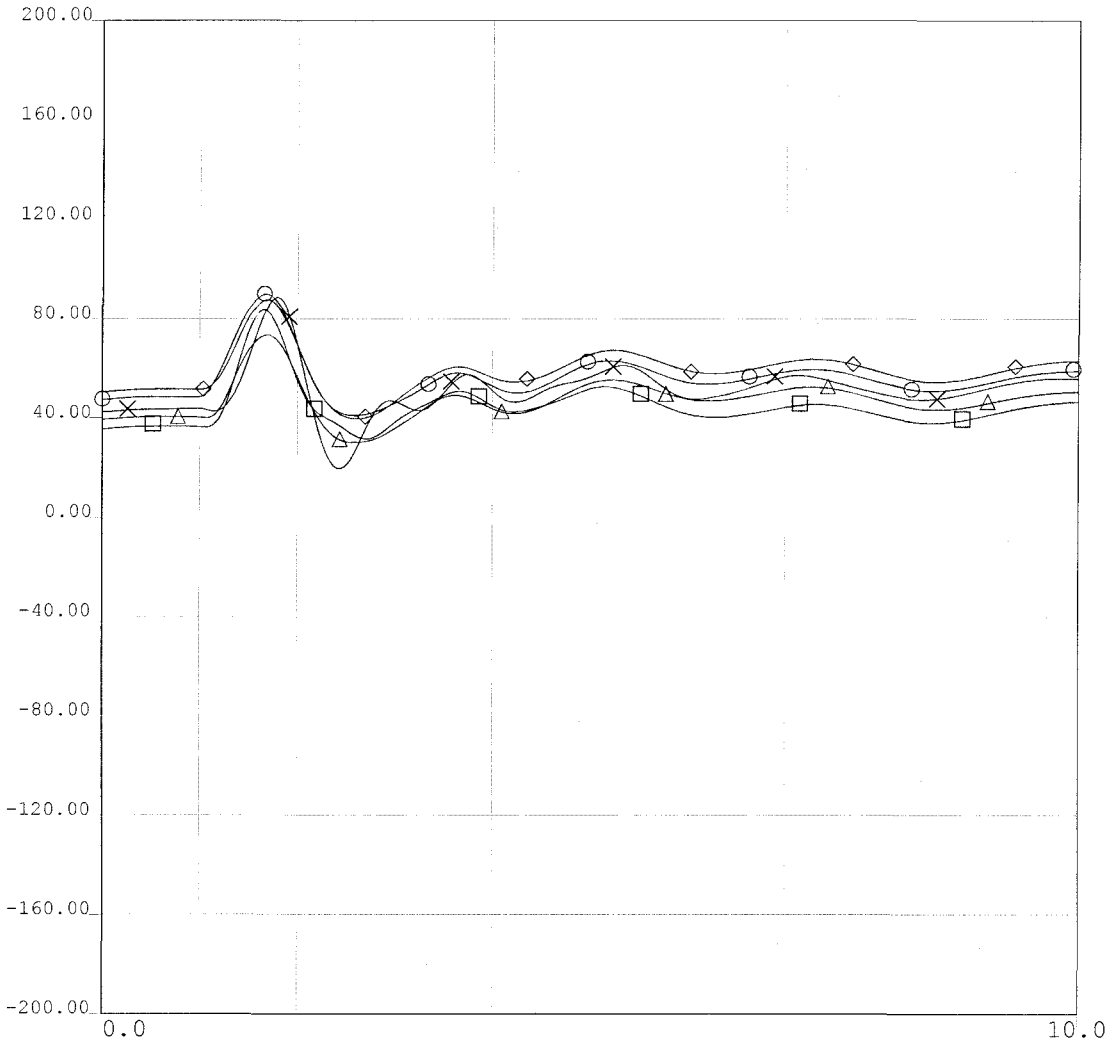
SYSTEM_Rotorangles



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-200.0000 ang	15914	KYRENE 4	13.8	0	0.0	1	1	200.0000
-200.0000 ang	15901	AGUAFR 1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	15926	SANTN 5S	18.0	0	0.0	1	1	200.0000
-200.0000 ang	14966	WPCC5CT1	15.0	0	0.0	1	1	200.0000

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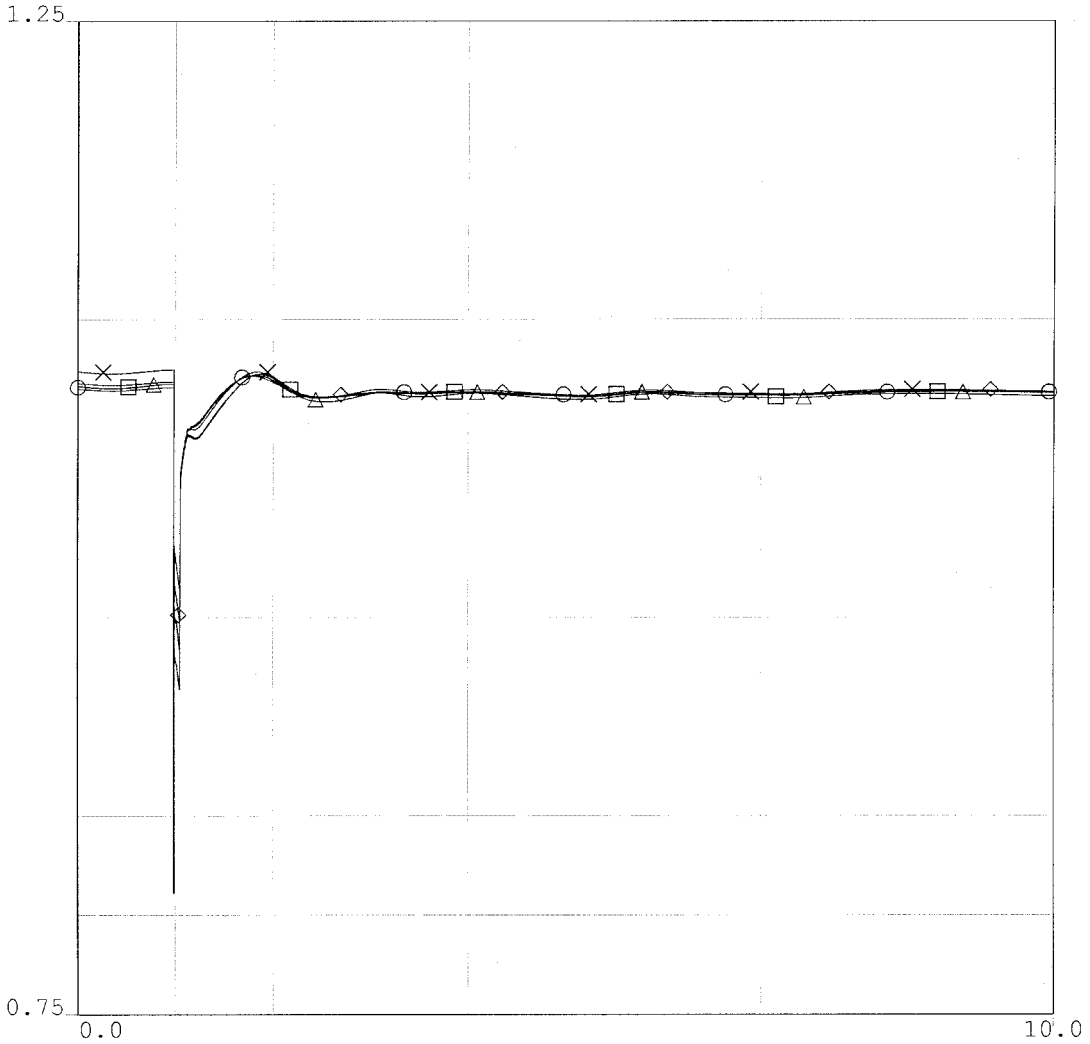
500 KV BUS_voltages:



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0.7500 vbus	19038	MEAD 500.0	0	0.0	1	1	1.2500
0.7500 vbus	26048	MCCULLGH 500.0	0	0.0	1	1	1.2500
0.7500 vbus	24042	ELDORDO 500.0	0	0.0	1	1	1.2500
0.7500 vbus	18453	SUNRISE 500.0	0	0.0	1	1	1.2500

2014HS-TS9:THREE-PHASE FAULT CLEARING ON THE PERKINS-MEAD 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV SOLAR MODEL/DATA (4/25/11)

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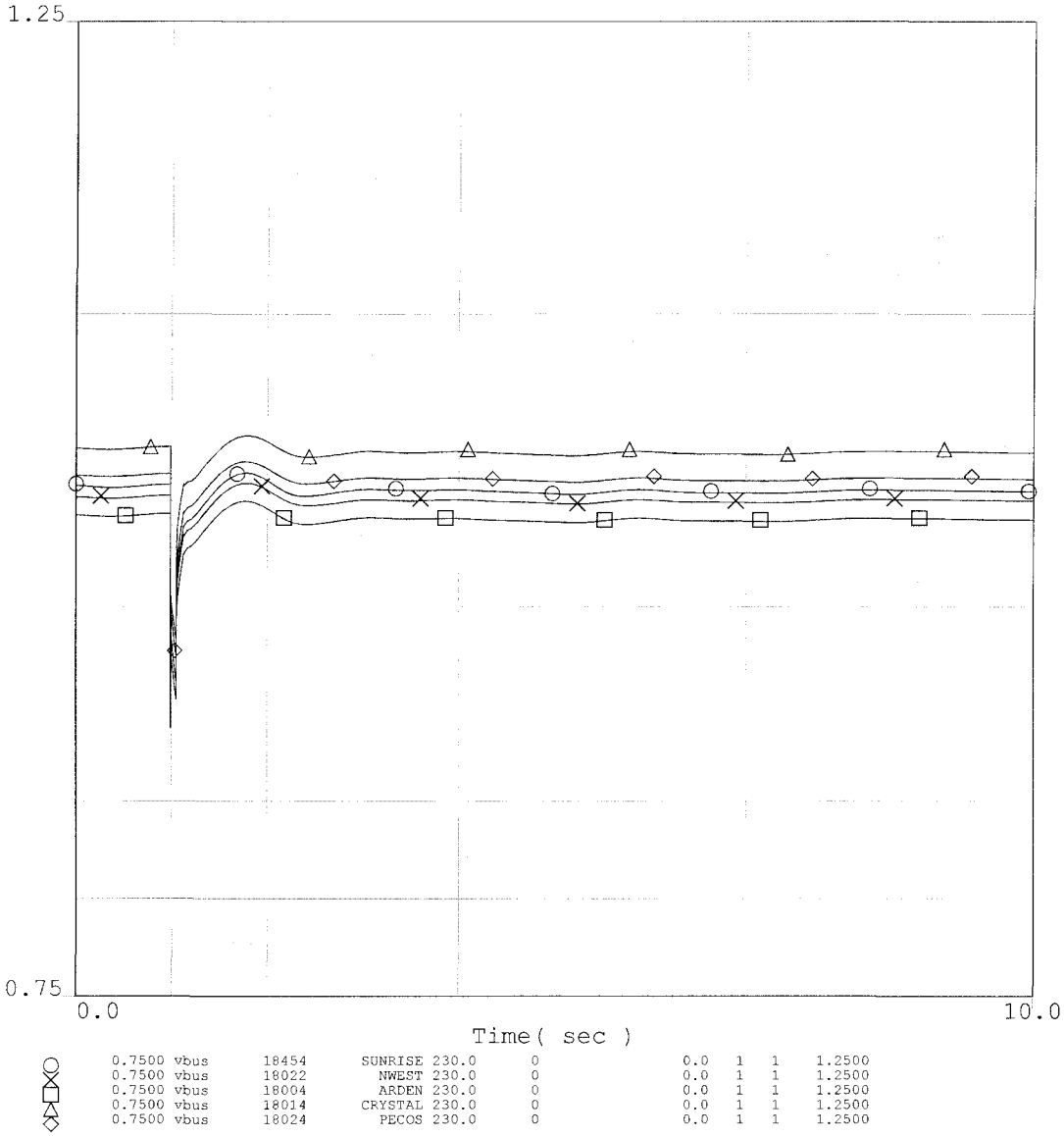

2014HS-TS9:THREE-PHASE FAULT CLEARING ON THE PERKINS-MEAD 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
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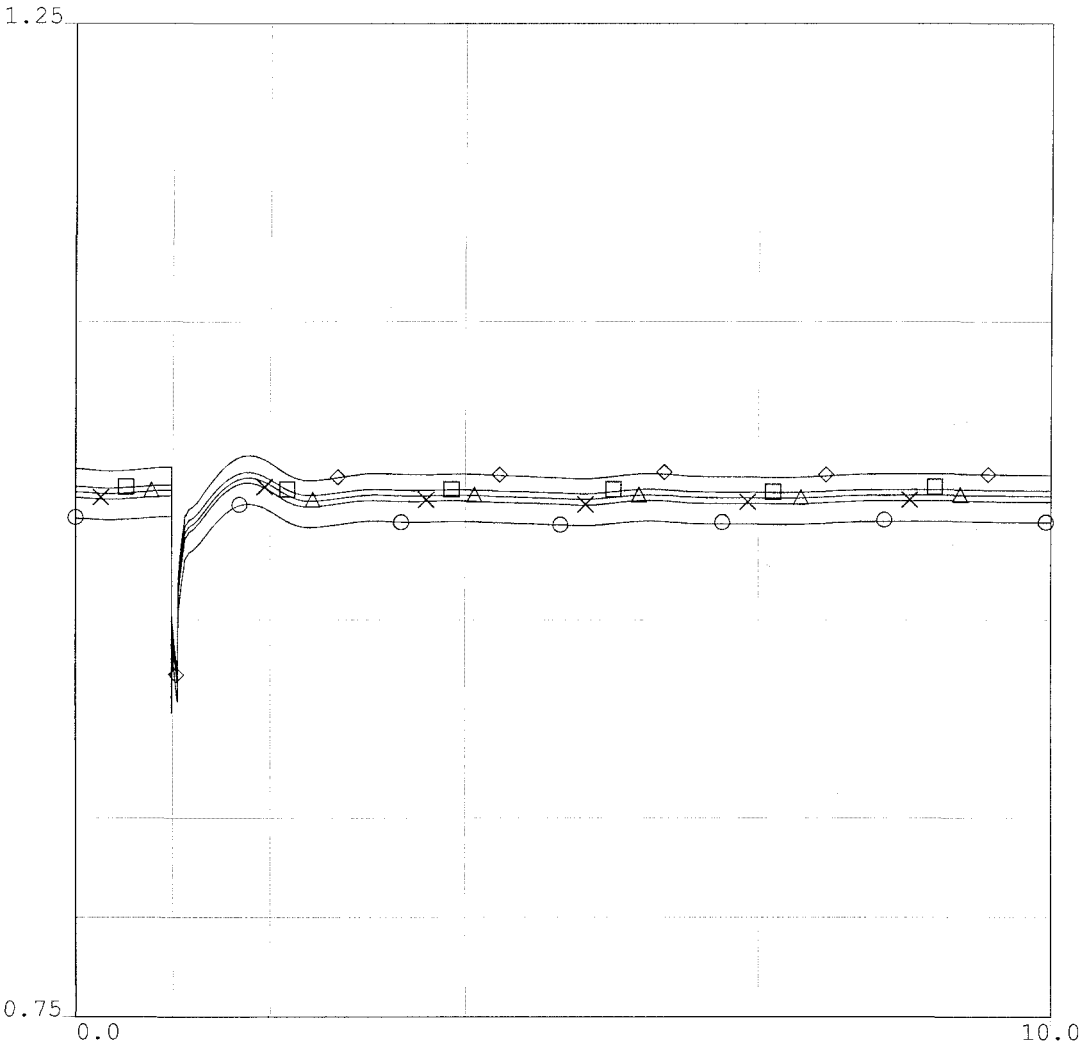

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0.7500 vbul	18088	PECOS 138.0	0	0.0	1	1	1.2500
0.7500 vbul	18072	IRONMTN 138.0	0	0.0	1	1	1.2500
0.7500 vbul	18296	VISTA 138.0	0	0.0	1	1	1.2500

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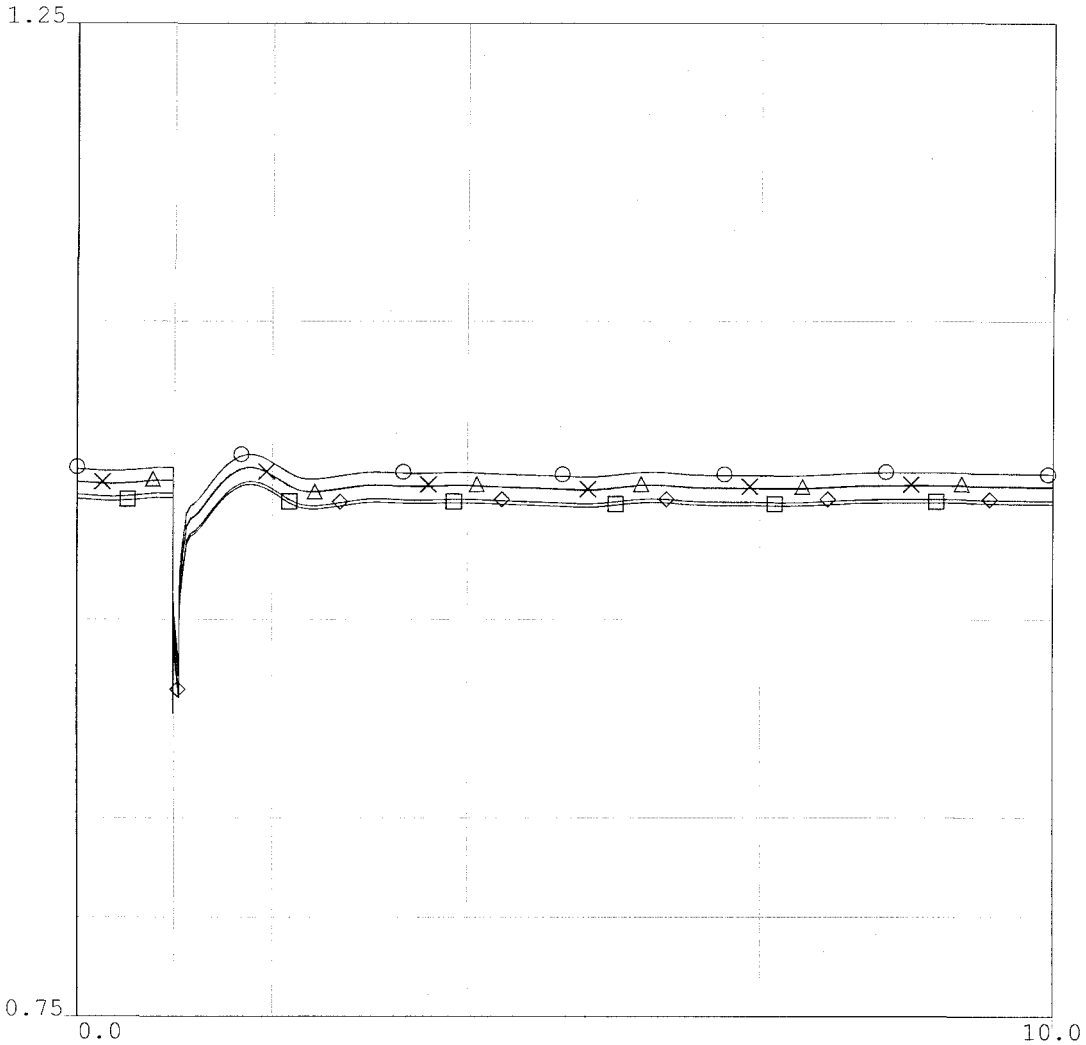

0.7500	vbul	18152	DECATURW	69.0	0	0.0	1	1	1.2500
0.7500	vbul	18167	LEWIS	69.0	0	0.0	1	1	1.2500
0.7500	vbul	18182	NCA2	69.0	0	0.0	1	1	1.2500
0.7500	vbul	18191	OLIVE	69.0	0	0.0	1	1	1.2500
0.7500	vbul	18200	PEARL	69.0	0	0.0	1	1	1.2500

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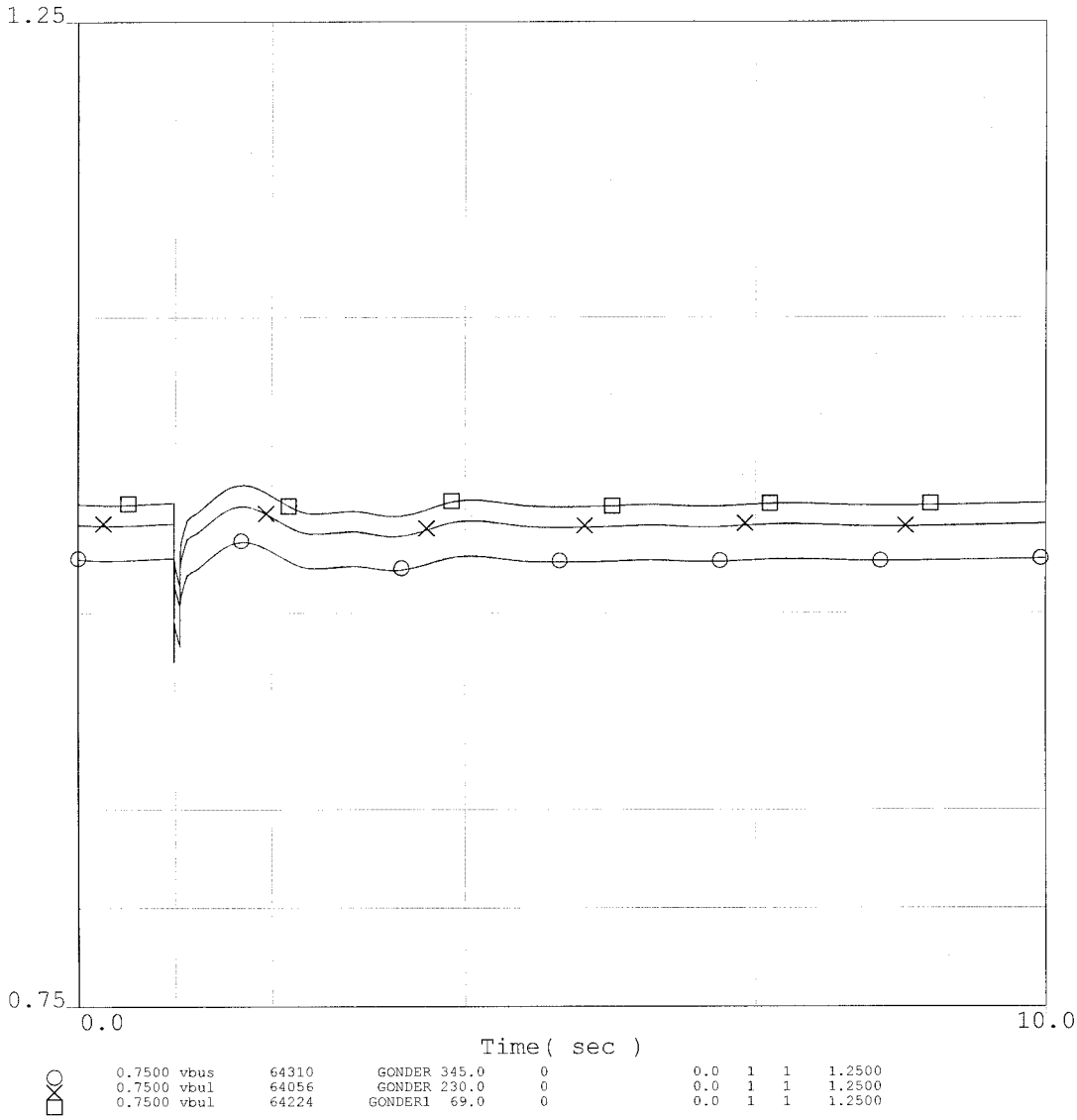

2014HS-TS9:THREE-PHASE FAULT CLEARING ON THE PERKINS-MEAD 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV SOLAR MODEL/DATA (4/25/11)

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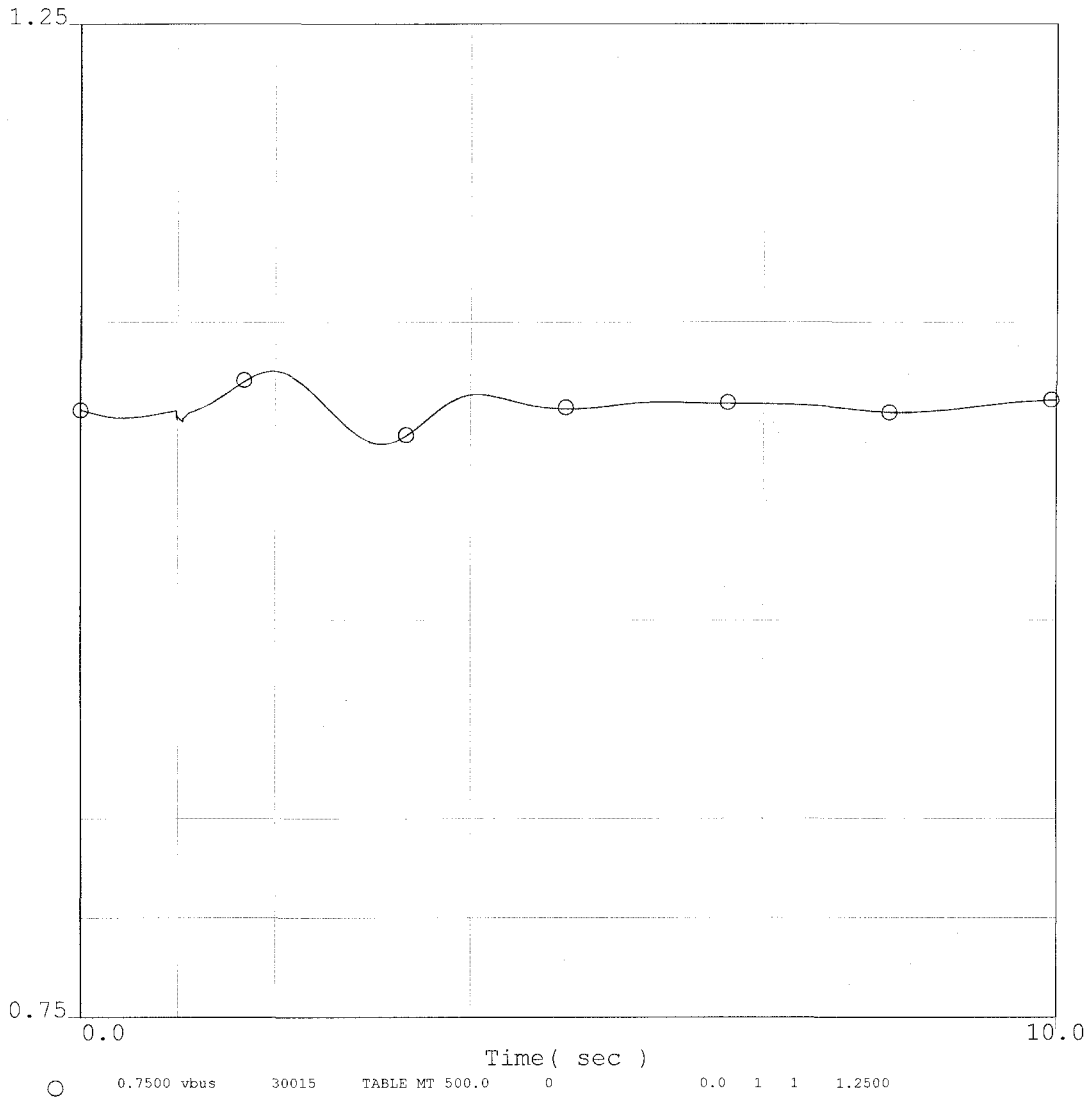
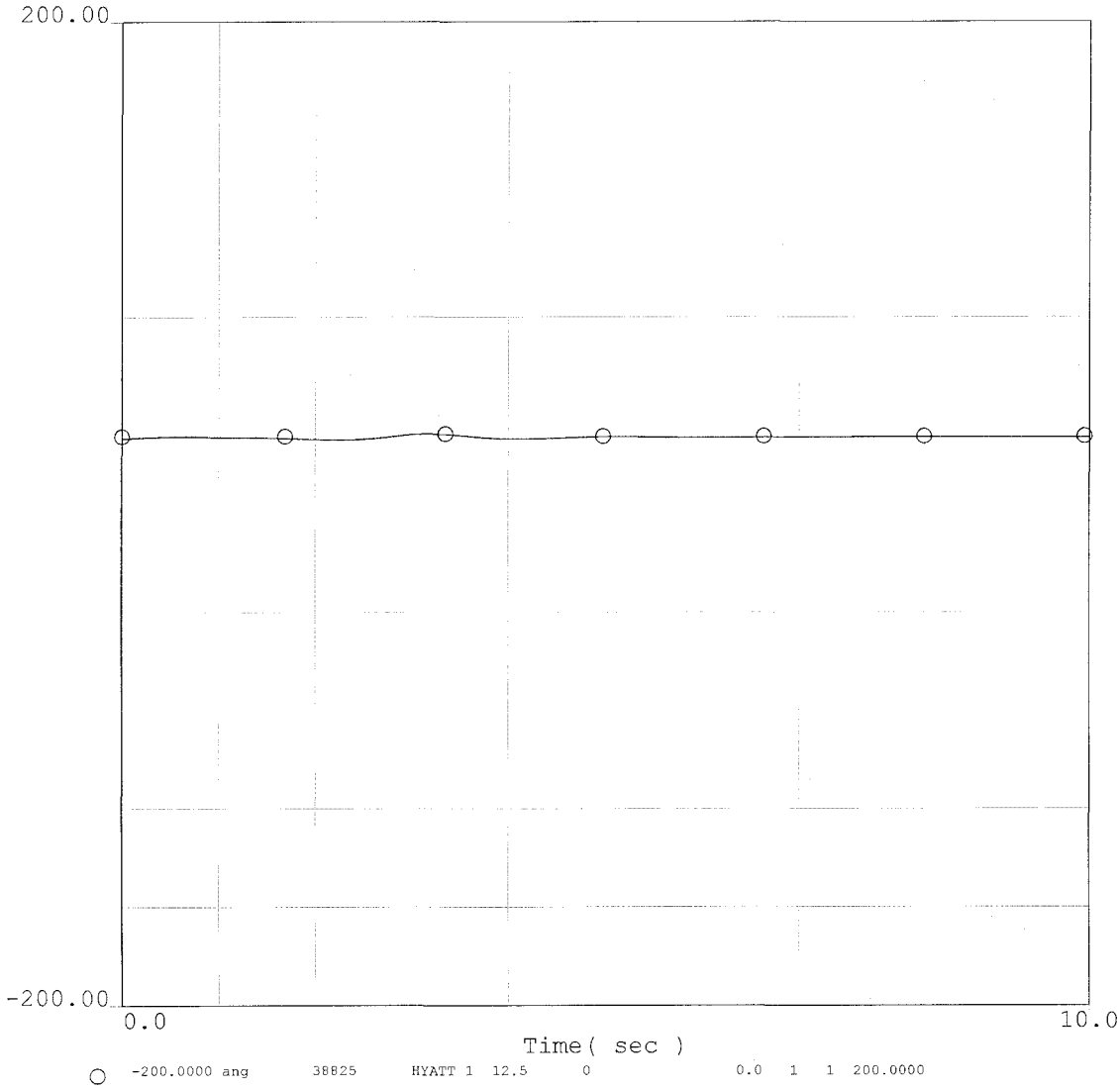


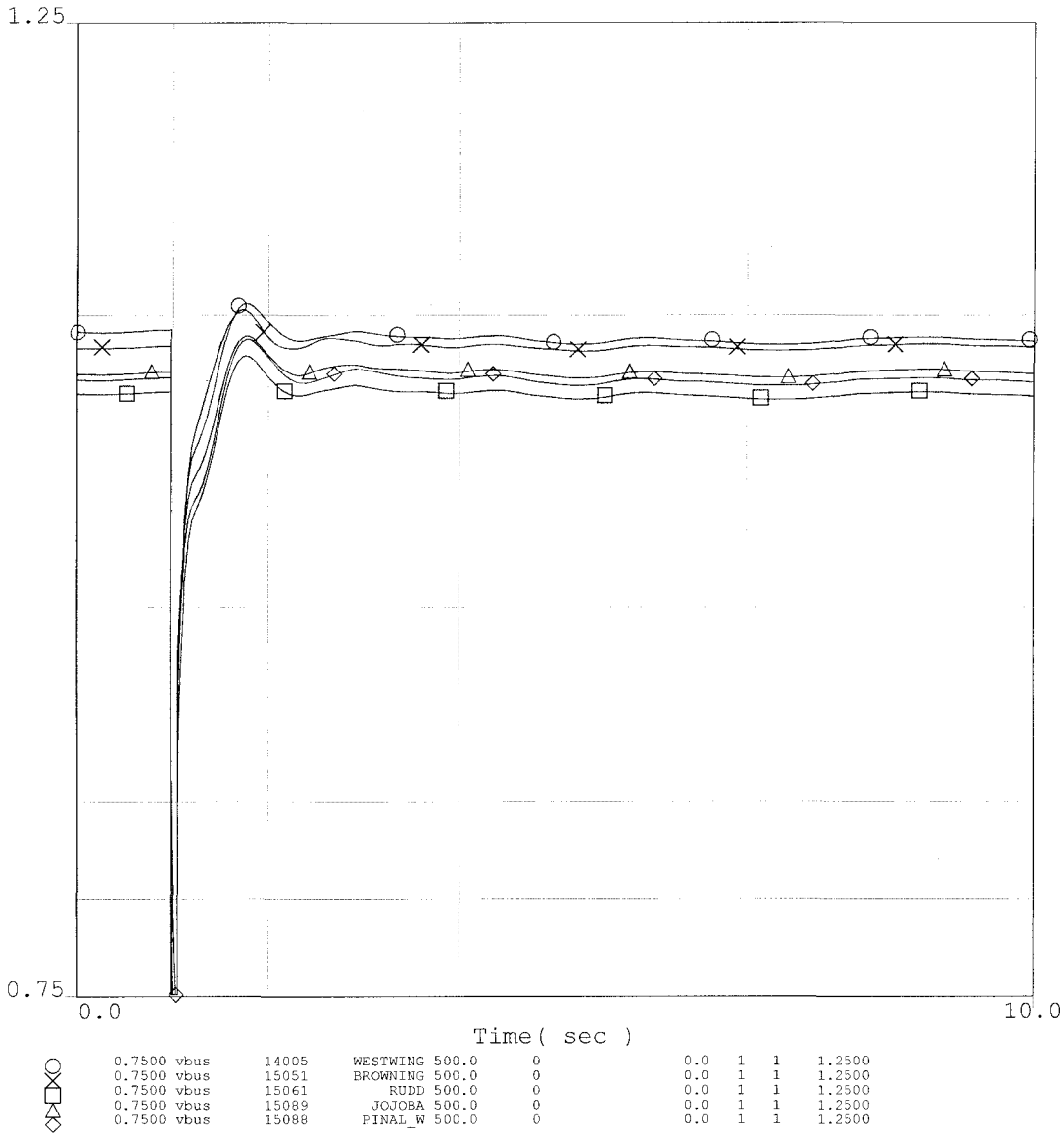
2014HS-TS9:THREE-PHASE FAULT CLEARING ON THE PERKINS-MEAD 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV SOLAR MODEL/DATA (4/25/11)

HYATT1_Rotorangles



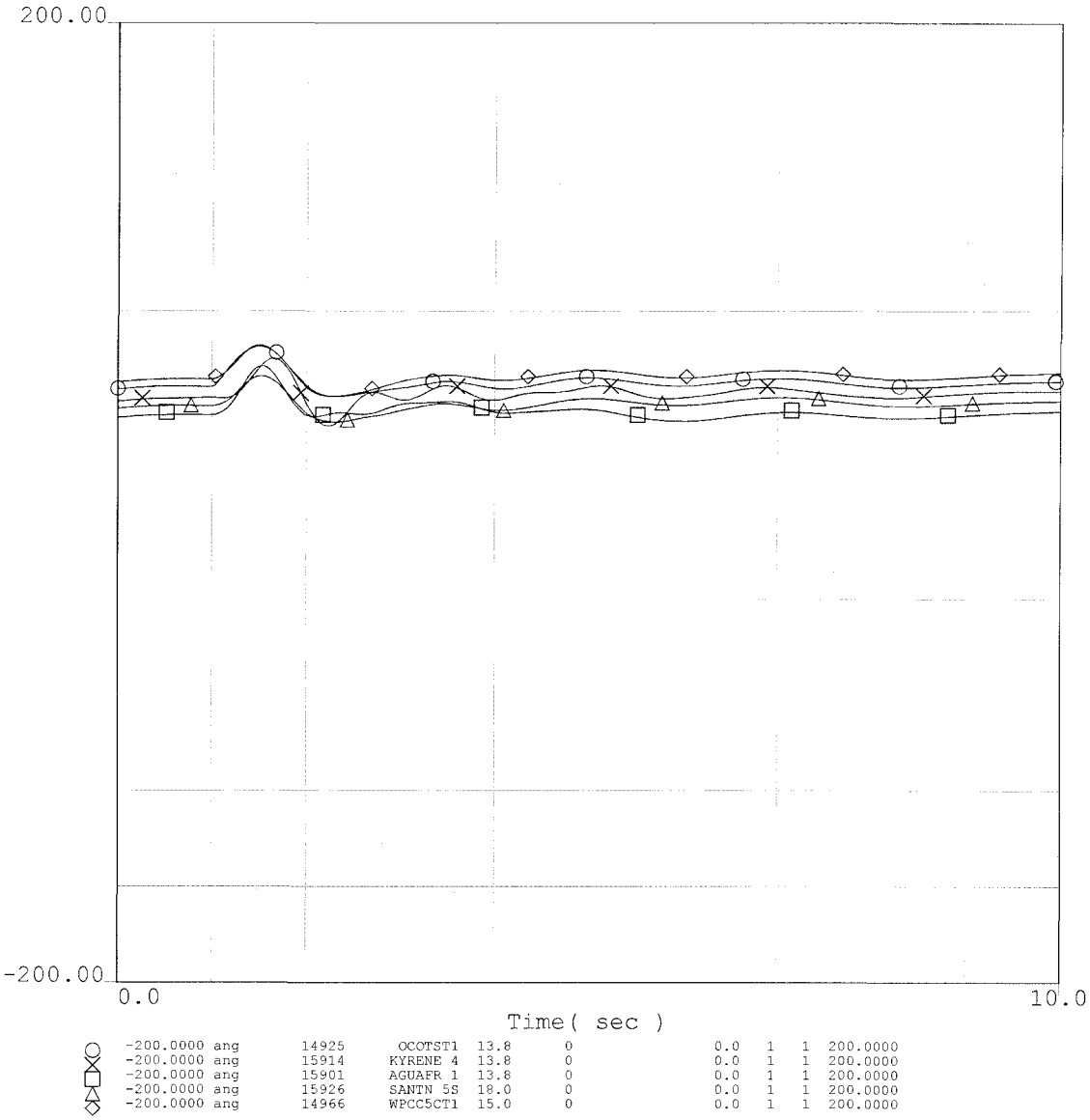
2014HS-TS9:THREE-PHASE FAULT CLEARING ON THE PERKINS-MEAD 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV SOLAR MODEL/DATA (4/25/11)

OTHERS_voltages:



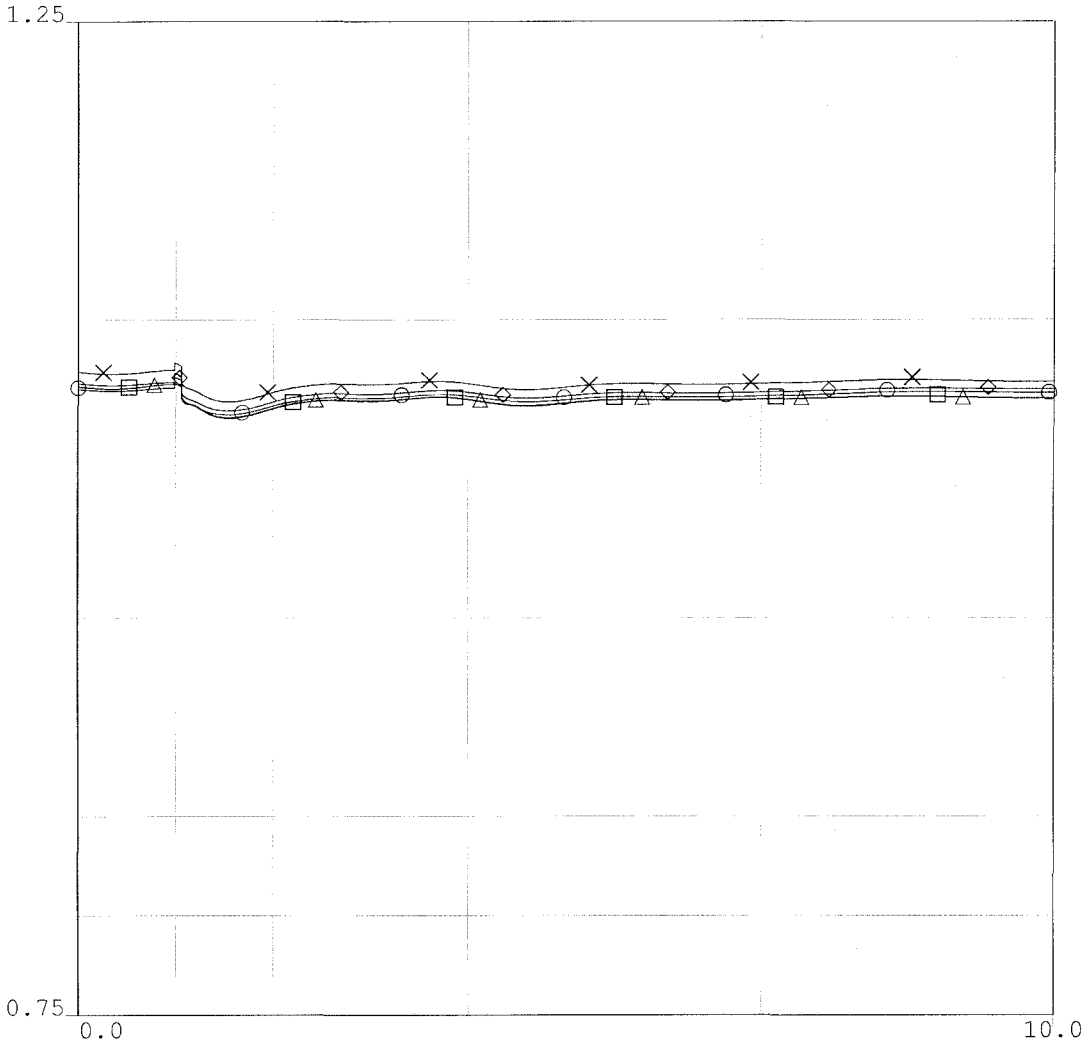
2014HS-TS9:THREE-PHASE FAULT CLEARING ON THE PERKINS-MEAD 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV SOLAR MODEL/DATA (4/25/11)

SYSTEM_Rotorangles



2014HS-TS9:THREE-PHASE FAULT CLEARING ON THE PERKINS-MEAD 500KV LINE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV SOLAR MODEL/DATA (4/25/11)

500 KV BUS_voltages:



0.7500 vbus	18450	H ALLEN 500.0	0	0.0	1	1	1.2500
0.7500 vbus	19038	MEAD 500.0	0	0.0	1	1	1.2500
0.7500 vbus	26048	MCCULLGH 500.0	0	0.0	1	1	1.2500
0.7500 vbus	24042	ELDORDO 500.0	0	0.0	1	1	1.2500
0.7500 vbus	18453	SUNRISE 500.0	0	0.0	1	1	1.2500

2014HS-TS12:IPP DC BIPOLAR PERMANENT BLOCK
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV SOLAR MODEL/DATA (4/24/11)

14hs_q3_ip-dc.chf

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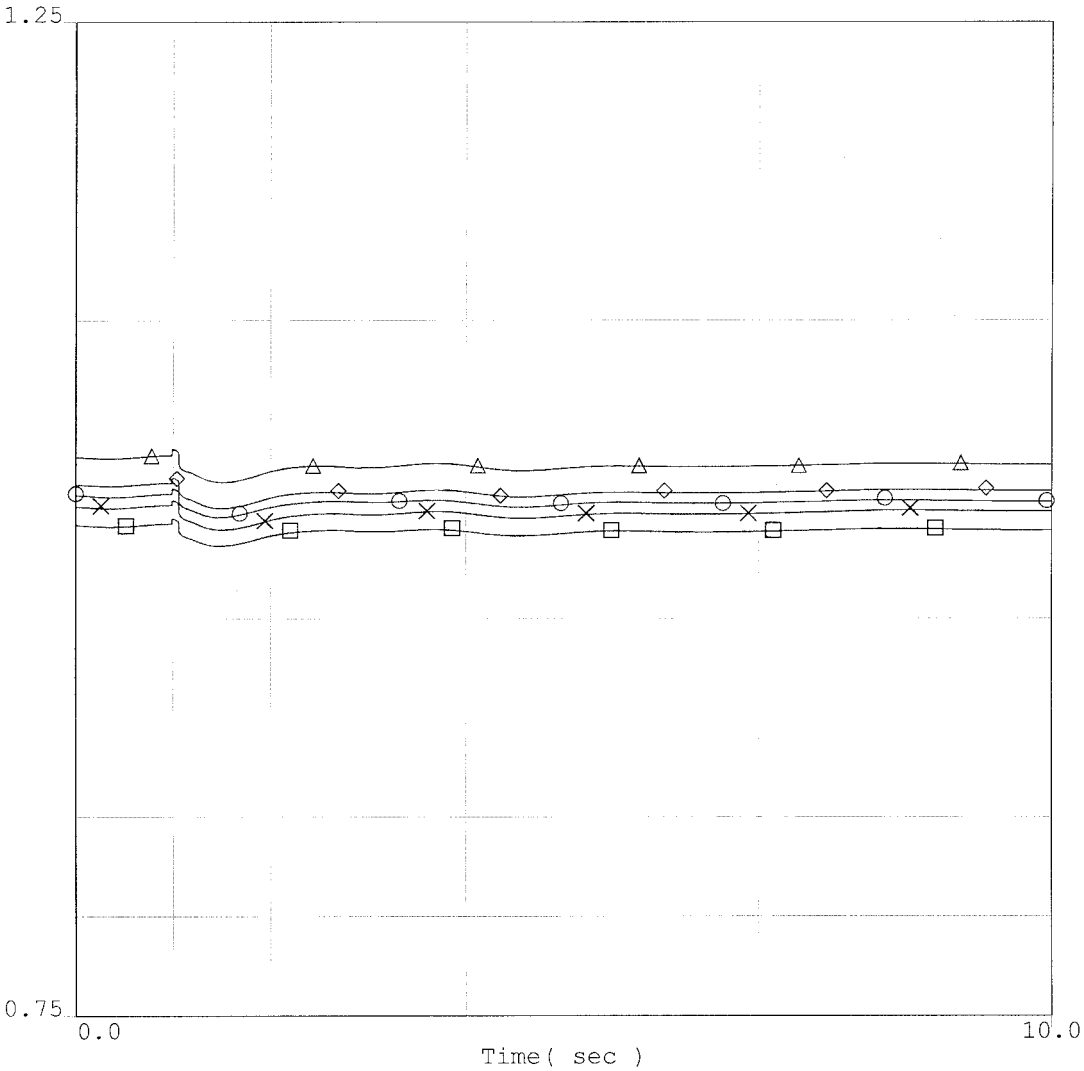
Sun Apr 24 07:23:53 2011

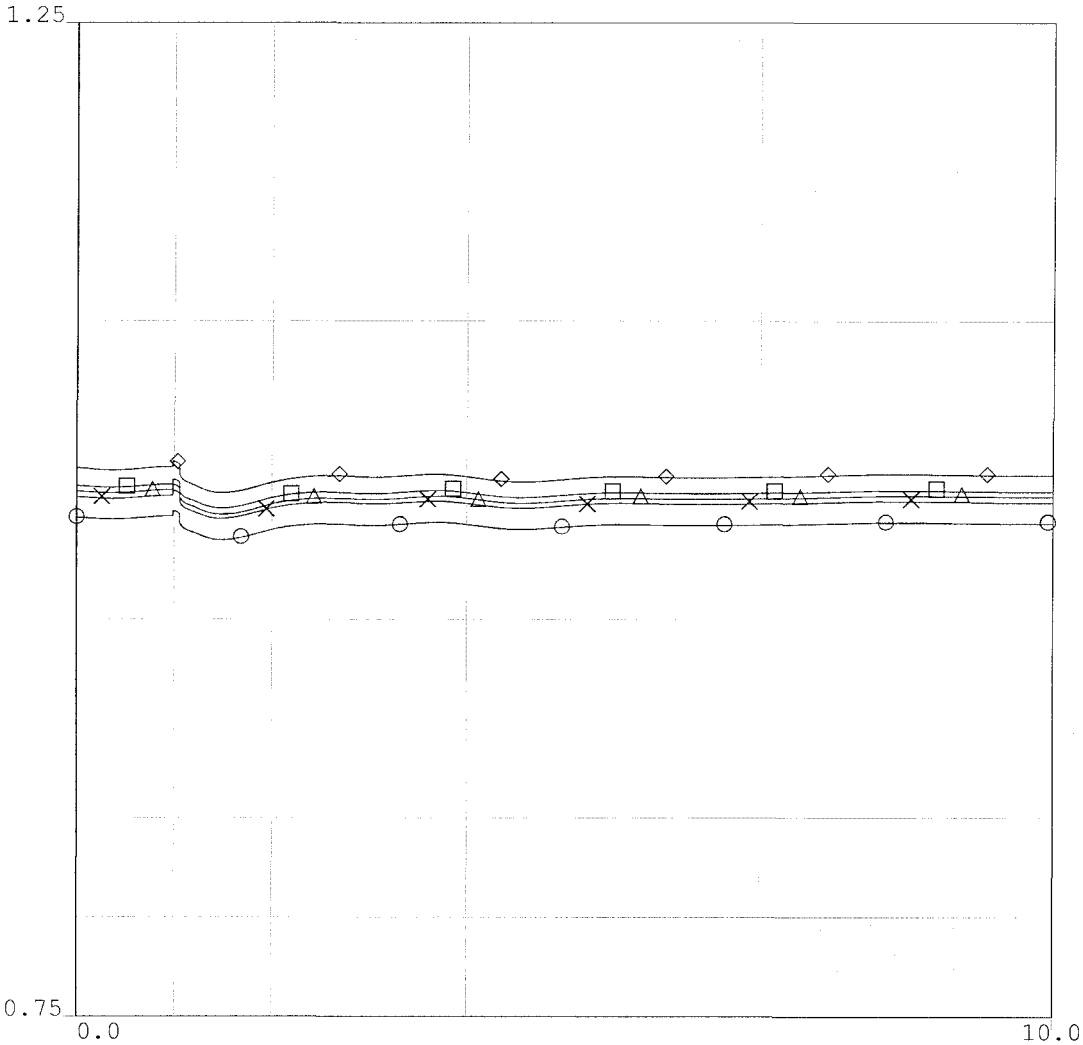
NEVADA 230KV_voltages:



0.7500 vbus	18454	SUNRISE 230.0	0	0.0	1	1	1.2500
0.7500 vbus	18022	NWEST 230.0	0	0.0	1	1	1.2500
0.7500 vbus	18004	ARDEN 230.0	0	0.0	1	1	1.2500
0.7500 vbus	18014	CRYSTAL 230.0	0	0.0	1	1	1.2500
0.7500 vbus	18024	PECOS 230.0	0	0.0	1	1	1.2500

2014HS-TS12:IPP DC BIPOLAR PERMANENT BLOCK
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV SOLAR MODEL/DATA (4/24/11)

NEVEDA 138KV_voltages:



0.7500 vbul	18195	BROOKS 138.0	0	0.0	1	1	1.2500
0.7500 vbul	18068	HIGHLAND 138.0	0	0.0	1	1	1.2500
0.7500 vbul	18088	PECOS 138.0	0	0.0	1	1	1.2500
0.7500 vbul	18072	IRONMTN 138.0	0	0.0	1	1	1.2500
0.7500 vbul	18296	VISTA 138.0	0	0.0	1	1	1.2500

2014HS-TS12:IPP DC BIPOLAR PERMANENT BLOCK
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV SOLAR MODEL/DATA (4/24/11)

14hs_q3_ip-dc.chf

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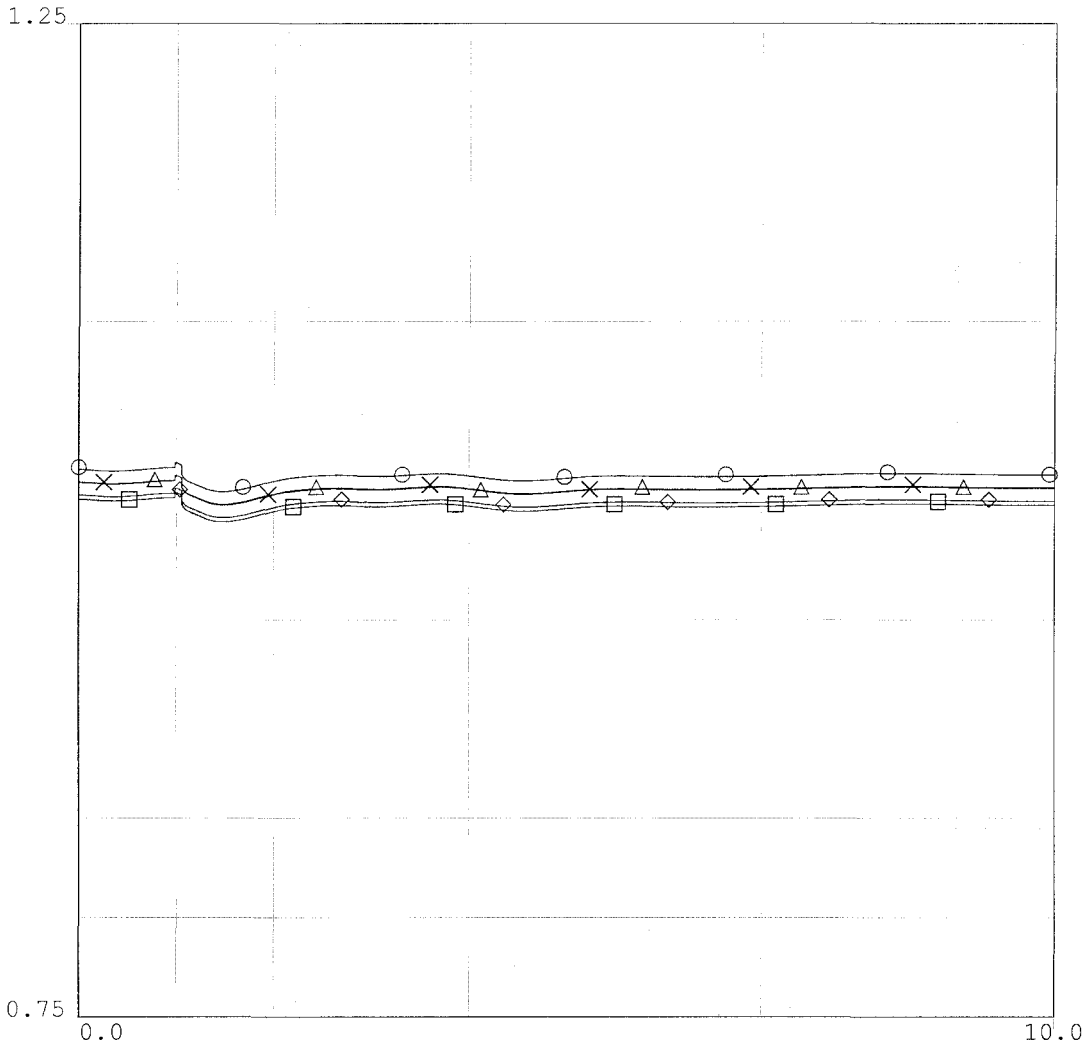
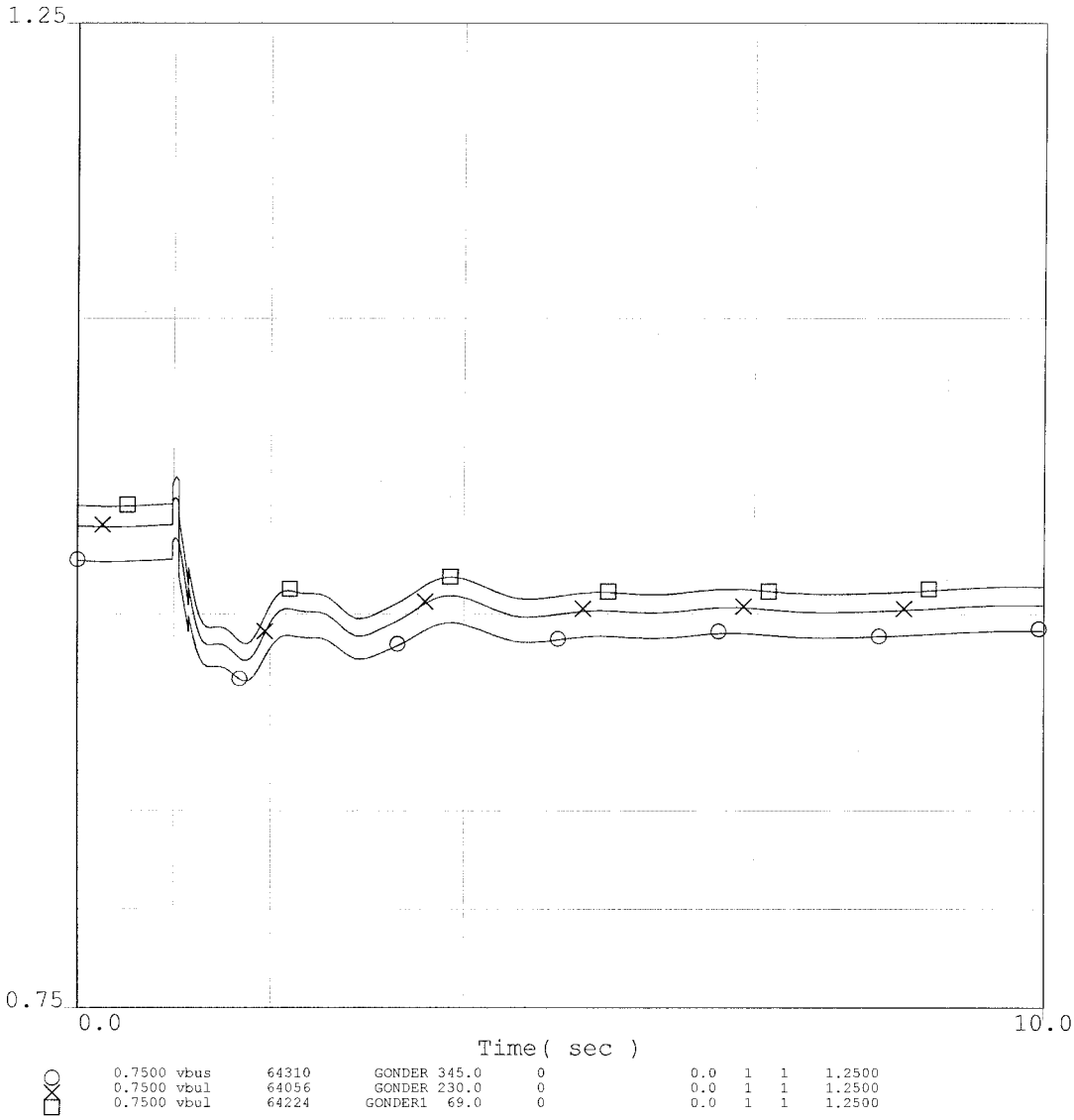
NEVADA 69KV_voltages:



○	0.7500 vbul	18152	DECATURW	69.0	0	0.0	1	1	1.2500
×	0.7500 vbul	18167	LEWIS	69.0	0	0.0	1	1	1.2500
□	0.7500 vbul	18182	NCA2	69.0	0	0.0	1	1	1.2500
△	0.7500 vbul	18191	OLIVE	69.0	0	0.0	1	1	1.2500
◇	0.7500 vbul	18200	PEARL	69.0	0	0.0	1	1	1.2500

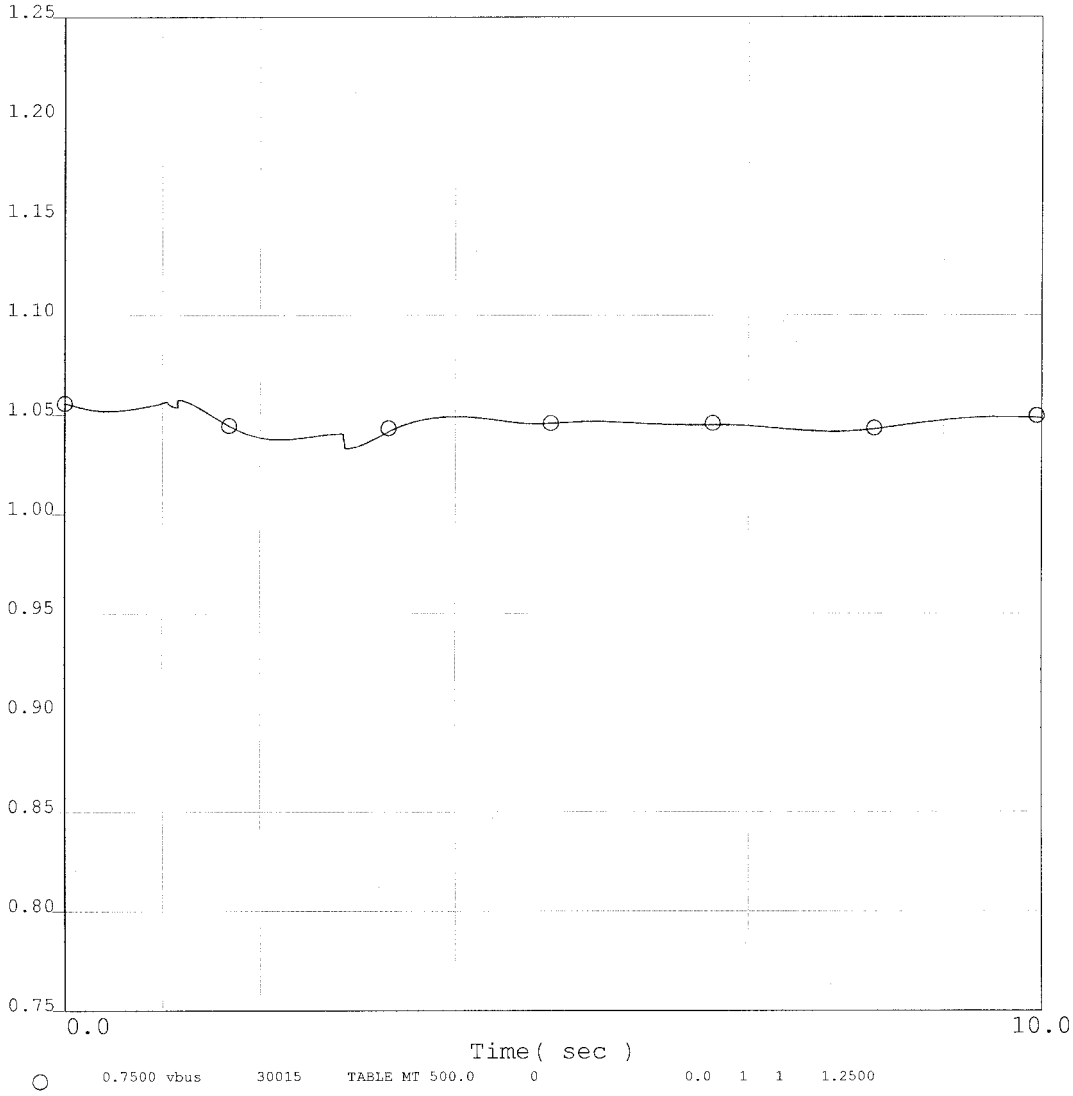
2014HS-TS12:IPP DC BIPOLAR PERMANENT BLOCK
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV SOLAR MODEL/DATA (4/24/11)

IPP RELATED_voltages:



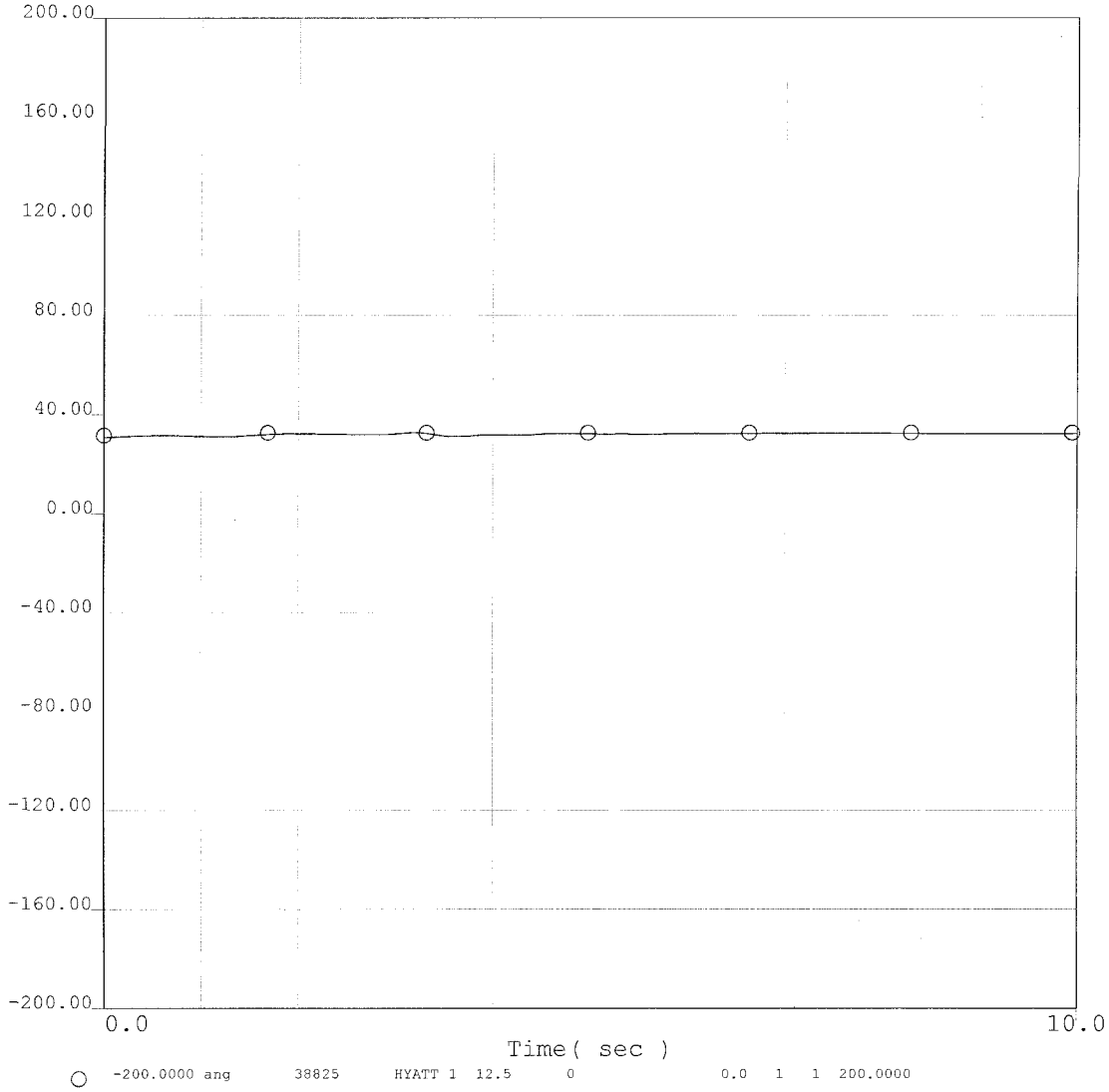
2014HS-TS12:IPP DC BIPOLAR PERMANENT BLOCK
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV SOLAR MODEL/DATA (4/24/11)

TABLE MT_voltages:



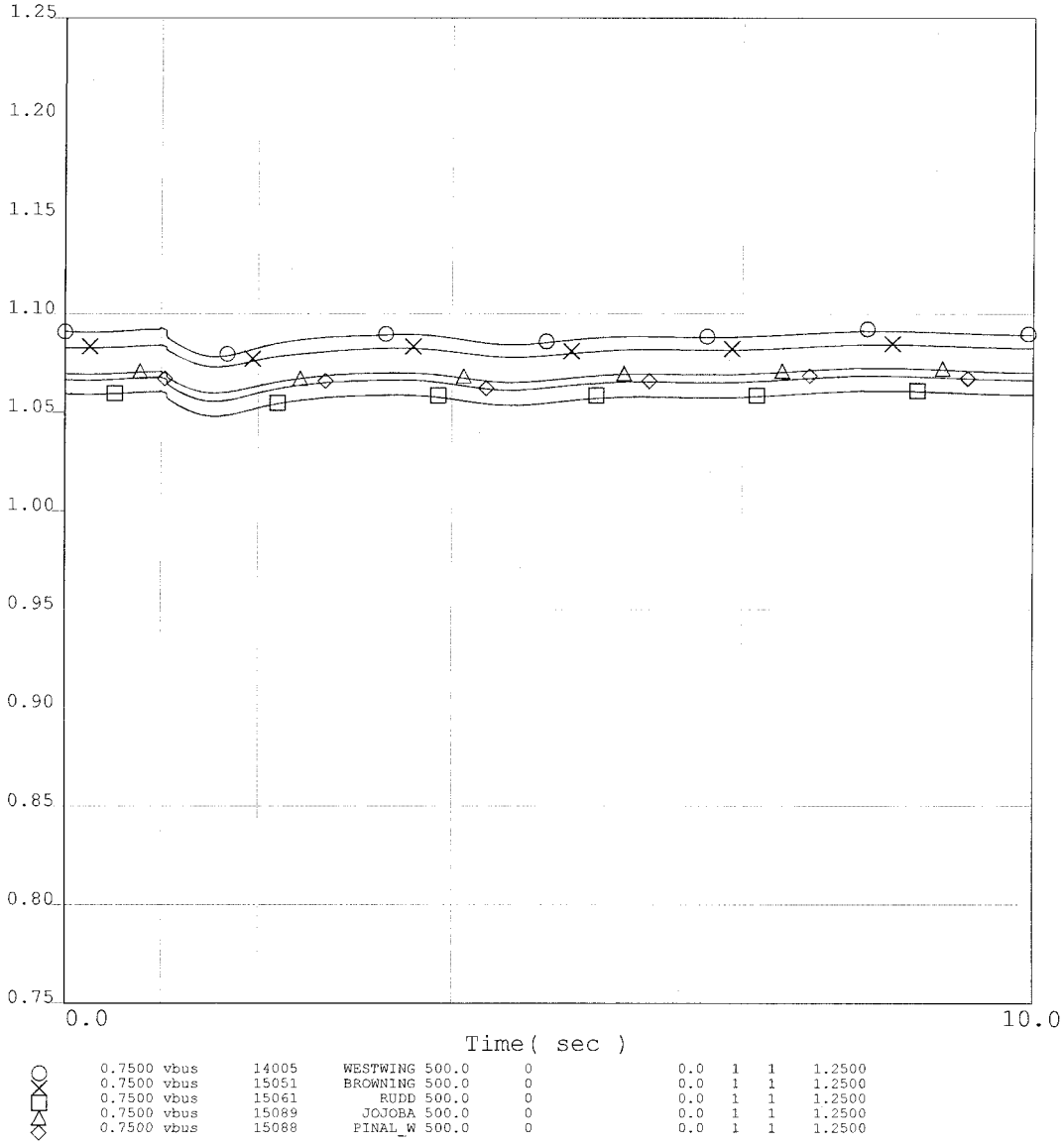
2014HS-TS12:IPP DC BIPOLAR PERMANENT BLOCK
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV SOLAR MODEL/DATA (4/24/11)

HYATT1_Rotorangles



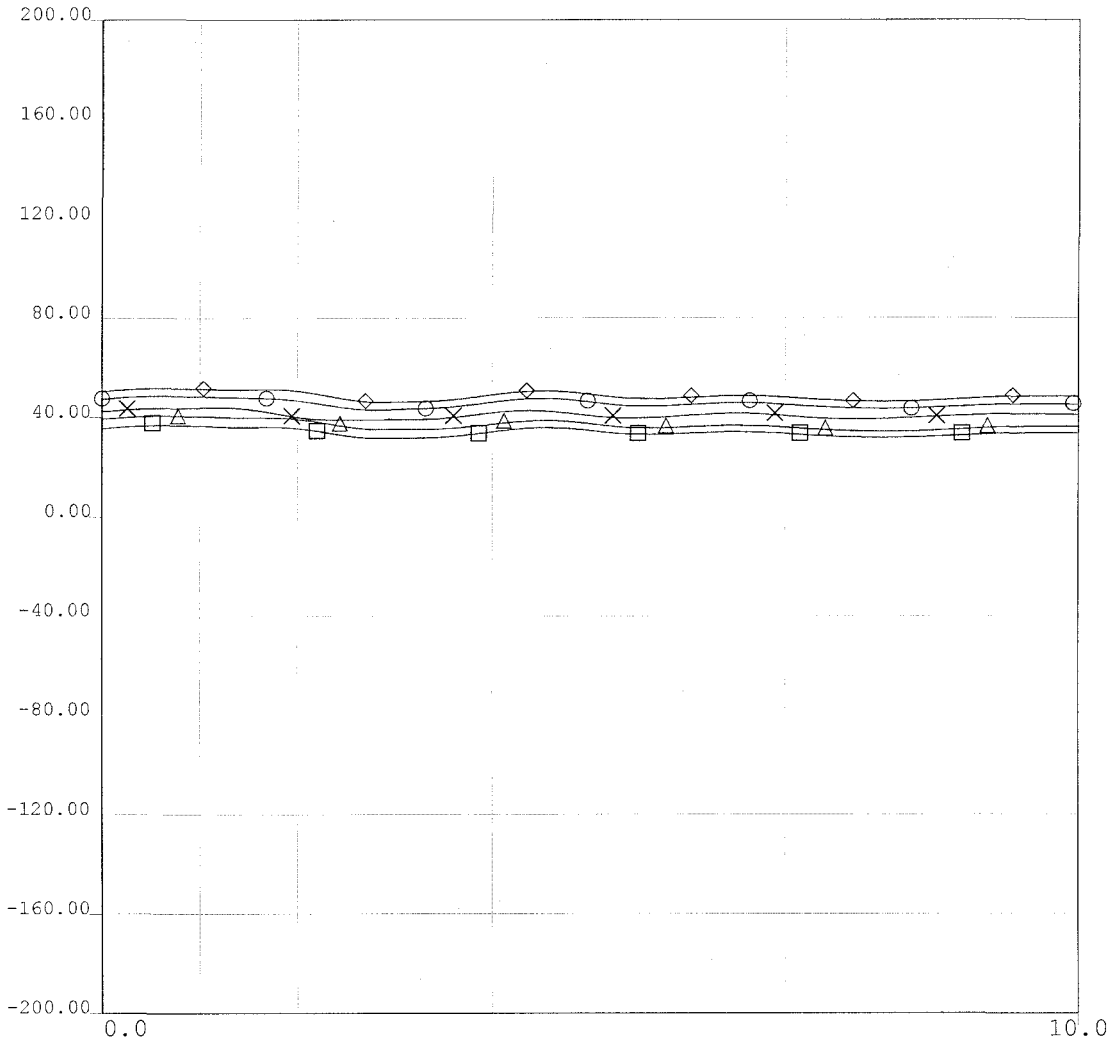
2014HS-TS12:IPP DC BIPOLAR PERMANENT BLOCK
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV SOLAR MODEL/DATA (4/24/11)

OTHERS_voltages:



2014HS-TS12:IPP DC BIPOLAR PERMANENT BLOCK
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV SOLAR MODEL/DATA (4/24/11)

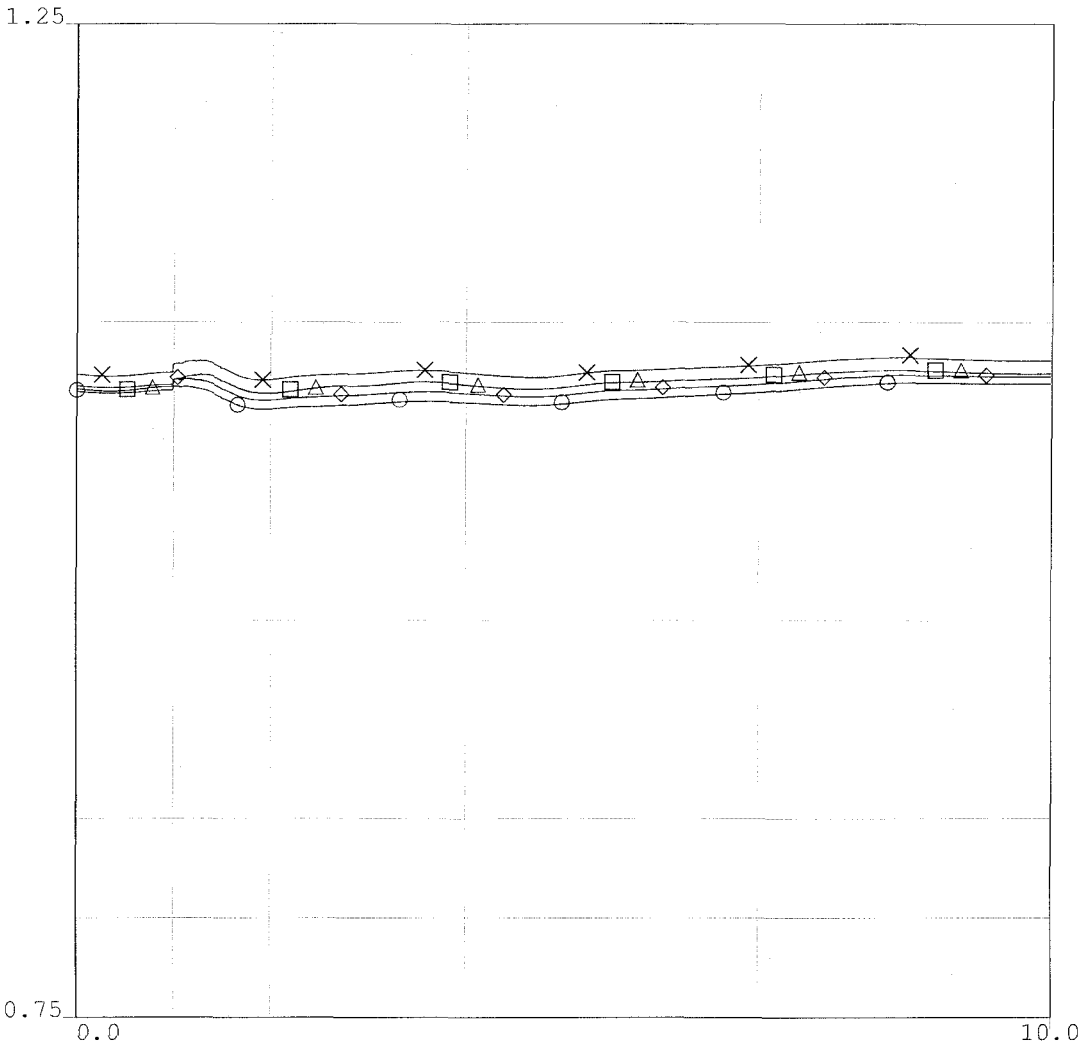
SYSTEM_Rotorangles



-200.0000 ang	14925	OCOTST1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	15914	KYRENE 4	13.8	0	0.0	1	1	200.0000
-200.0000 ang	15901	AGUAFR 1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	15926	SANTN 5S	18.0	0	0.0	1	1	200.0000
-200.0000 ang	14966	WPCC5CT1	15.0	0	0.0	1	1	200.0000

2014HS-TS12:IPP DC BIPOLAR PERMANENT BLOCK
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV SOLAR MODEL/DATA (4/24/11)

500 KV BUS_voltages:



○	0.7500 vbus	18450	H ALLEN	500.0	0	0.0	1	1	1.2500
⊗	0.7500 vbus	19038	MEAD	500.0	0	0.0	1	1	1.2500
□	0.7500 vbus	26048	MCCULLGH	500.0	0	0.0	1	1	1.2500
△	0.7500 vbus	24042	ELDORDO	500.0	0	0.0	1	1	1.2500
◇	0.7500 vbus	18453	SUNRISE	500.0	0	0.0	1	1	1.2500

2014HS-TS13:PALO VERDE TWO GENERATOR OUTAGE (G-2 LOSS)
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV SOLAR MODEL/DATA (4/25/11)

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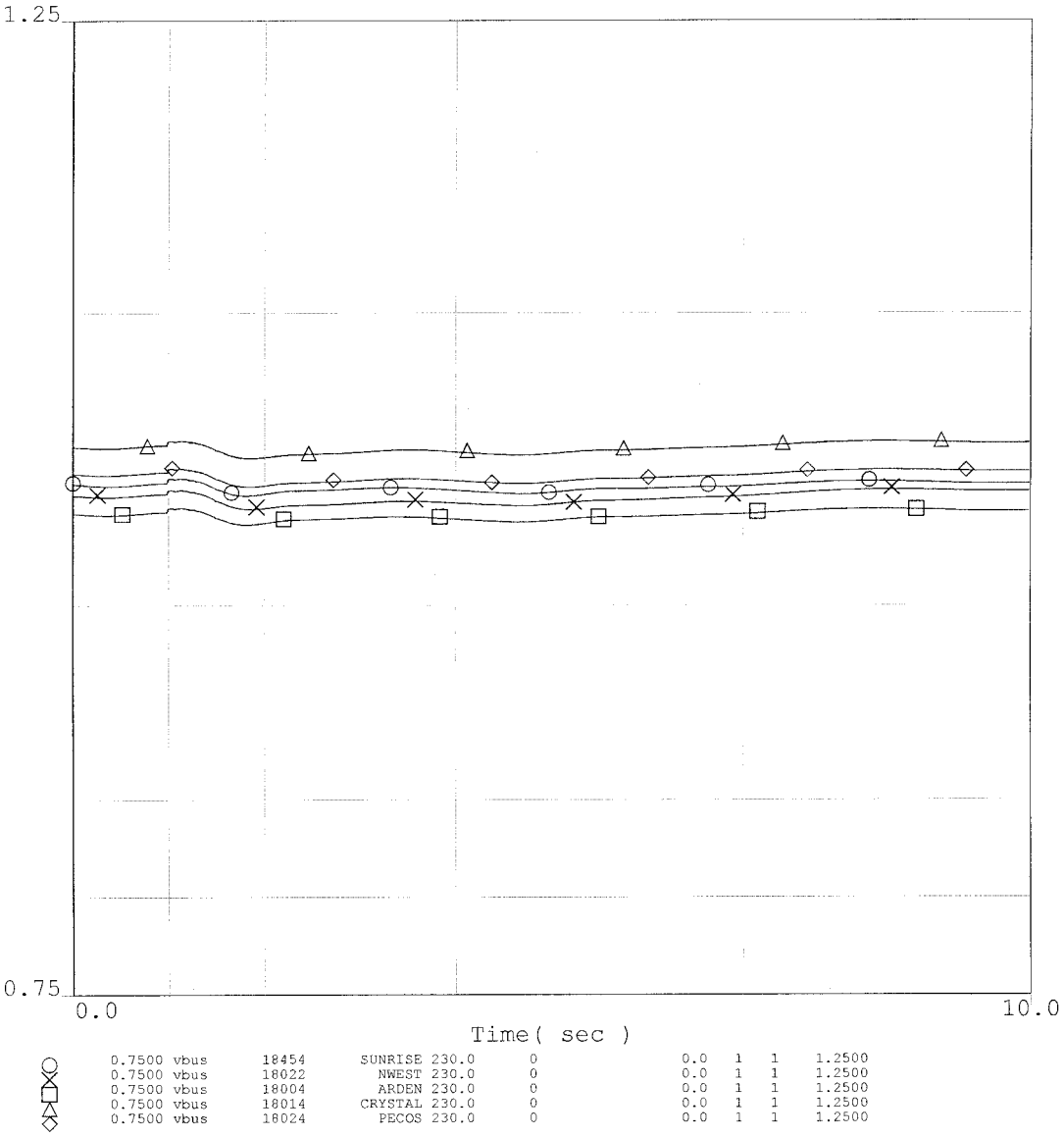
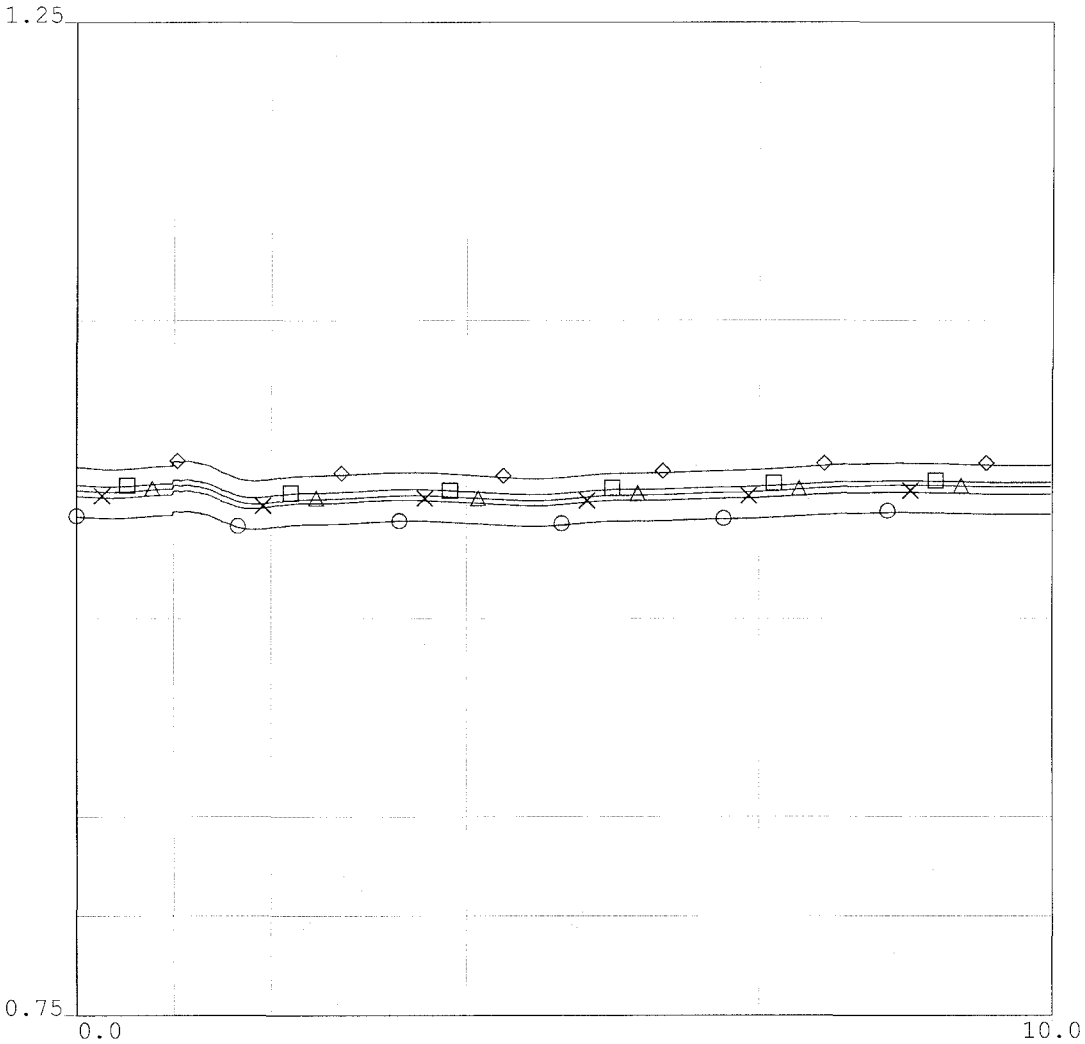
NEVADA 230KV_voltages:



2014HS-TS13:PALO VERDE TWO GENERATOR OUTAGE (G-2 LOSS)
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC).
MODIFIED SONORAN PV SOLAR MODEL/DATA (4/25/11)

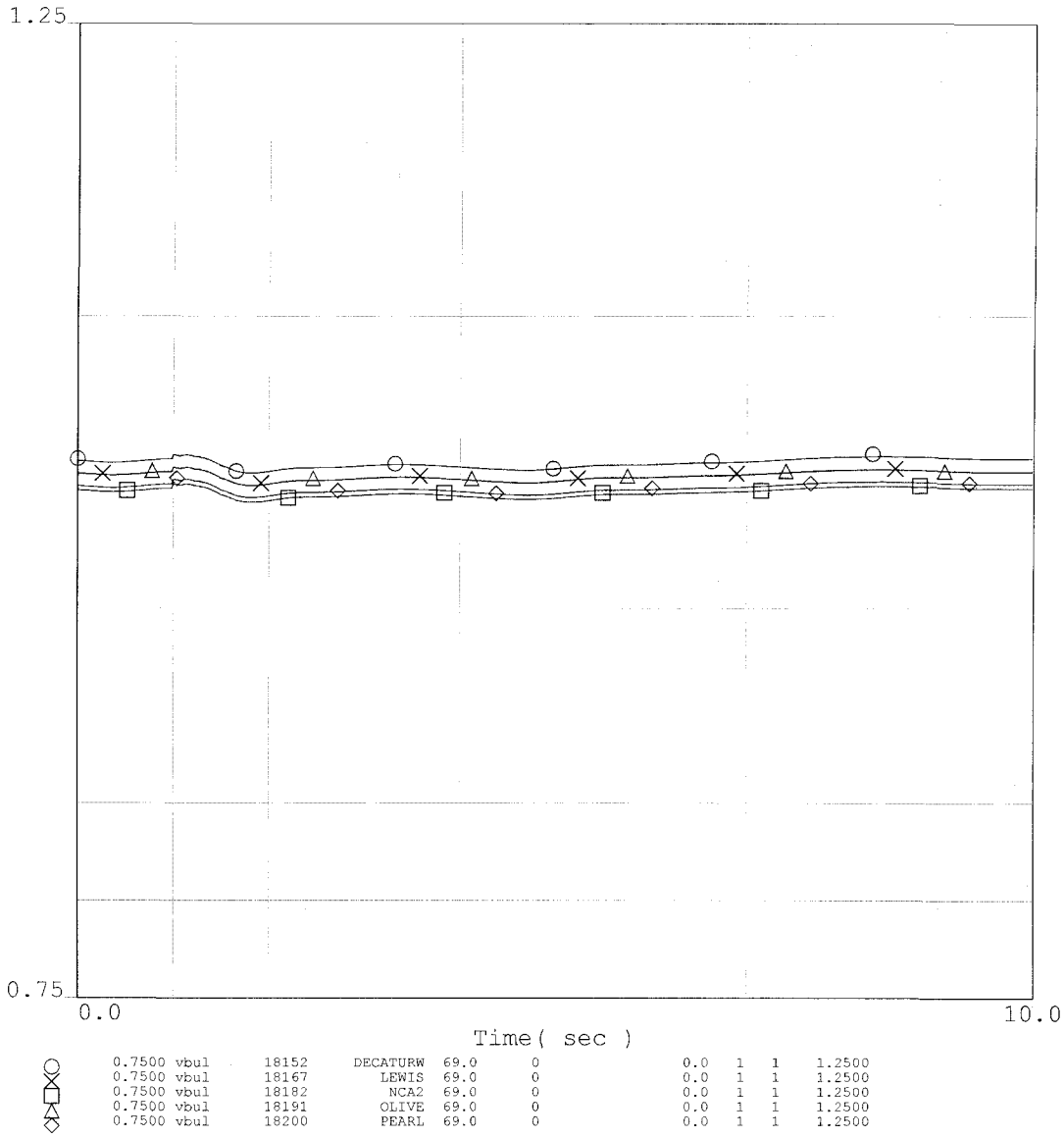
NEVEDA 138KV_voltages:



0.7500 vbul	18195	BROOKS 138.0	0	0.0	1	1	1.2500
0.7500 vbul	18068	HIGHLAND 138.0	0	0.0	1	1	1.2500
0.7500 vbul	18088	PECOS 138.0	0	0.0	1	1	1.2500
0.7500 vbul	18072	IRONMTN 138.0	0	0.0	1	1	1.2500
0.7500 vbul	18296	VISTA 138.0	0	0.0	1	1	1.2500

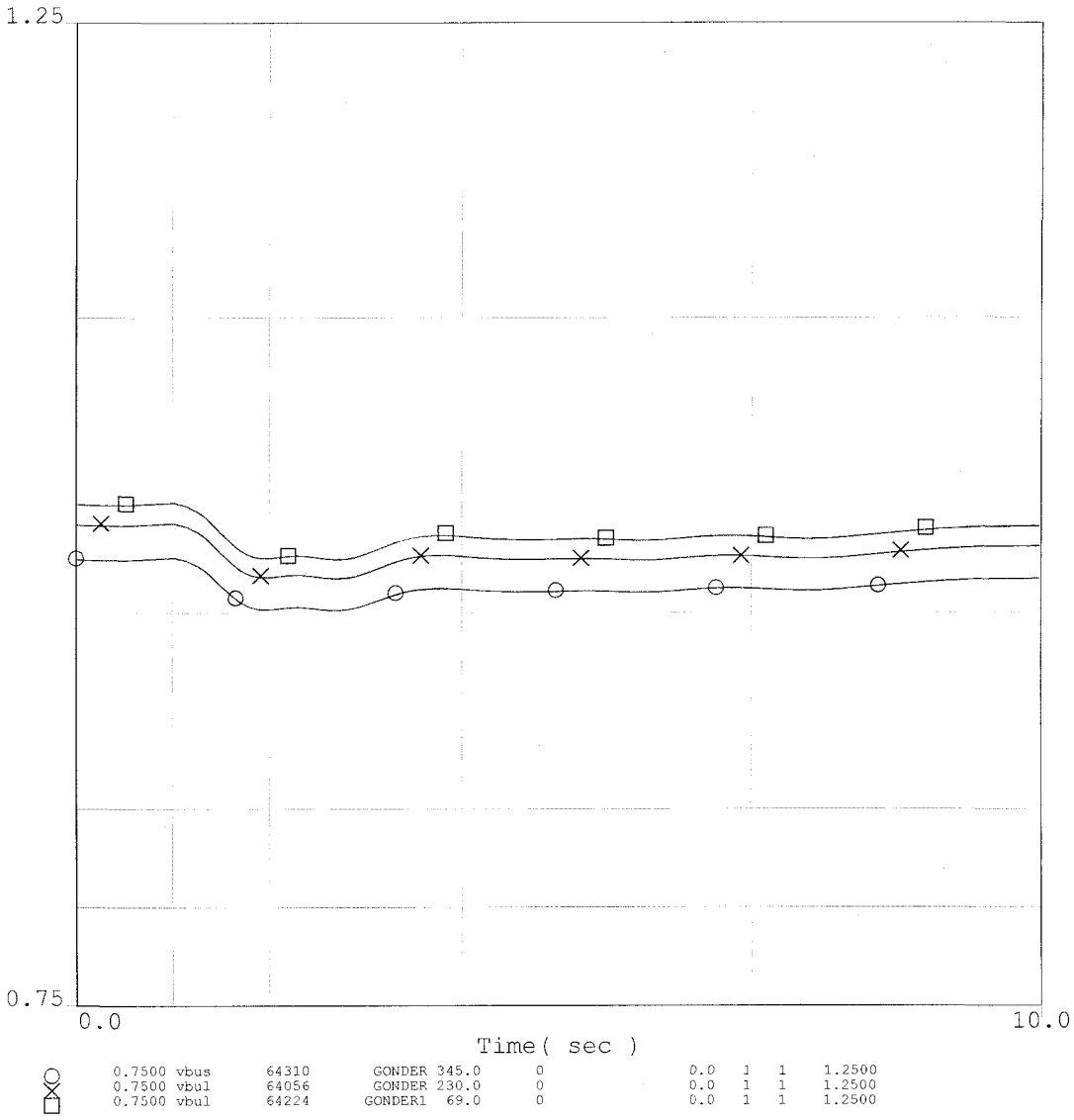
2014HS-TS13:PALO VERDE TWO GENERATOR OUTAGE (G-2 LOSS)
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV SOLAR MODEL/DATA (4/25/11)

NEVADA 69KV_voltages:



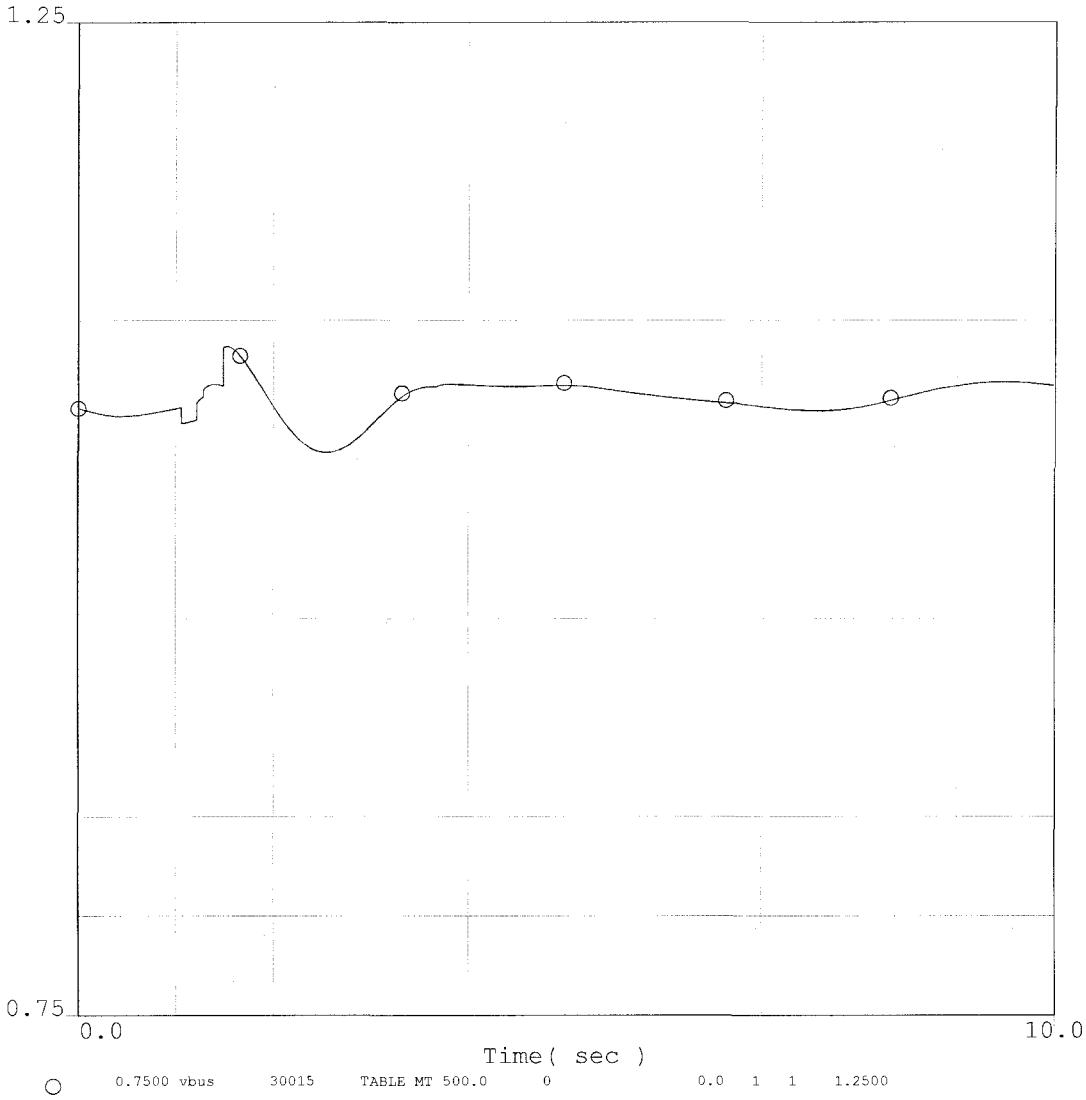
2014HS-TS13:PALO VERDE TWO GENERATOR OUTAGE (G-2 LOSS)
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV SOLAR MODEL/DATA (4/25/11)

IPP RELATED_voltages:



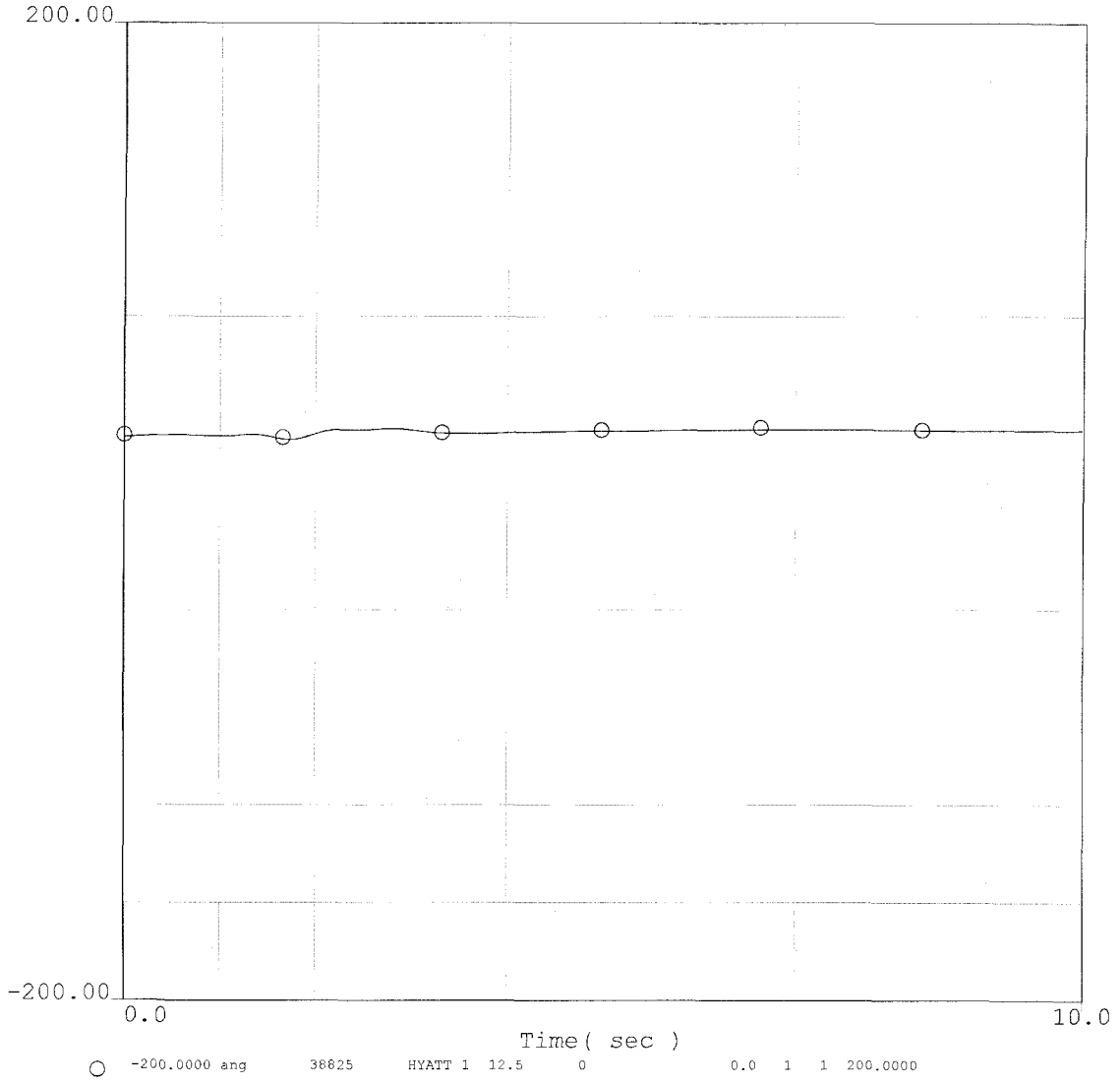
2014HS-TS13:PALO VERDE TWO GENERATOR OUTAGE (G-2 LOSS)
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV SOLAR MODEL/DATA (4/25/11)

TABLE MT_voltages:



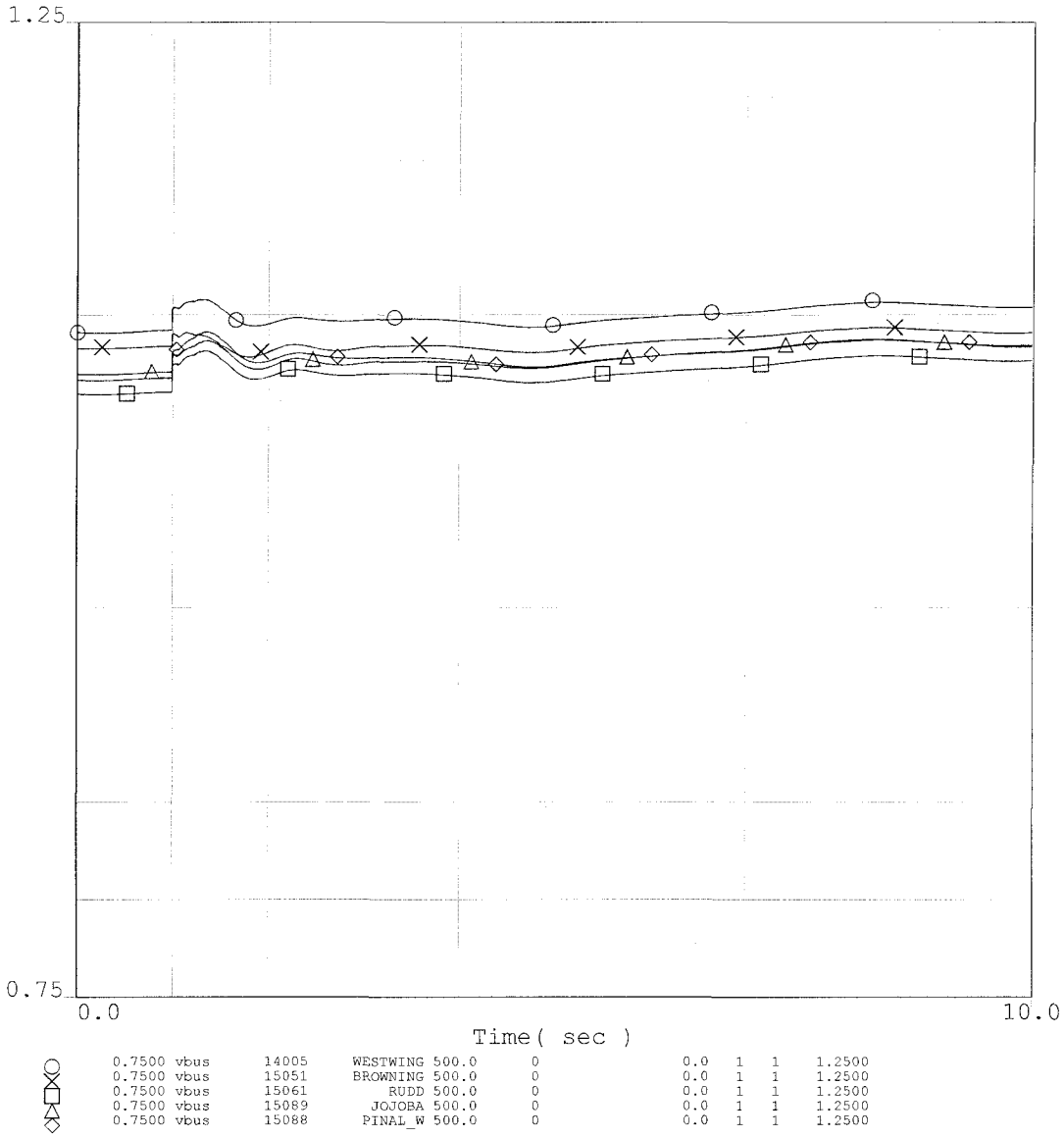
2014HS-TS13:PALO VERDE TWO GENERATOR OUTAGE (G-2 LOSS)
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV SOLAR MODEL/DATA (4/25/11)

HYATT1_Rotorangles



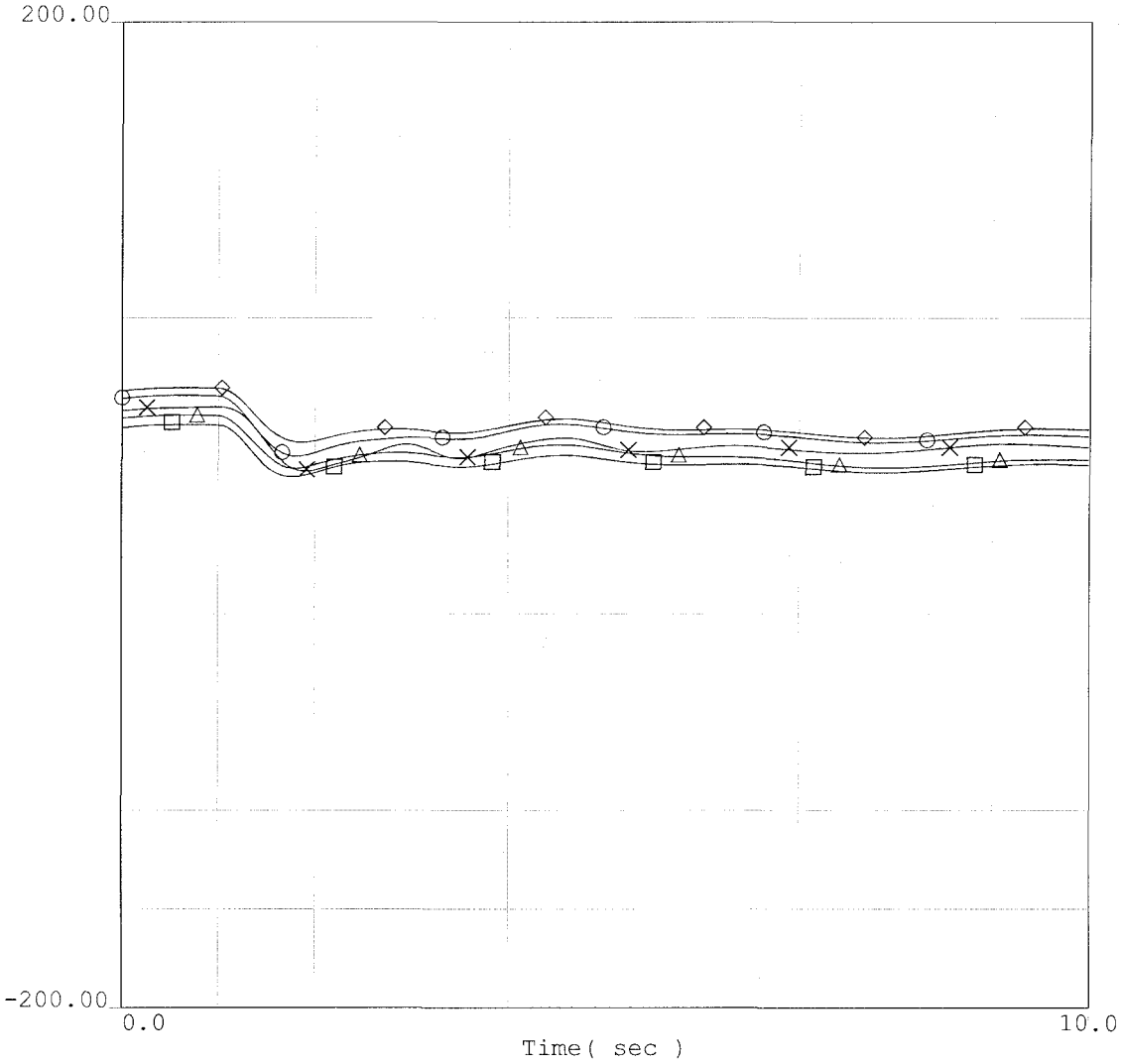
2014HS-TS13:PALO VERDE TWO GENERATOR OUTAGE (G-2 LOSS)
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV SOLAR MODEL/DATA (4/25/11)

OTHERS_voltages:



2014HS-TS13:PALO VERDE TWO GENERATOR OUTAGE (G-2 LOSS)
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV SOLAR MODEL/DATA (4/25/11)

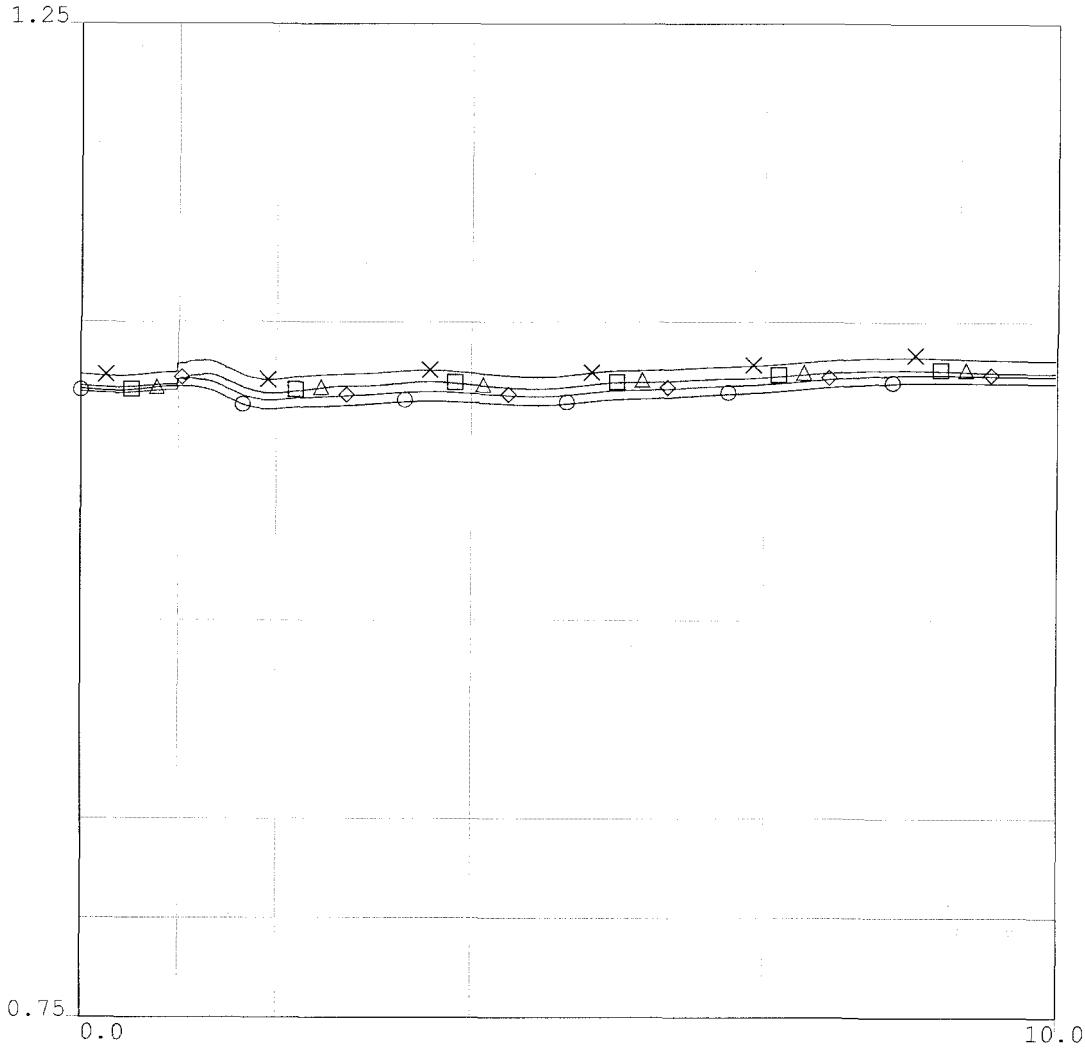
SYSTEM_Rotorangles



-200.0000 ang	14925	OCOTST1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	15914	KYRENE 4	13.8	0	0.0	1	1	200.0000
-200.0000 ang	15901	AGUAFR 1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	15926	SANTN 5S	18.0	0	0.0	1	1	200.0000
-200.0000 ang	14966	WPCC5CT1	15.0	0	0.0	1	1	200.0000

2014HS-TS13:PALO VERDE TWO GENERATOR OUTAGE (G-2 LOSS)
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV SOLAR MODEL/DATA (4/25/11)

500 KV BUS_voltages:



○	0.7500	vbus	18450	H ALLEN	500.0	0	0.0	1	1	1.2500
⊗	0.7500	vbus	19038	MEAD	500.0	0	0.0	1	1	1.2500
□	0.7500	vbus	26048	MCCULLGH	500.0	0	0.0	1	1	1.2500
△	0.7500	vbus	24042	ELDORDO	500.0	0	0.0	1	1	1.2500
◇	0.7500	vbus	18453	SUNRISE	500.0	0	0.0	1	1	1.2500

2014HS-TS13:PALO VERDE TWO GENERATOR OUTAGE (G-2 LOSS)
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV SOLAR MODEL/DATA (4/25/11)

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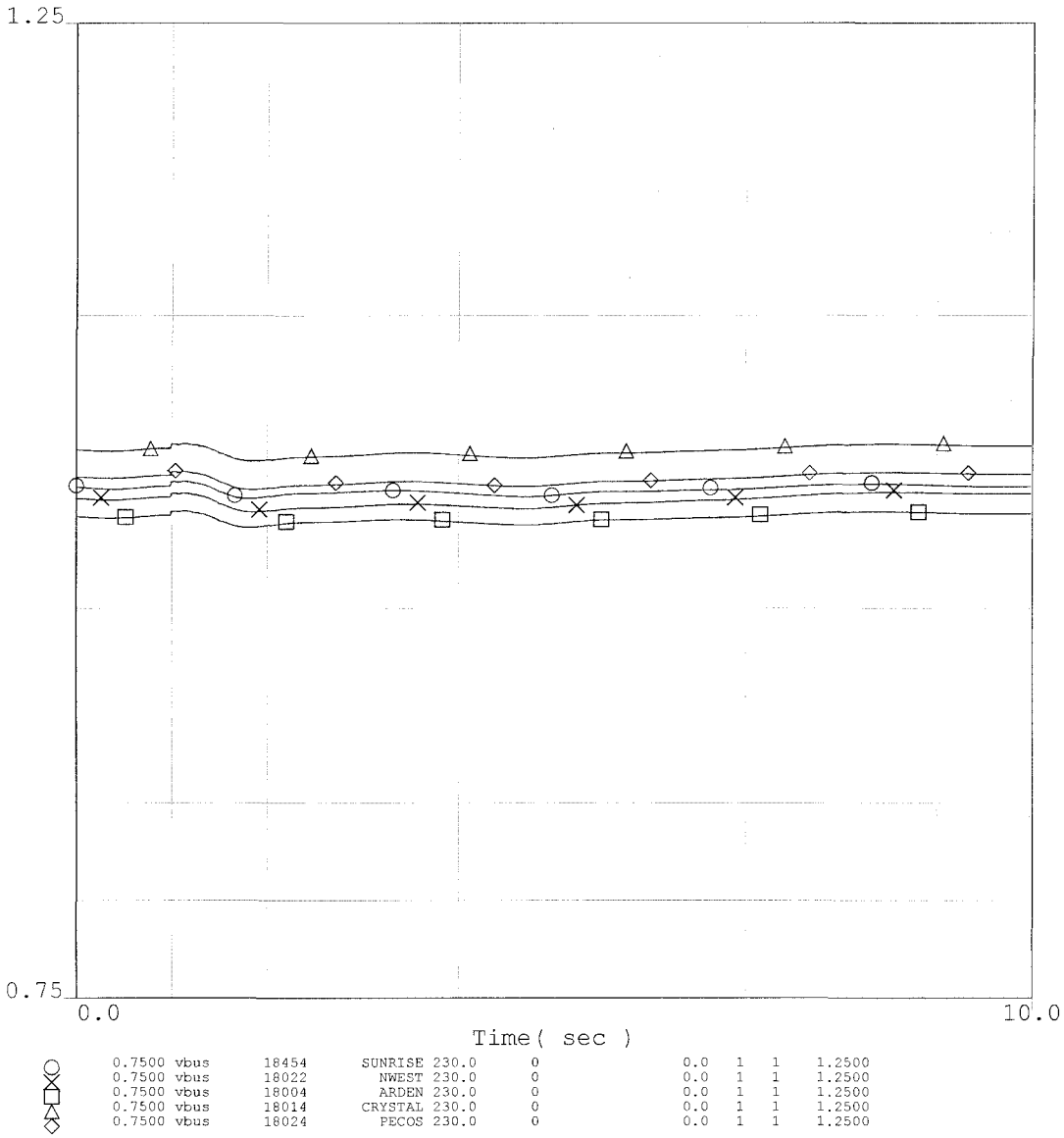
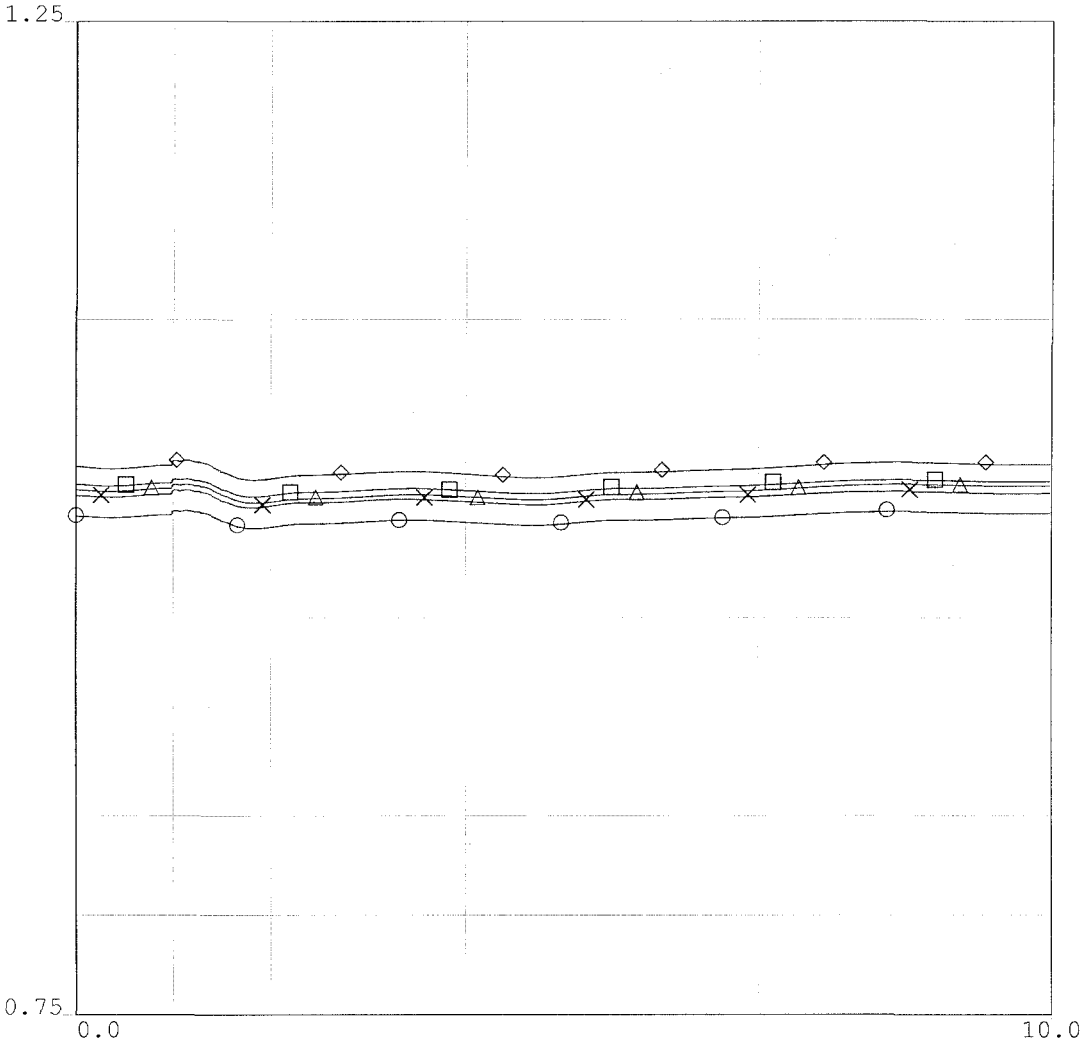
NEVADA 230KV_voltages:



2014HS-TS13:PALO VERDE TWO GENERATOR OUTAGE (G-2 LOSS)
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV SOLAR MODEL/DATA (4/25/11)

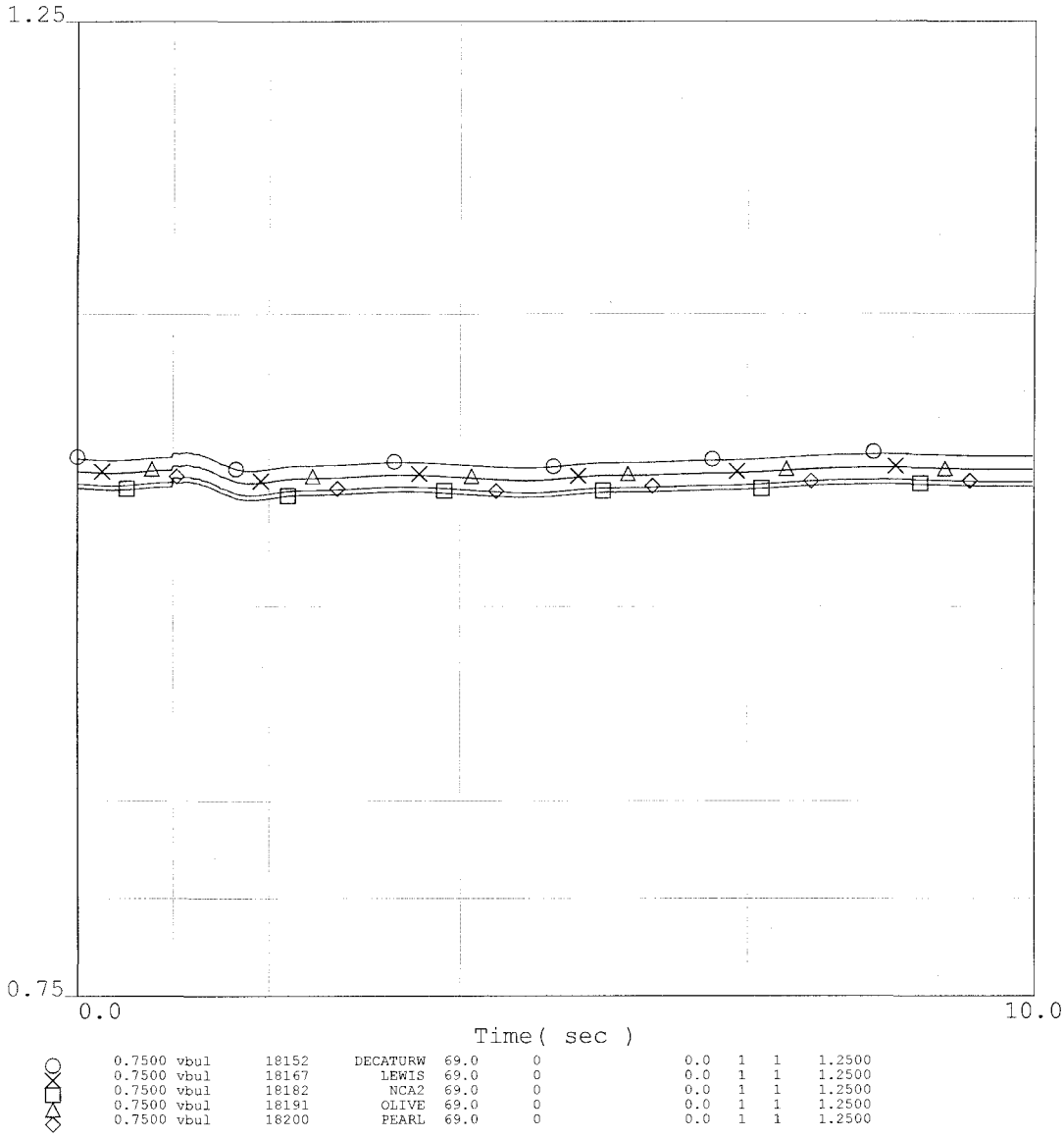
NEVEDA 138KV_voltages:



0.7500 vbul	18195	BROOKS 138.0	0	0.0	1	1	1.2500
0.7500 vbul	18068	HIGHLAND 138.0	0	0.0	1	1	1.2500
0.7500 vbul	18088	PECOS 138.0	0	0.0	1	1	1.2500
0.7500 vbul	18072	IRONMTN 138.0	0	0.0	1	1	1.2500
0.7500 vbul	18296	VISTA 138.0	0	0.0	1	1	1.2500

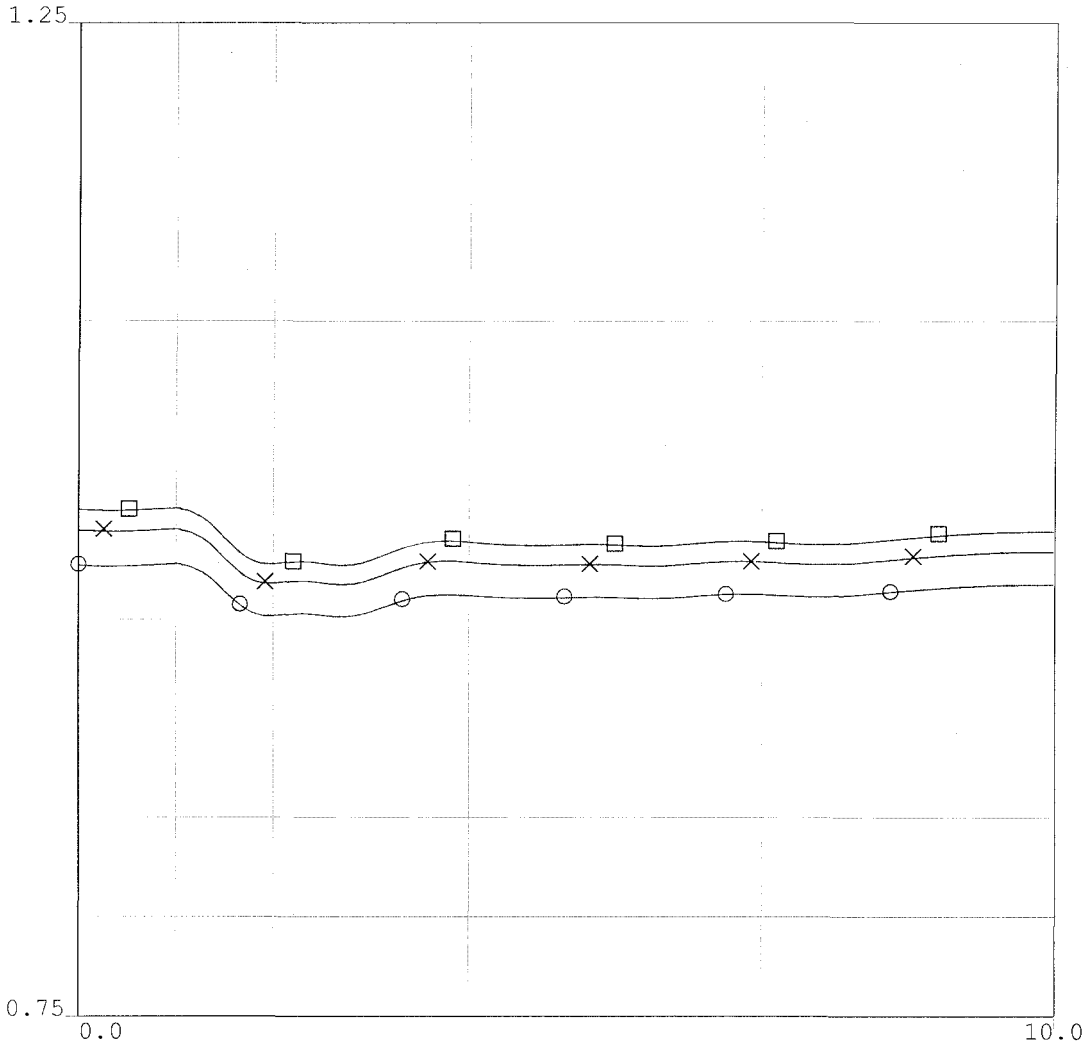
2014HS-TS13:PALO VERDE TWO GENERATOR OUTAGE (G-2 LOSS)
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV SOLAR MODEL/DATA (4/25/11)

NEVADA 69KV_voltages:



2014HS-TS13:PALO VERDE TWO GENERATOR OUTAGE (G-2 LOSS)
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV SOLAR MODEL/DATA (4/25/11)

IPP RELATED_voltages:



0.7500 vbus	64310	GONDER 345.0	0	0.0	1	1	1.2500
0.7500 vbul	64056	GONDER 230.0	0	0.0	1	1	1.2500
0.7500 vbul	64224	GONDER1 69.0	0	0.0	1	1	1.2500

2014HS-TS13:PALO VERDE TWO GENERATOR OUTAGE (G-2 LOSS)
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV SOLAR MODEL/DATA (4/25/11)

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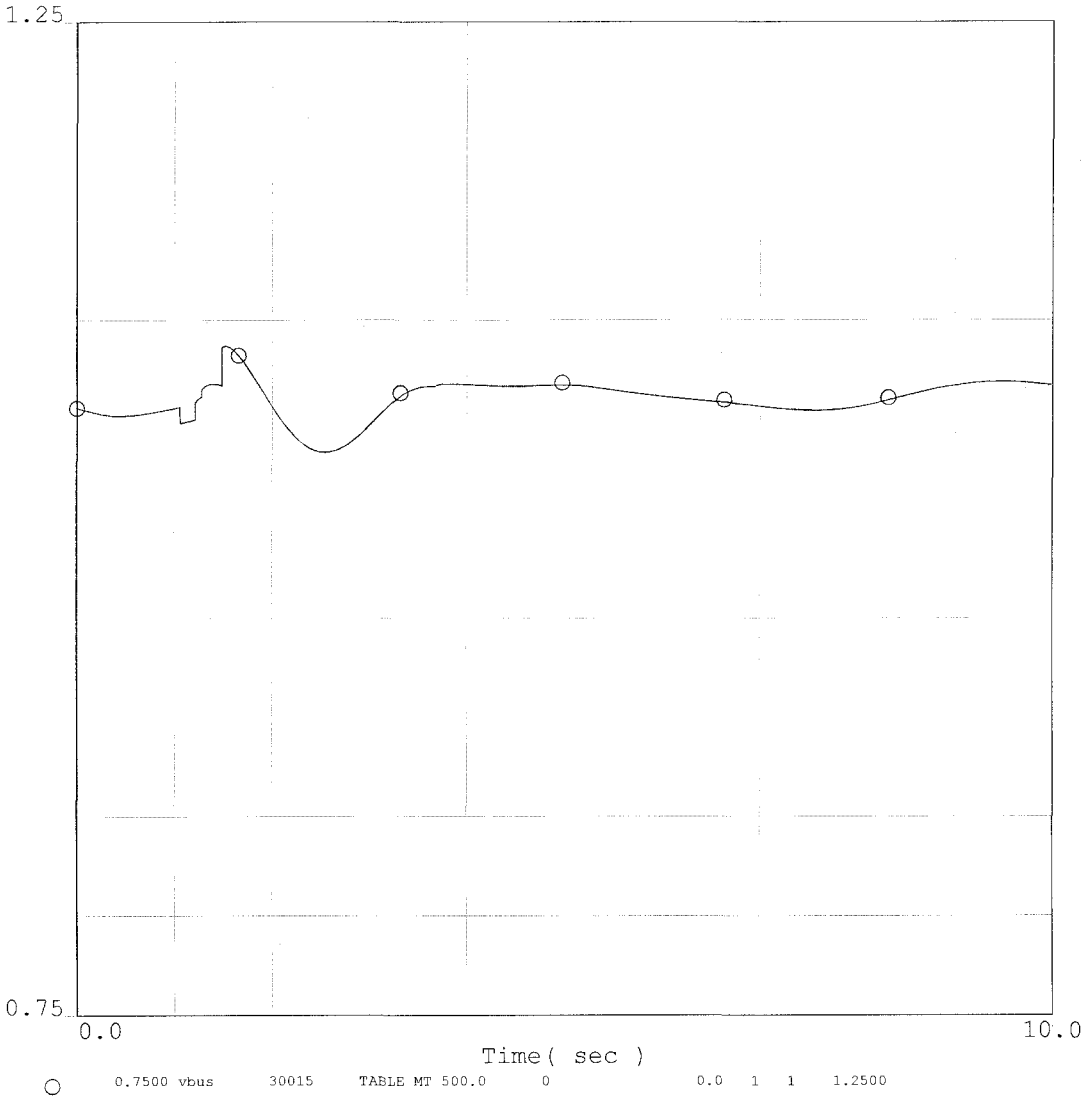
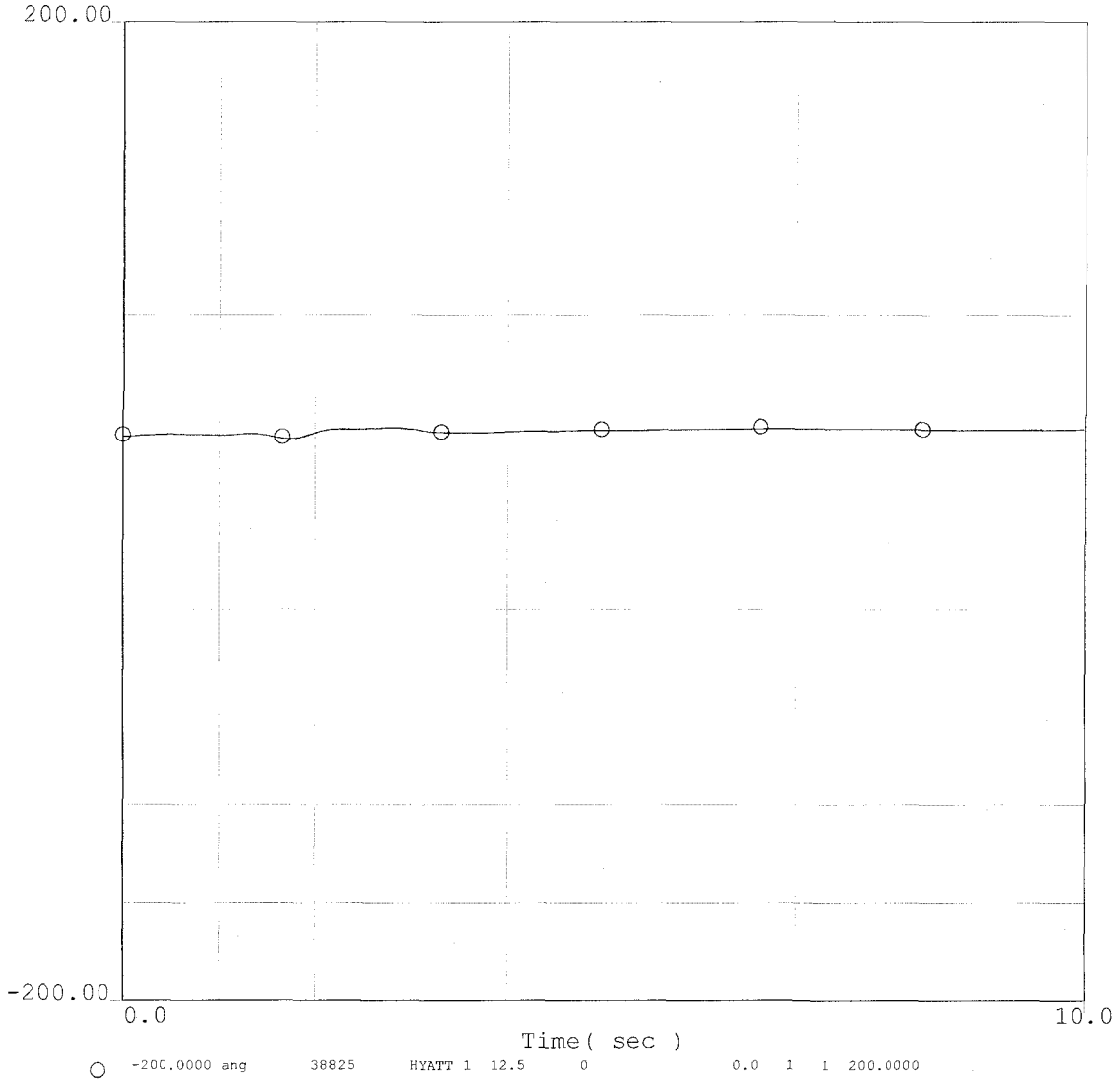
TABLE MT_voltages:



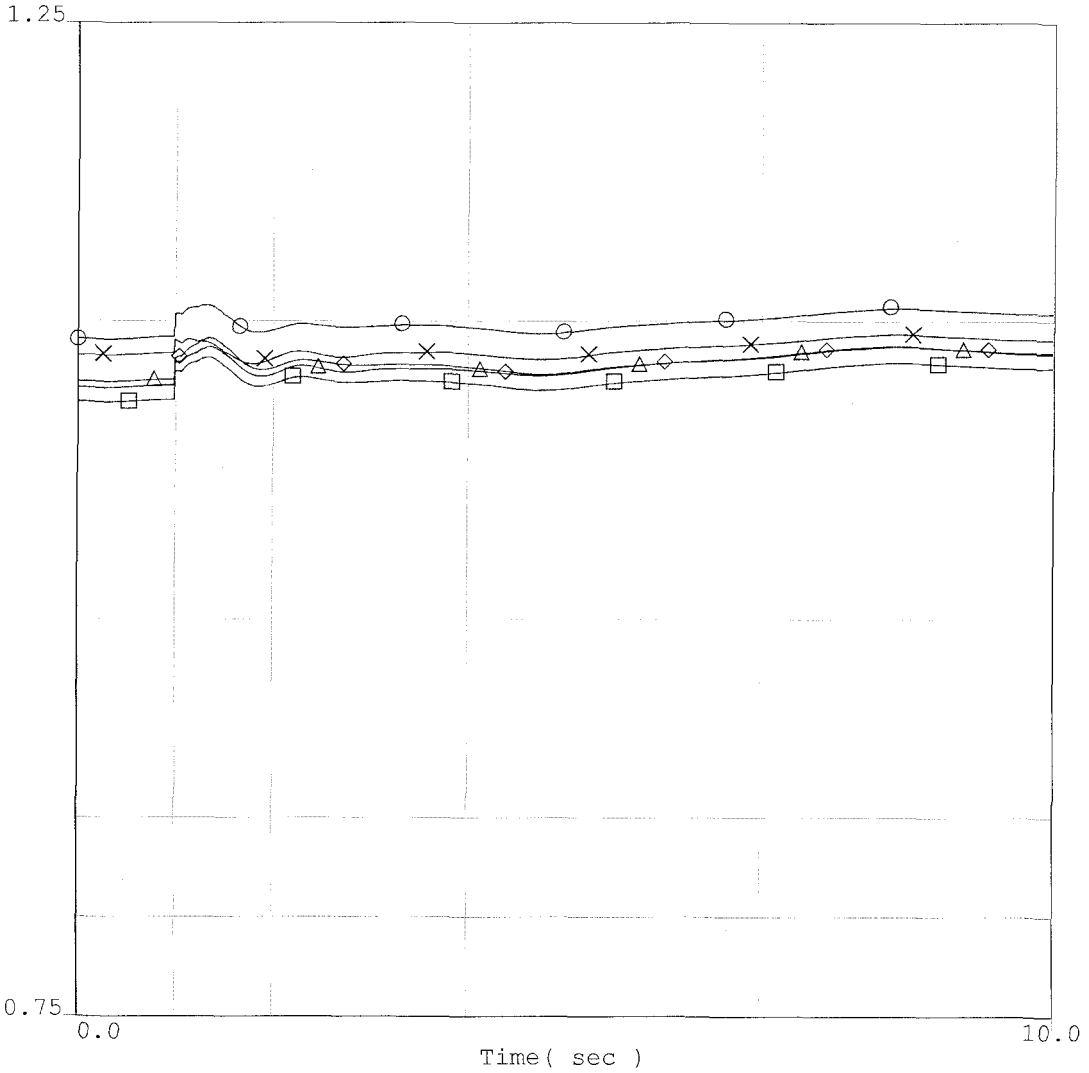
2014HS-TS13:PALO VERDE TWO GENERATOR OUTAGE (G-2 LOSS)
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV SOLAR MODEL/DATA (4/25/11)

HYATT1_Rotorangles



2014HS-TS13:PALO VERDE TWO GENERATOR OUTAGE (G-2 LOSS)
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV SOLAR MODEL/DATA (4/25/11)

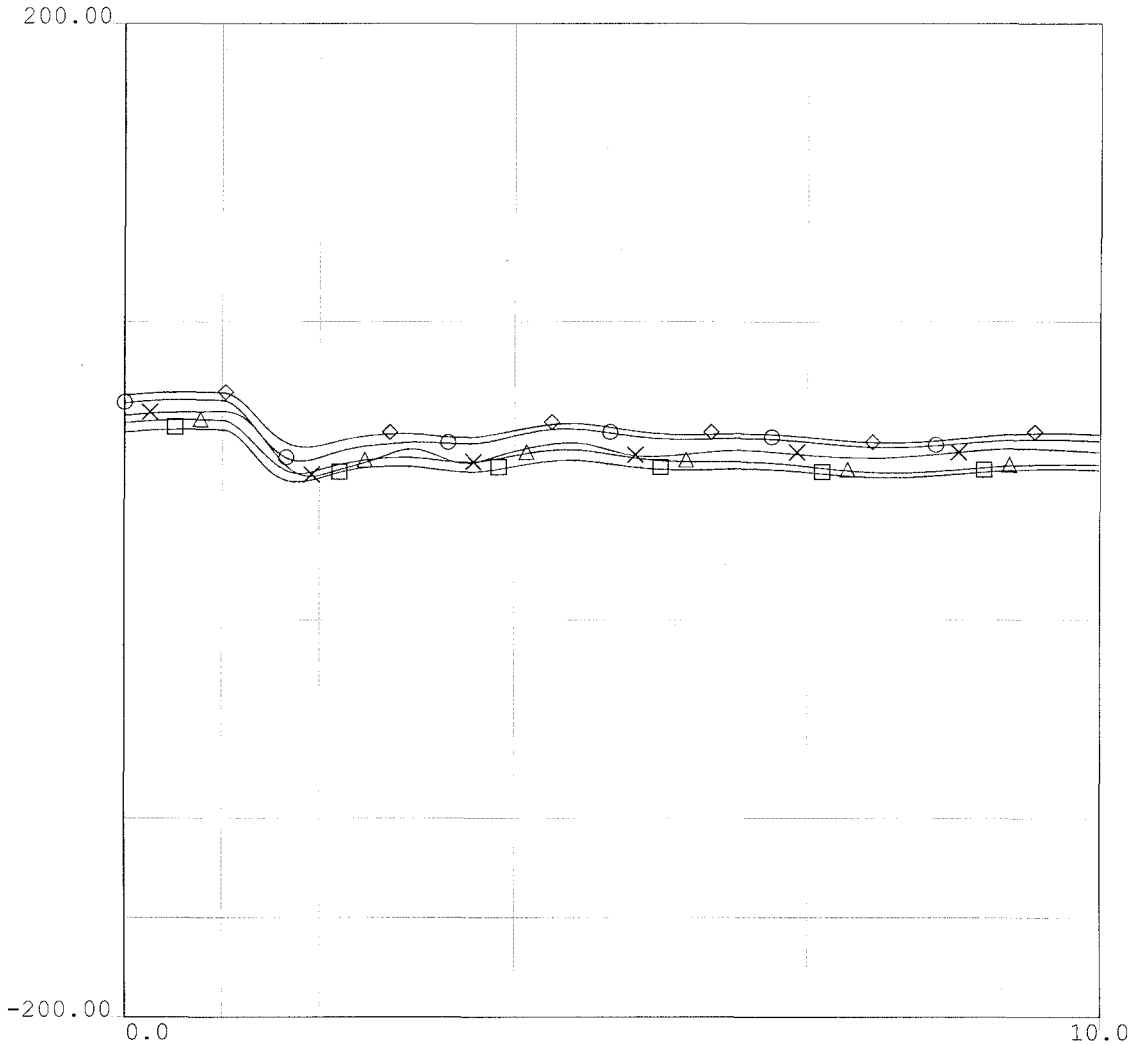
OTHERS_voltages:



○	0.7500	vbus	14005	WESTWING	500.0	0	0.0	1	1	1.2500
⊗	0.7500	vbus	15051	BROWNING	500.0	0	0.0	1	1	1.2500
□	0.7500	vbus	15061	RUDD	500.0	0	0.0	1	1	1.2500
△	0.7500	vbus	15089	JOJOBA	500.0	0	0.0	1	1	1.2500
◇	0.7500	vbus	15088	PINAL_W	500.0	0	0.0	1	1	1.2500

2014HS-TS13:PALO VERDE TWO GENERATOR OUTAGE (G-2 LOSS)
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV SOLAR MODEL/DATA (4/25/11)

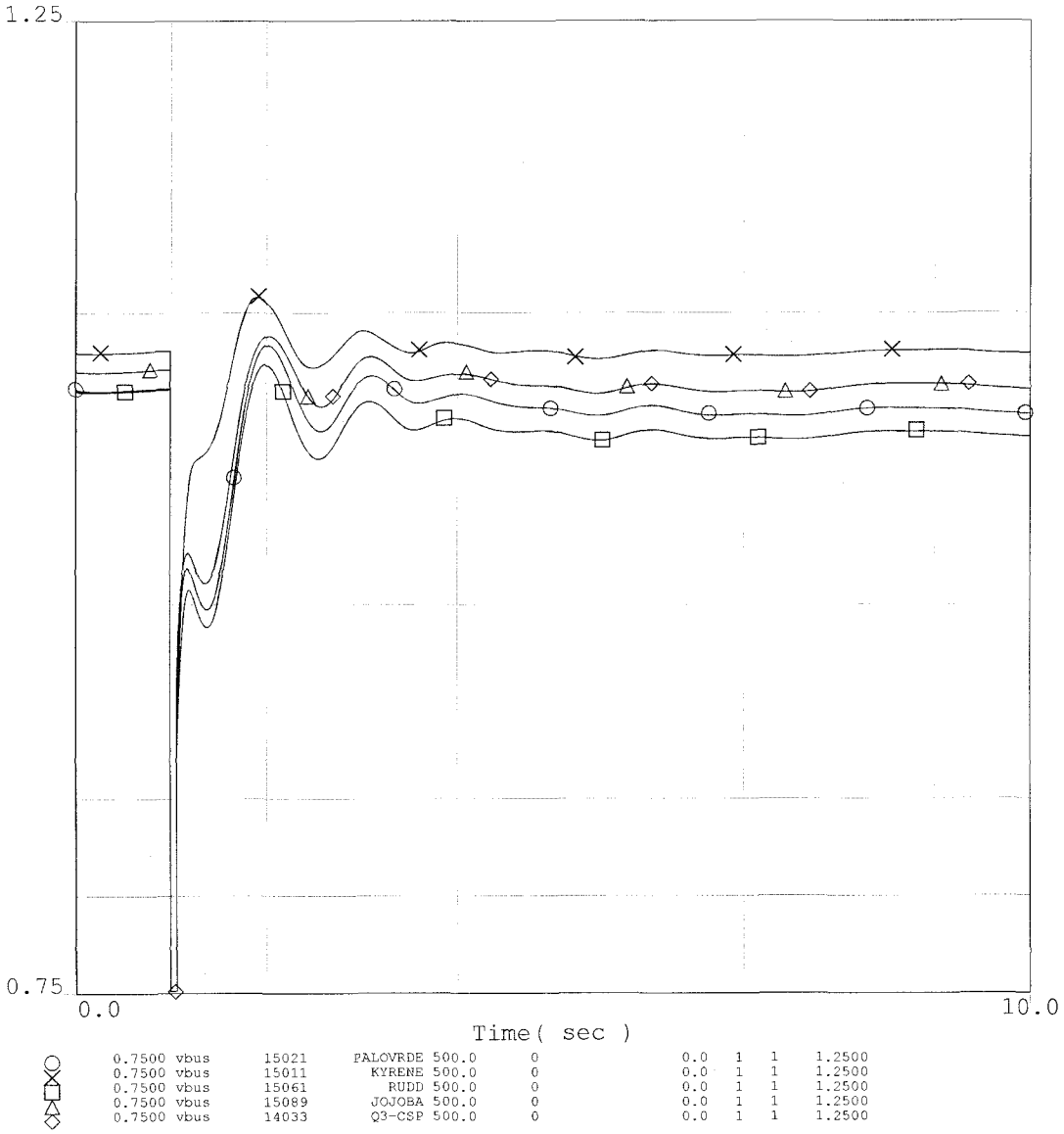
SYSTEM_Rotorangles



-200.0000 ang	14925	OCOTST1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	15914	KYRENE 4	13.8	0	0.0	1	1	200.0000
-200.0000 ang	15901	AGUAFR 1	13.8	0	0.0	1	1	200.0000
-200.0000 ang	15926	SANTN 5S	18.0	0	0.0	1	1	200.0000
-200.0000 ang	14966	WPCC5CT1	15.0	0	0.0	1	1	200.0000

2014HS-TS13:PALO VERDE TWO GENERATOR OUTAGE (G~2 LOSS)
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV SOLAR MODEL/DATA (4/25/11)

ARIZONA 500 KV_voltages:



2014HS-TS16:THREE PHASE FAULT JOJOBA W/JOA-KYR & HAA-PINAL W OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
MODIFIED SONORAN PV SOLAR MODEL/DATA (4/26/11)

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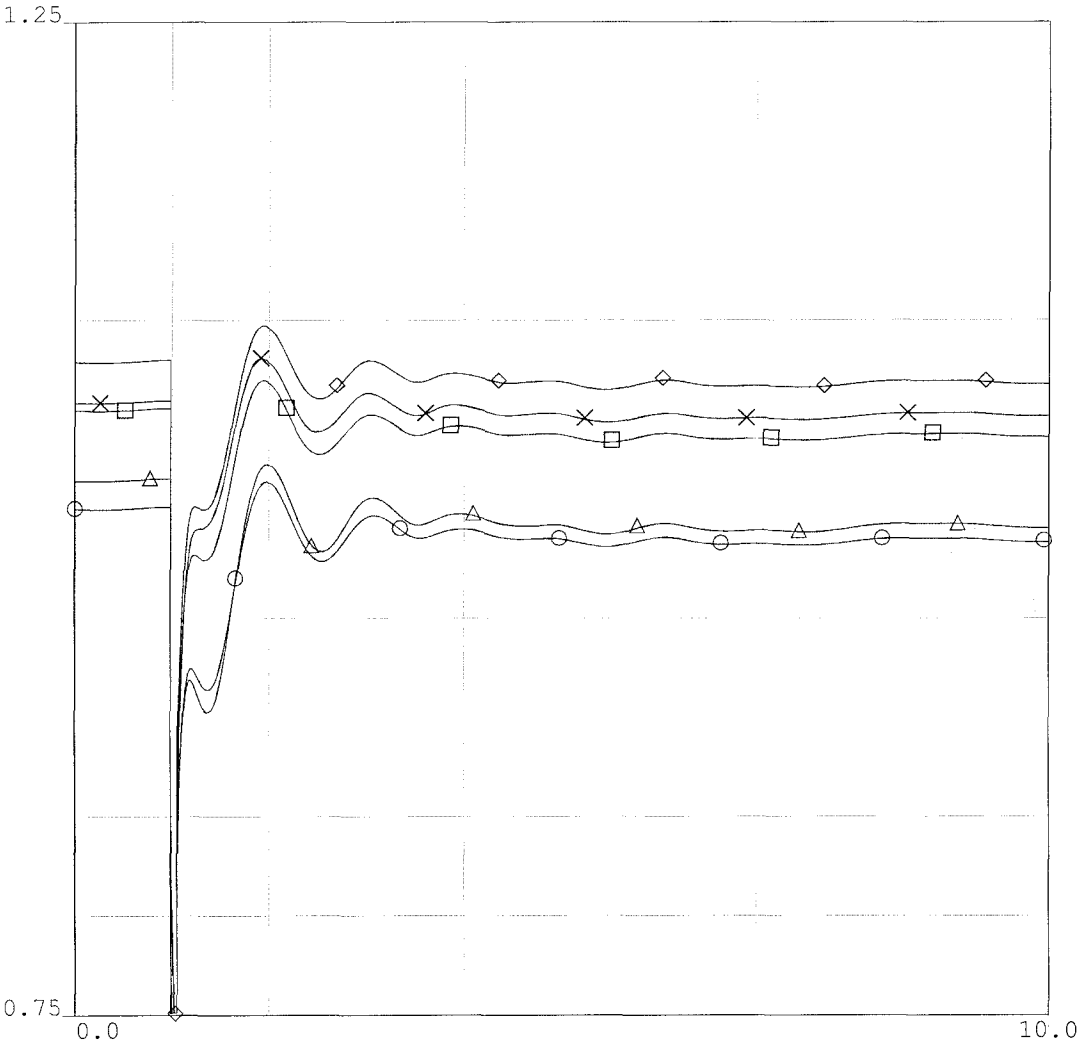
ARIZONA 230KV_voltages:



○	0.7500 vbul	14231	WESTWNGW 230.0	0	0.0	1	1	1.2500
✕	0.7500 vbus	15207	KYRENE 230.0	0	0.0	1	1	1.2500
□	0.7500 vbul	14221	PPAPS W 230.0	0	0.0	1	1	1.2500
△	0.7500 vbus	14224	JOJOBA 230.0	0	0.0	1	1	1.2500
◇	0.7500 vbus	14219	OCOTILLO 230.0	0	0.0	1	1	1.2500

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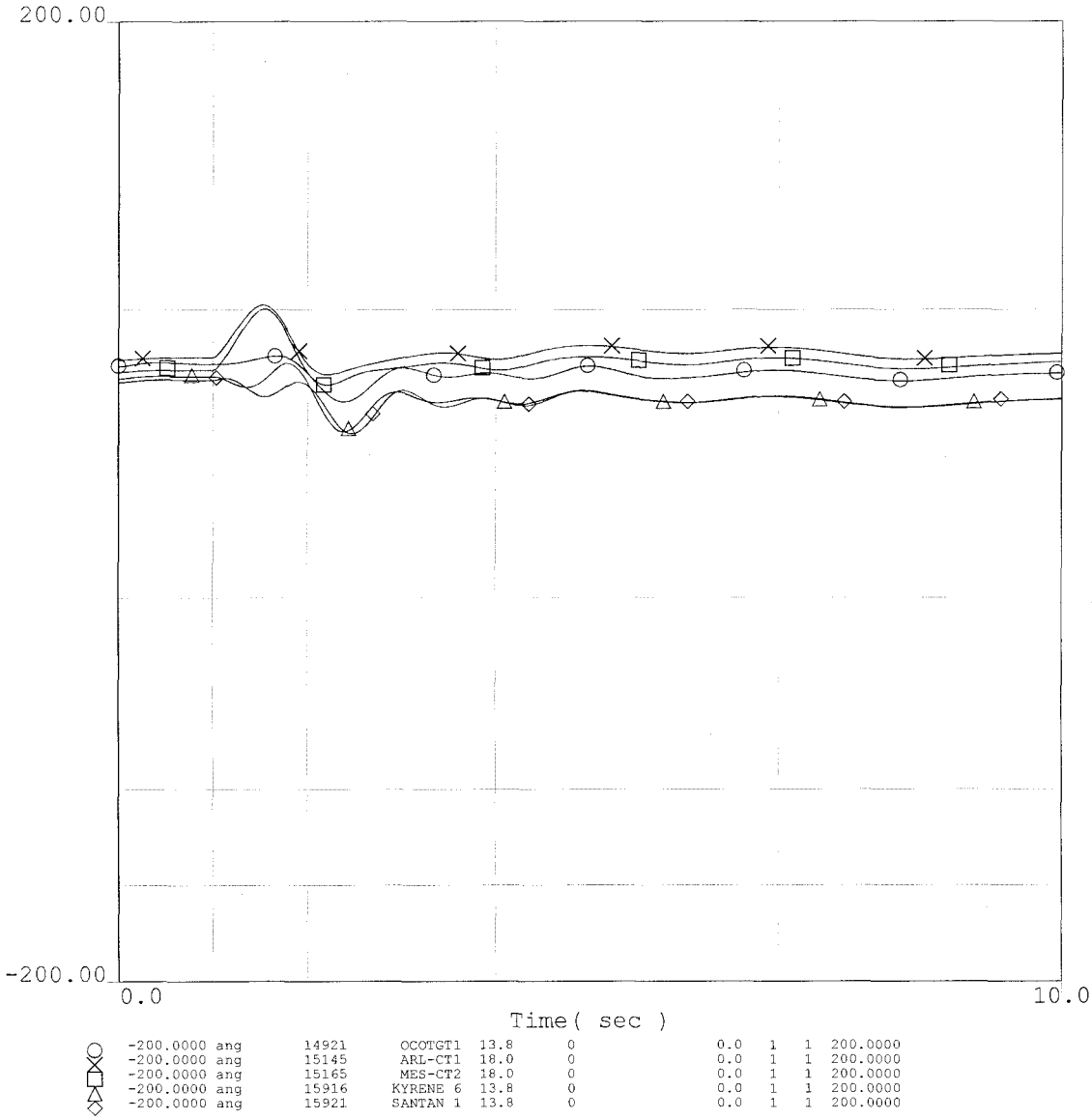
SYSTEM_Rotorangles



2014HS-TS16:THREE PHASE FAULT JOJOBA W/JOA-KYR & HAA-PINAL W OUTAGE
SONORAN SOLAR PLANT JOJOBA INTERCONNECTION IMPACT STUDY(PHOTOVOLTIC)
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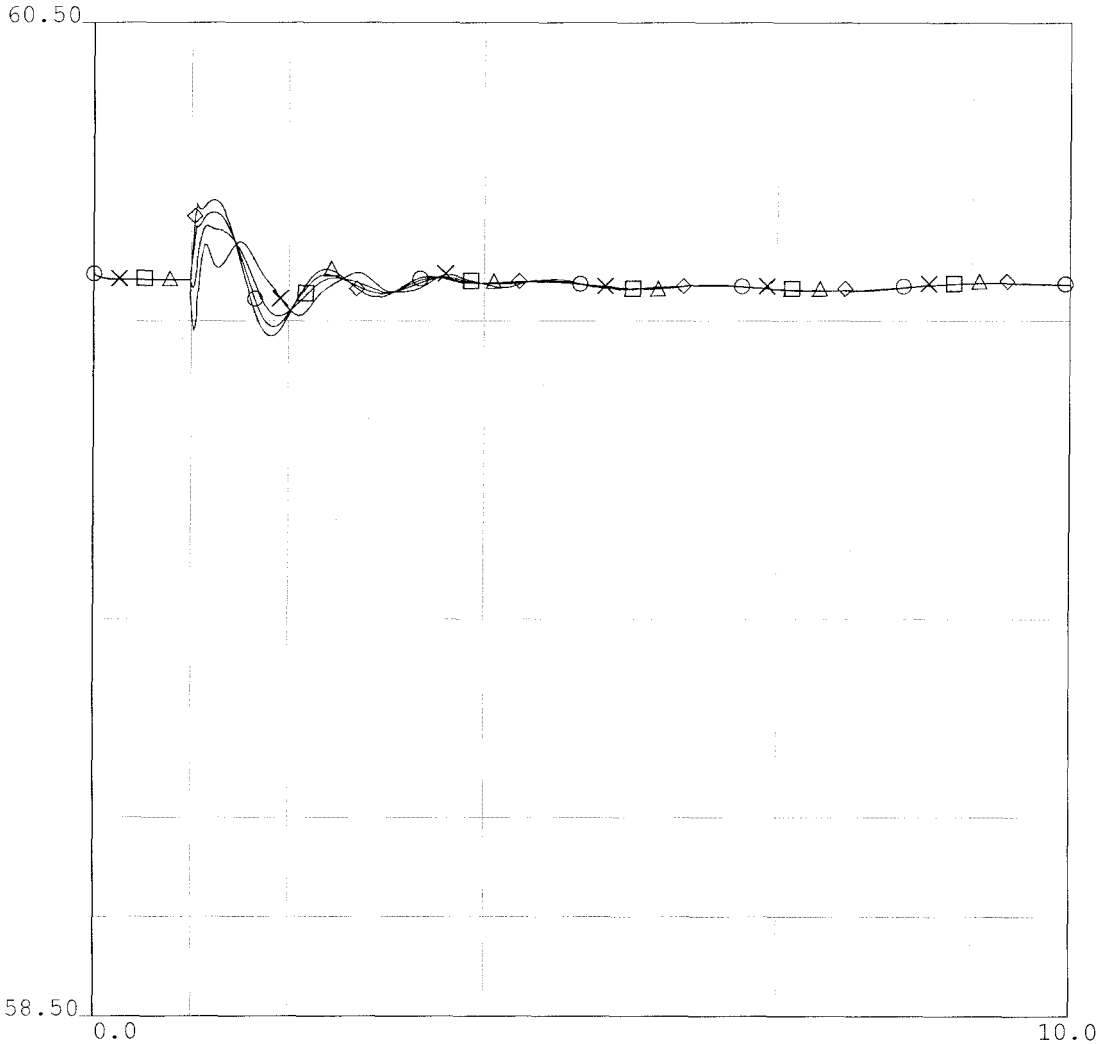
Frequencies:



○	58.5000 fbus	15021	PALOVRDE 500.0	0	0.0	1	1	60.5000
⊗	58.5000 fbus	15011	KYRENE 500.0	0	0.0	1	1	60.5000
□	58.5000 fbus	15061	RUDD 500.0	0	0.0	1	1	60.5000
△	58.5000 fbus	15089	JOJOBA 500.0	0	0.0	1	1	60.5000
◇	58.5000 fbus	14033	Q3-CSP 500.0	0	0.0	1	1	60.5000

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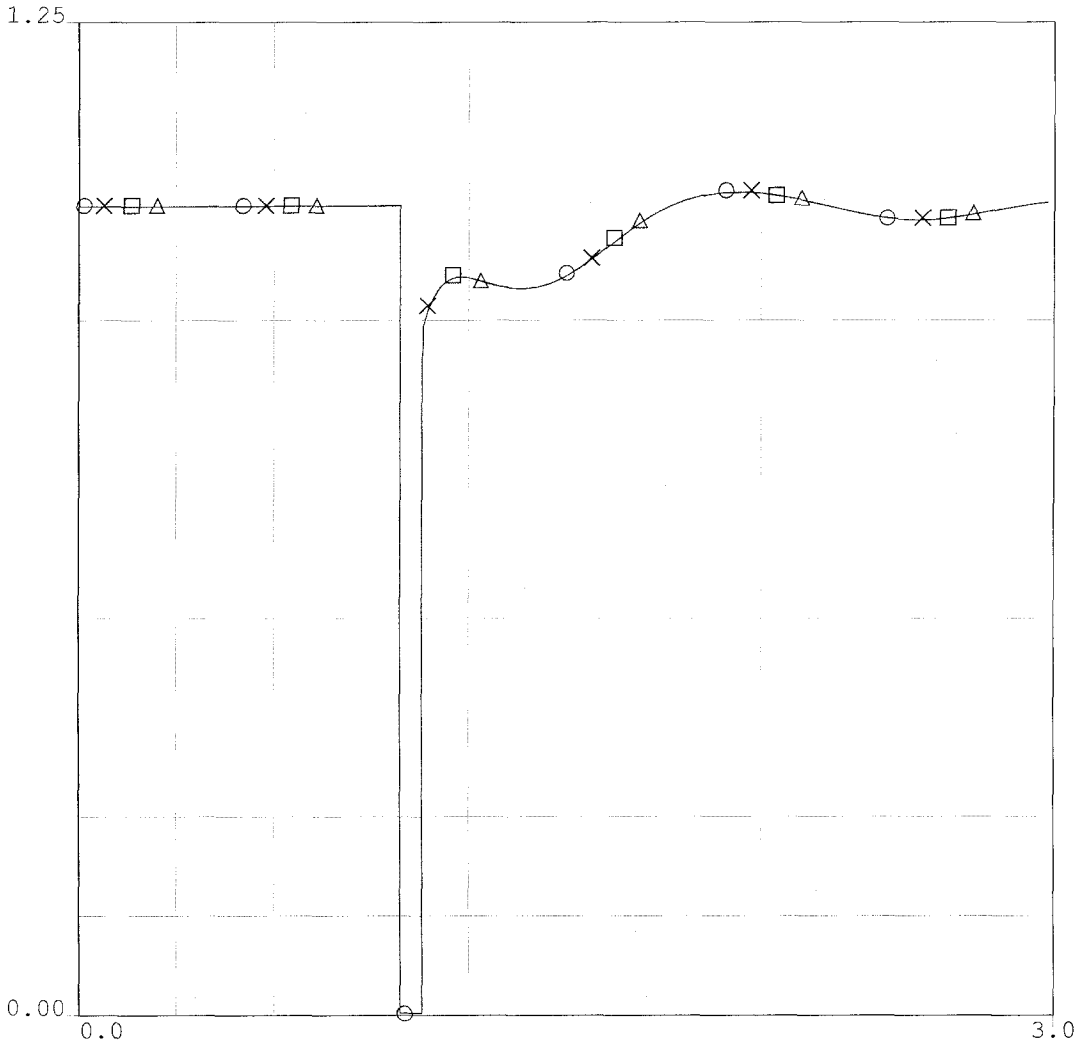
SSEP LVRT_voltages:



○	0.0000 vbug	14812	Q3-PV1	13.8	0	0.0	1	1	1.2500
⊗	0.0000 vbug	14813	Q3-PV2	13.8	0	0.0	1	1	1.2500
□	0.0000 vbug	14814	Q3-PV3	13.8	0	0.0	1	1	1.2500
△	0.0000 vbug	14815	Q3-PV4	13.8	0	0.0	1	1	1.2500

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