

Transient Stability Analysis with PowerWorld Simulator



T7: Transient Stability Plots



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Plots



- You may design plots of data prior to performing the transient stability run. PowerWorld Simulator makes it easy to define commonly used plots.
- Simulator has been designed to give a great deal of flexibility in the design of your plots, allowing for multiple charts on a single plot, as well as multiple vertical axes on a single chart
- Plot definitions are saved with the case, and plots can be set to automatically display at the end of a transient stability run
- Any object fields in a plot definition will automatically be stored to RAM by Simulator during the run
 - Thus, you can ignore the Result Storage settings and instead just design the desired plots
 - By designing your plots, you are automatically specifying what to store
- To define plots, use the Plots page on the Transient Stability Analysis form

Defining Plots



Plots Page

Plot Designer tab

Plot Definition Grids tab

Plot Series tab

More tabs available on Plot Designer page

Device Type

Field

Object; note multiple objects and/or fields can be simultaneously selected.

Customize the plot line.

Choosing your Plot Series



- Choosing your Plot series

- Choose Device Type
- Choose Multiple Fields
- Choose Multiple Objects

- Click **Add >>** buttons

- **Add >>**
- **Add >> Group Fields**
- **Add >> Group Objects**

Device Type: Generator

Choose Fields

- Accel MW
- Field Current
- Field Voltage (pu)
- Mech Input
- Mvar Terminal
- MW Terminal
- Rotor Angle
- Rotor Angle, No Shift
- Speed
- Stabilizer Vs
- Term. PU

Choose Objects

Sort: ☒ By Name ☐ By Number

- 1 (Bus1) #1 [16.5 kV]
- 2 (Bus 2) #1 [18 kV]
- 3 (Bus 3) #1 [13.8 kV]

Add >> Add >> Group Fields Add >> Group Objects

Select All Clear All

Elements of the Plot Definition

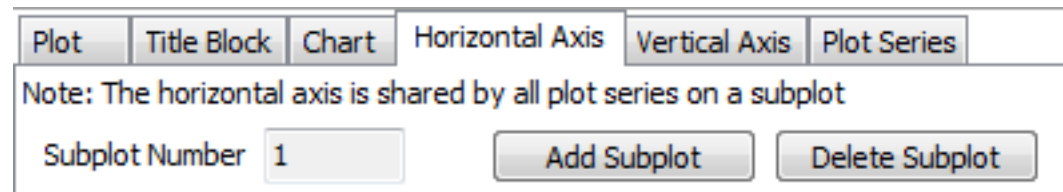
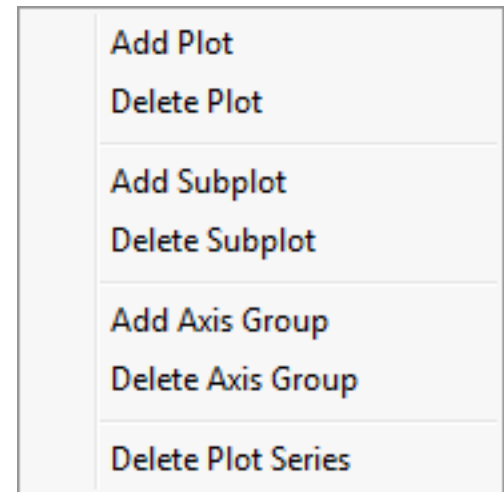


- Plot
 - A single window showing plotted results
 - A single plot can contains any number of subplots
- Subplot
 - Represents the actual graphical chart
 - Contains the horizontal axis description
 - A single subplot contains one or more axis groups
 - All the axis groups then share the horizontal axis
 - For many plots, there will only be one subplot
- Axis Groups
 - A single axis group may contain many plot series
 - Contains the vertical axis description
 - All the plot series then share the vertical axis
 - For many plots, there will only be one axis group
- Plot Series
 - Actual graphical line representing one numerical data series

Inserting and Deleting Plot Elements



- Right-Click on Plot Element to see options to Add or Delete
 - Options will be enabled based on where you right-click
- Add and Delete buttons are on the various tabs



- Drag/Drop to move plot elements between different plots

Tabs on Plot Designer Page



- Plot Tab
 - Options apply to plot
 - When to show plot
 - Options to display the subplots
- Title Block
 - Options for a title block on plot
- Chart Tab
 - Options apply to subplot
 - Background, title, footer
- Horizontal Axis Tab
 - Options apply to subplot
 - Set axis object, axis title, scale
- Vertical Axis Tab
 - Options apply to axis group
 - Axis title, scale, axis group buttons
- Plot Series Tab
 - Options apply to each plot series
 - Series line style, visibility, color, etc.

Plot Tab

Name the plot

When to show

Tile mode

Auto-Save Images of Plots

Plot Name: TS9 Bus Bus Fault FinalPlot

When to show the plot:

- ☒ Completion of a run
- ☐ On execution of a run
- ☐ Manually show plots

Tile Subplots Mode:

- ☐ Left-Right, then Down
- ☒ Top-Bottom, then Right
- ☐ None (user-specified)

Auto-Save an Image File of the Plot

When: Never

File Type: Metafile (*.EMF)

Image Pixel Width: 800

Image Pixel Height: 600

Note: Files are saved to the directory specified in the Results Storage, Hard Drive Options. Filename is always "ContingencyName_PlotName.jpg"

Maximum plot series for which legend is shown by default: 16

Format the Plot Series

Plot Series List

Note: The vertical axis contains the list of plot series below

Axis Group Number: 1

Add Axis Group Delete Axis Group

	Object	Variable	Style	Visible	Color	Thickness	Dashed	Stairs	Symbol Every	Symbol	Width	Height
1	Gen '1' '1'	TSGenP	Line	YES	Blue	2	Solid	No	0	Diamond	5	5
2	Gen '2' '1'	TSGenP	Line	YES	Red	2	Solid	No	0	Diamond	5	5
3	Gen '3' '1'	TSGenP	Line	YES	Green	2	Solid	No	0	Diamond	5	5

Plot Designer: Title Block



- Show
- Show Data/Time
- Sizing
- Location
 - Top/Bottom
- Font Size
- Left Memo
- Right Memo
- Show Logo
 - Custom Logo

The screenshot shows the 'Title Block' tab of the Plot Designer. The 'Plot Name' field contains 'TS9 Bus Bus Fault FinalPlot'. Below it are buttons for 'Rename Plot', 'Add Plot', and 'Delete Plot'. The 'Show Title Block on Plot' checkbox is unchecked, and the 'Font Size' is set to 10. The 'Show Date and Time in Title Block' checkbox is checked. The 'Title Block Height %' is 15.00 and the 'Right Memo Width %' is 50.00. Under 'Where to show the title block', 'Bottom of Plot' is selected. There are empty text boxes for 'Left Memo' and 'Right Memo'. The 'Show Logo Image in Title Block' checkbox is checked, and a 'Browse...' button is next to the 'Logo Image' field. A note at the bottom states: 'If none, the PowerWorld logo will be used.'

Plot Designer: Chart Tab



- Visible
- Color
- Title, Footer
- Location
 - Used when plot is *not* set to one of the “Tile” modes
- Advanced Options
 - A file location

In GUI, the Subplot Number is managed internally, but when using AUX files, this is the key field for the subplot

The screenshot shows the 'Chart' tab of the Plot Designer interface. At the top, there are tabs for 'Plot', 'Chart', 'Horizontal Axis', 'Vertical Axis', and 'Plot Series'. Below the tabs, a note states: 'Note: The chart attributes are assigned to one subplot.' The 'Subplot Number' is set to '1'. There are 'Add Subplot' and 'Delete Subplot' buttons. The 'Visible' checkbox is checked. The 'Background Color' is set to a light gray, with a 'Change' button. The 'Title' section has a 'Visible' checkbox checked, 'Font Size' set to '12', and a 'Specify Color' checkbox unchecked. The 'Footer' section has a 'Visible' checkbox checked, 'Font Size' set to '12', and a 'Specify Color' checkbox unchecked. The 'Location' section has a 'Plot is set to automatically tile the subplots' checkbox checked. The 'Top' position is set to '0.0', 'Left' to '0.0', 'Right' to '100.0', and 'Bottom' to '50.0'. The 'Advanced Options Filename' section has a text box and 'Browse...' and 'Clear' buttons.

Plot Designer:

Horizontal Axis Tab



- Show Axis
- Inverted
- Logarithmic
- Title
- Scale
- Horizontal Axis Value
 - Defaults to time
 - Change for a “State Space” plot

In GUI, the Subplot Number is managed internally, but when using AUX files this is the key field for the subplot

The screenshot shows the 'Horizontal Axis' tab of the Plot Designer. At the top, there are tabs for 'Plot', 'Chart', 'Horizontal Axis' (selected), 'Vertical Axis', and 'Plot Series'. Below the tabs, a note states: 'Note: The horizontal axis is shared by all plot series on a subplot'. The 'Subplot Number' is set to '1', with 'Add Subplot' and 'Delete Subplot' buttons. The 'Show Horizontal Axis on Plot' checkbox is checked. The 'Inverted' and 'Logarithmic' checkboxes are unchecked. The 'Scale' section has 'Automatic' checked for both 'Maximum' and 'Minimum' (both set to 0.00), and 'Round' is unchecked. The 'Title' section has 'Visible' checked, 'Font Size' set to 12, and 'Specify Color' is unchecked. The 'Horizontal Axis Value' section has a 'Clear' button, 'Object plotted' set to an empty field with a 'Choose...' button, and 'Field plotted' set to 'Time' with a 'Choose...' button.

Plot Designer: Vertical Axis Tab



- Show Axis
- Inverted
- Logarithmic
- Title
- Scale

In GUI, the Axis Group Number is managed internally, but when using AUX files this is the key field for the axis group

The screenshot shows the 'Vertical Axis' tab in the Plot Designer. At the top, there are tabs for 'Plot', 'Chart', 'Horizontal Axis', 'Vertical Axis' (selected), and 'Plot Series'. Below the tabs, a note states: 'Note: The vertical axis is shared by all plot series in an axis group'. The 'Axis Group Number' is set to '1'. There are buttons for 'Add Axis Group' and 'Delete Axis Group'. The 'Show Vertical Axis on Plot' checkbox is checked. The 'Inverted' and 'Logarithmic' checkboxes are unchecked. The 'Axis Side' is set to 'Left' (radio button selected). The 'Title' section has 'Visible' checked, 'Font Size' set to '12', and a 'Specify Color' button. The 'Scale' section has 'Automatic' checked, 'Round' unchecked, 'Maximum' set to '0.00', 'Increment' set to '0.00', 'Minimum' set to '0.00', and 'Automatic' checked, 'Round' unchecked.

Plot Designer: Plot Series List



- A list of the plot series which are in the axis group

In GUI, the Axis Group Number is managed internally, but when using AUX files this is the key field for the axis group

	Object	Variable	Style	Visible	Color	Thickness	Dashed	Stairs	Symt Ever
1	Gen '1' '1'	TSGenDelta	Line	YES	Blue	1	Solid	No	
2	Gen '2' '1'	TSGenDelta	Line	YES	Green	1	Solid	No	
3	Gen '3' '1'	TSGenDelta	Line	YES	Red	1	Solid	No	

Plot Designer: Plot Series Tab



- Object/Field is the key field for plot series
- Visible
- Color
- Type
 - Line Series
 - Point Series
- Line Attributes
- Point Attributes

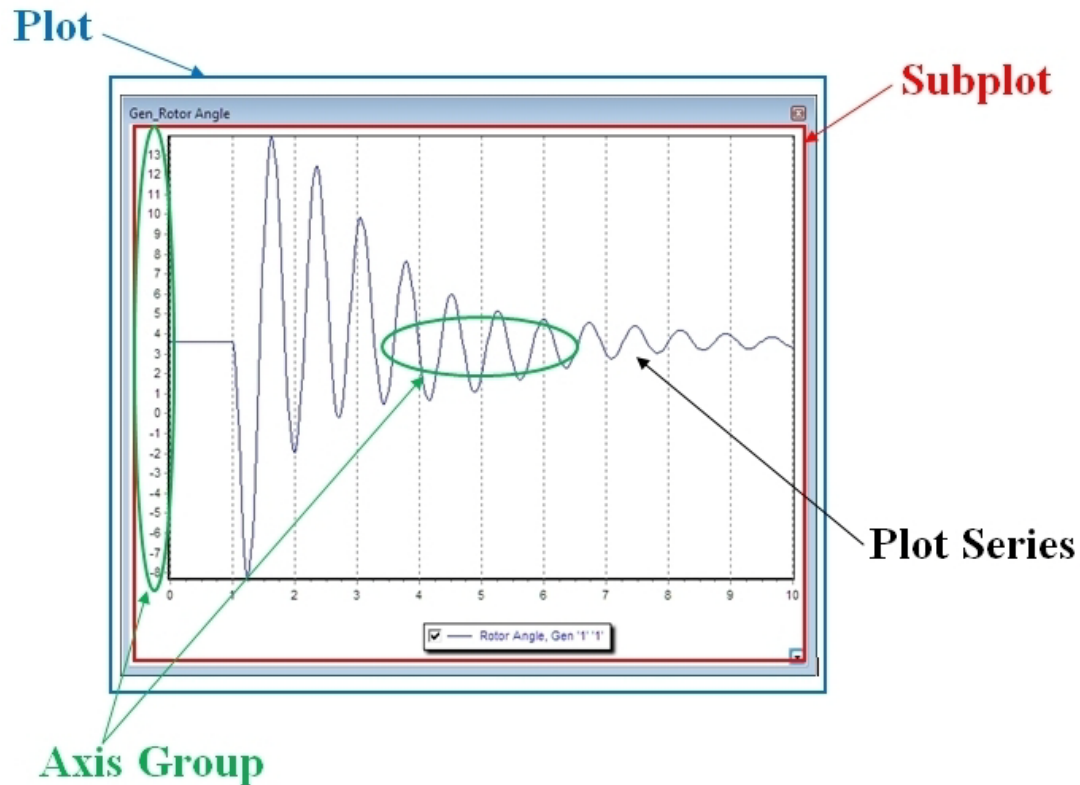
The screenshot shows the 'Plot Series' tab in the Plot Designer. At the top, there are tabs for 'Plot', 'Chart', 'Horizontal Axis', 'Vertical Axis', and 'Plot Series'. Below the tabs, a note states: 'Note: The plot series represents ONE actual line on a chart'. The 'Object plotted' field contains 'Gen '3' '1'' and the 'Field plotted' field contains 'Speed'. A 'Delete Plot Series' button is located to the right of the 'Field plotted' field. Below these fields, there is a section for 'Plot Series Visible' with a checked checkbox. The 'Color' is set to red, with a 'Change' button next to it. The 'Plot Series Type' is set to 'Line Series' in a dropdown menu. Below this, there are two sections: 'Line Attributes' and 'Point Attributes'. The 'Line Attributes' section includes 'Style' (Solid), 'Thickness' (1), 'Stairs' (No), and 'Symbol Every' (0). The 'Point Attributes' section includes 'Style' (Diamond), 'Height' (5), and 'Width' (5).

A Simple Plot



- A plot containing 1 subplot, that contains 1 axis group, that contains 1 plot series

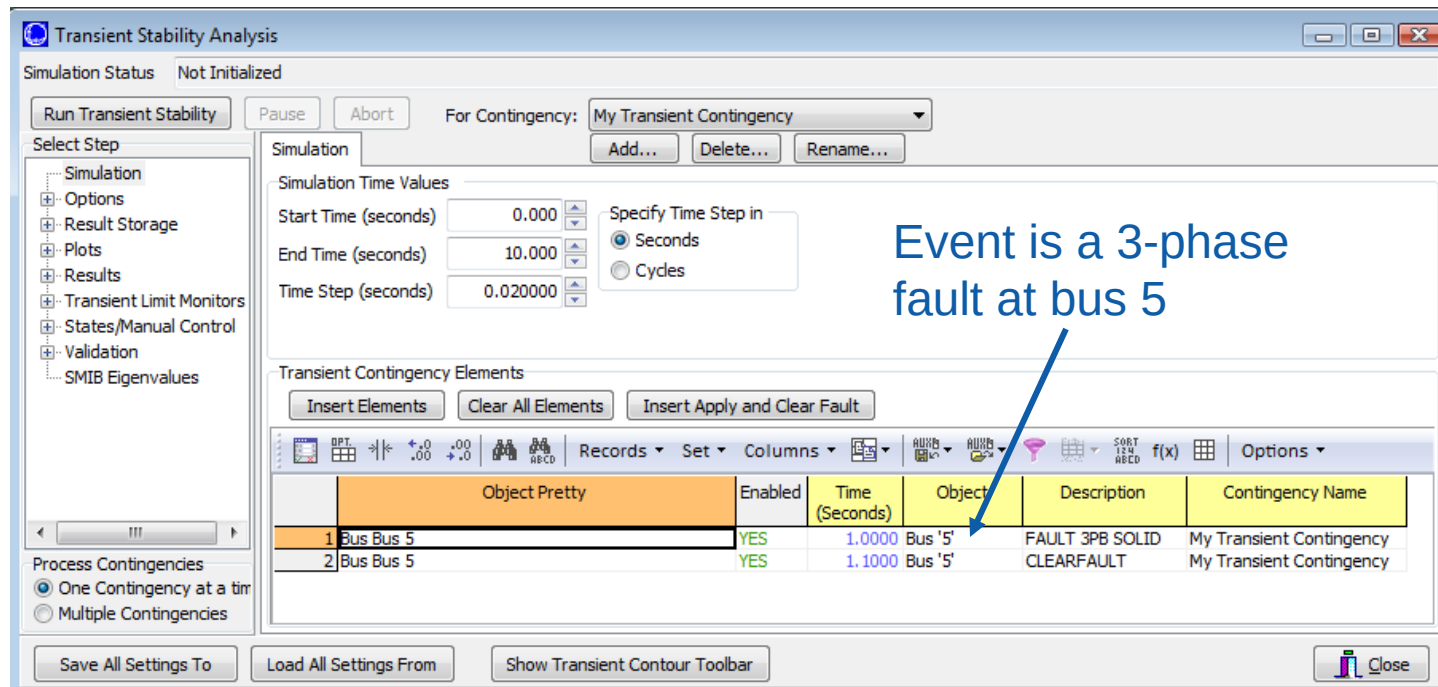
Hierarchy:
Plot,
Subplot,
Axis group,
Plot Series



Plot Definition Example



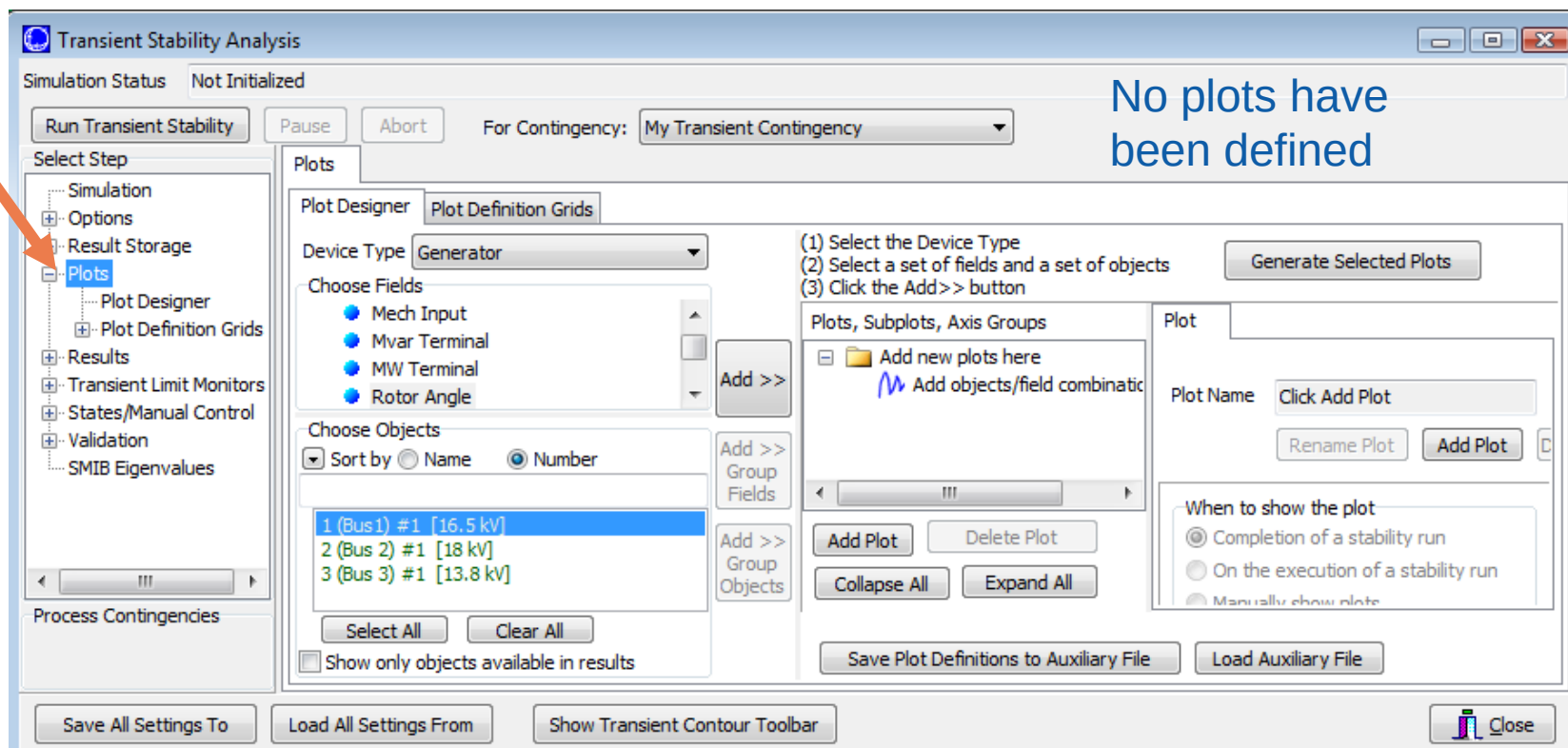
- Open “TS9Bus Bus Fault NoPlot”
- This case has GENSAL and IEEE1 models
- We will be creating some plot definitions for this system
- Open the Transient Stability Dialog



Example: Create a simple plot



- Click “Plots” to open the Plots page
- Plot Designer Tab and Plot Definition Grids Tab are available
- We’ll use the Plot Designer Tab to create a simple plot



Example: Create a simple plot

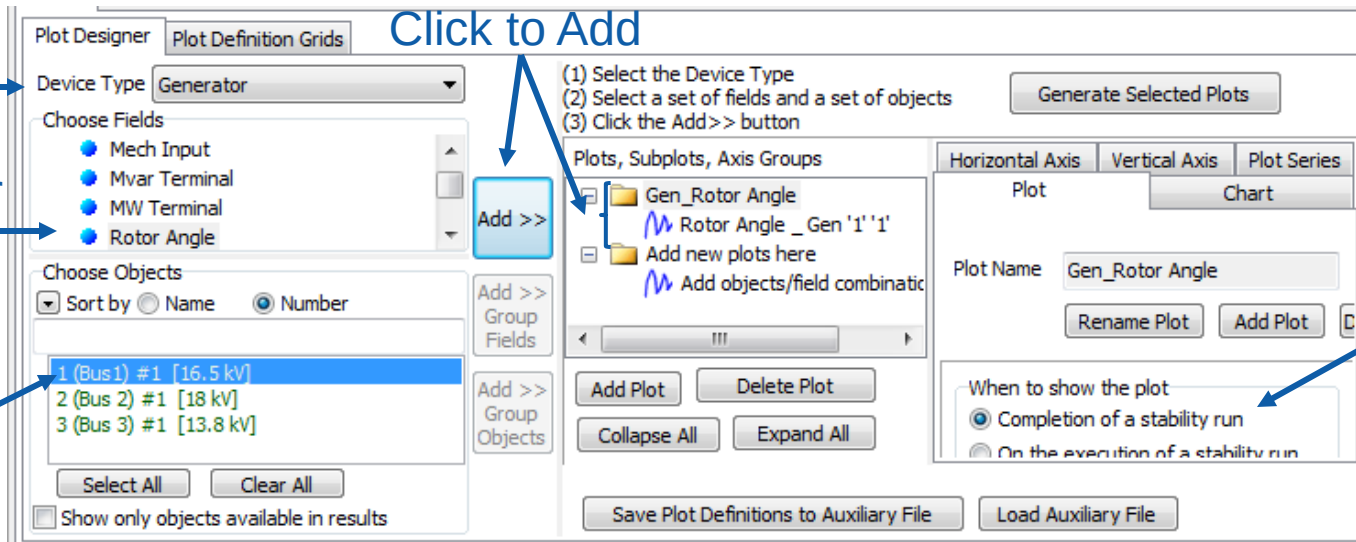


- Make a simple plot of the rotor angle of the machine at bus 1
 - Device Type- Generator
 - Fields- Rotor Angle
 - Choose Objects- Bus 1
 - Click “Add >>” Button
- New plot item appears in “Plots, Subplots, Axis Groups” window

Show
Generator
fields

Select Rotor
Angle

Select Bus
1 object

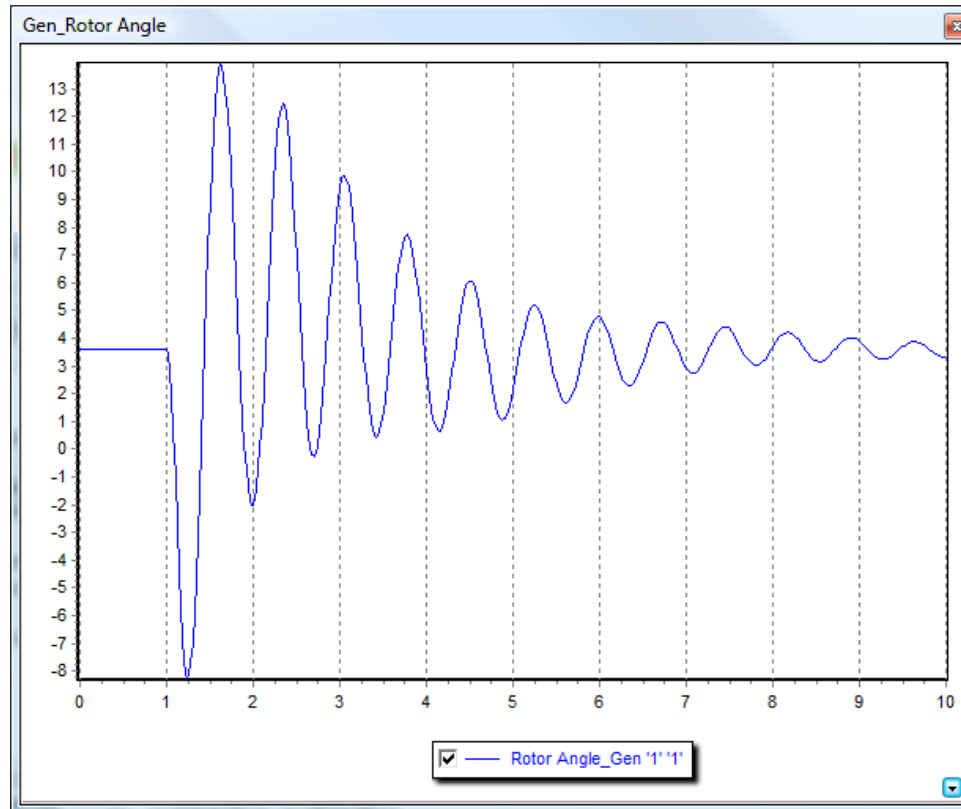


Show plot
after run

Example: A simple plot



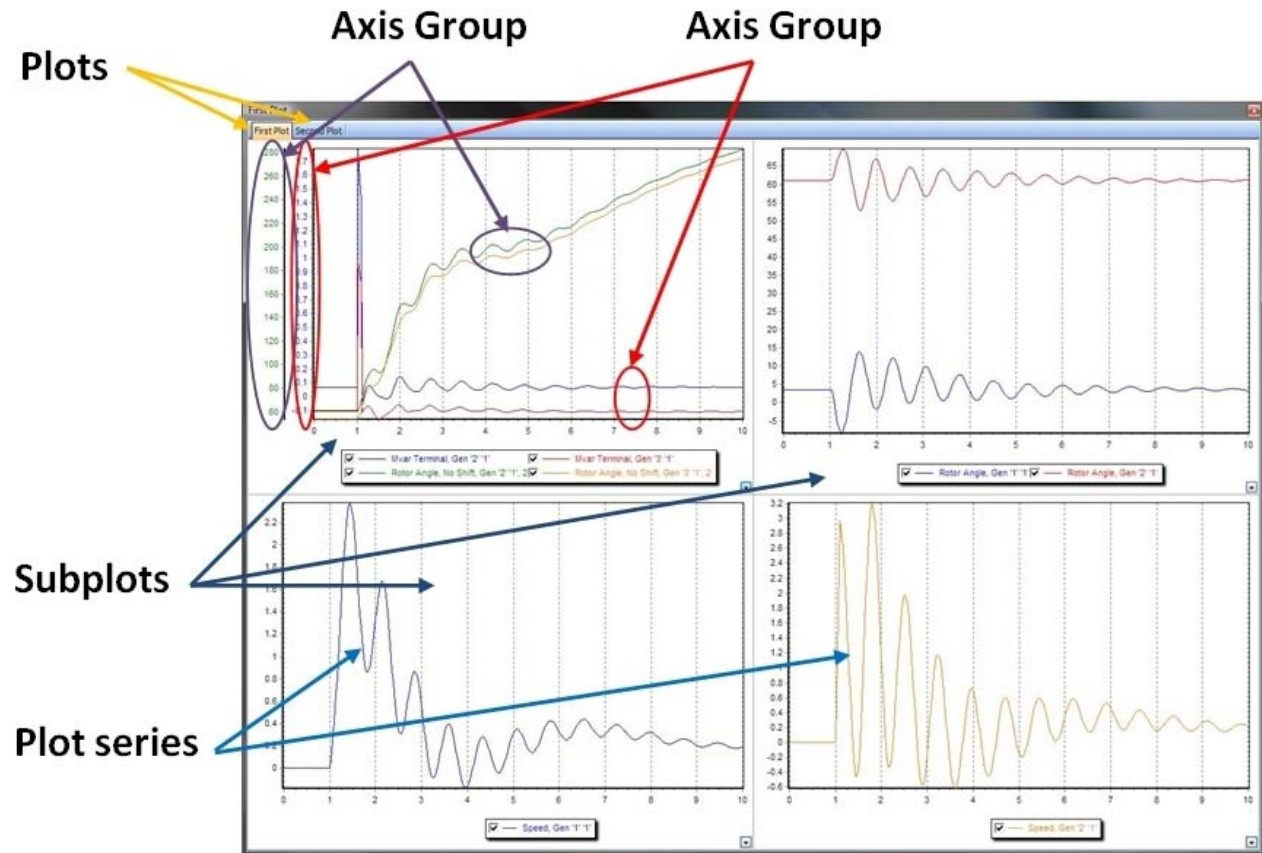
- Click “Run Transient Stability”
- A plot of the rotor angle at bus 1 is generated
- Save the case as “**TS9Bus Bus Fault SimplePlot**” for later use



A Complex Plot



- Four subplots with multiple axis groups and plot series



Plot Definition Example

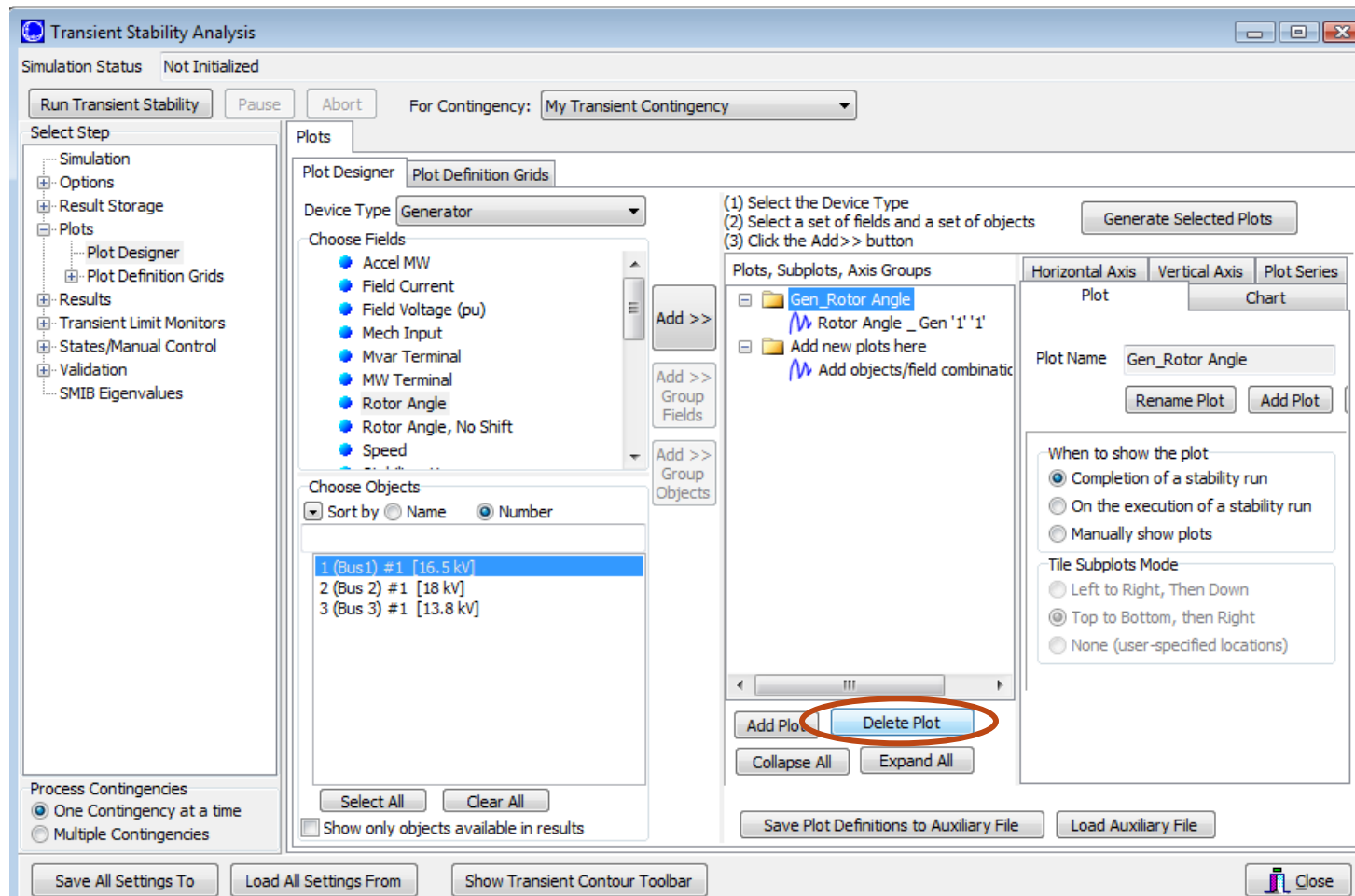


- We will add more complex plot definitions to the current example case by implementing the following changes:
- Create 4 subplots with multiple series
- Create multiple axis groups and multiple plot series
- Change the horizontal axis variable for a subplot
 - Subplot 1- all MW Terminal series, all Rotor Angles, No Shift
 - Subplot 2- all Rotor Angle series
 - Subplot 3- all Speed series
 - Subplot 4- Speed vs. Rotor Angle of Generator 2

Plot Definition Example



- First, delete the existing plot by clicking the “Delete Plot” button



Plot Definition Example



- Choose a Device Type (Generator), Field (MW Terminal), and Objects (Buses 1, 2, and 3).
- Then click the “Add” button (or drag from the field list over to the plot list).
- Next click on the Plot Series tab (far right) to customize the plot’s appearance; set Thickness to 2 for each plot series.

Transient Stability Analysis

Simulation Status: Not Initialized

Run Transient Stability | Pause | Abort | For Contingency: My Transient Contingency

Select Step

- Simulation
- Options
- Result Storage
- Plots
 - Plot Designer
 - Plot Definition Grids
- Results
- Transient Limit Monitors
- States/Manual Control
- Validation
- SMIB Eigenvalues

Process Contingencies

Save All Settings To | Load All Settings From | Show Transient Contour Toolbar

Plots

Plot Designer | Plot Definition Grids

Device Type: Generator

Choose Fields

- Field Current
- Field Voltage (pu)
- Mech Input
- Mvar Terminal
- MW Terminal
- Peter Angle

Choose Objects

Sort by: Name | Number

- 1 (Bus1) #1 [16.5 kV]
- 2 (Bus 2) #1 [18 kV]
- 3 (Bus 3) #1 [13.8 kV]

Select All | Clear All

Show only objects available in results

Plots, Subplots, Axis Groups

(1) Select the Device Type
(2) Select a set of fields and a set of objects
(3) Click the Add>> button

Generate Selected Plots

Plot | Chart | Horizontal Axis | Vertical Axis | Plot Series List

Note: The vertical axis contains the list of plot series below

Axis Group Number: 1 | Add Axis Group | Delete Axis Group

	Object	Variable	Style	Visible	Color	Thickness	Dashed
1	Gen '1' '1'	TSGenP	Line	YES	Blue	2	Solid
2	Gen '2' '1'	TSGenP	Line	YES	Red	2	Solid
3	Gen '3' '1'	TSGenP	Line	YES	Green	2	Solid

Add Plot | Delete Plot | Collapse All | Expand All

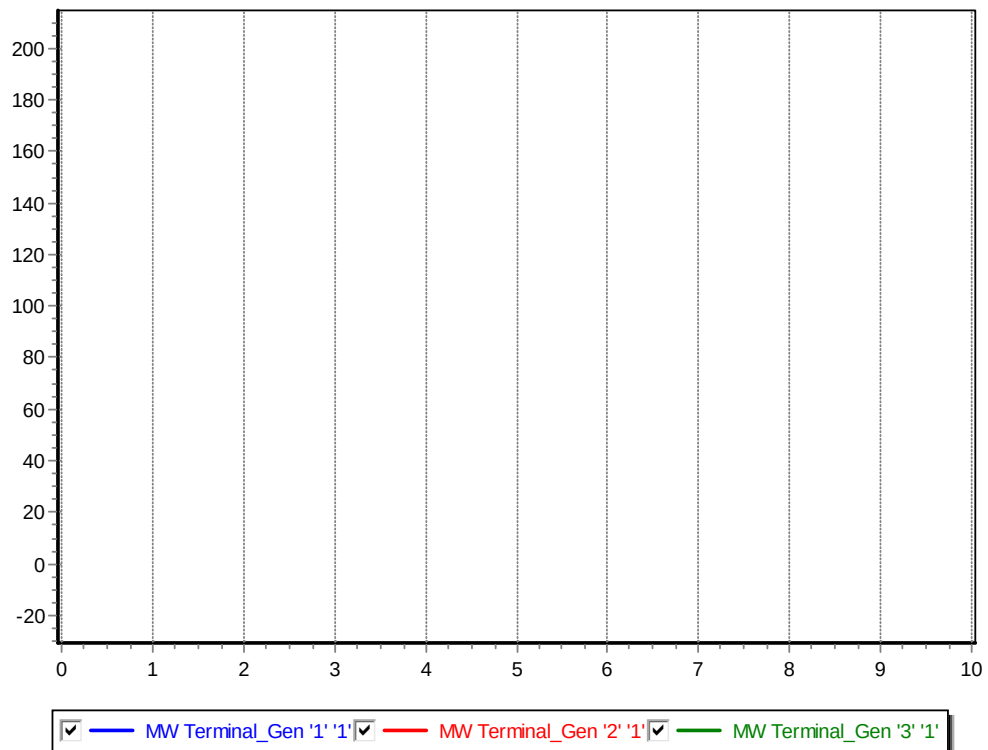
Save Plot Definitions to Auxiliary File | Load Auxiliary File

Close

Plot Definition Example



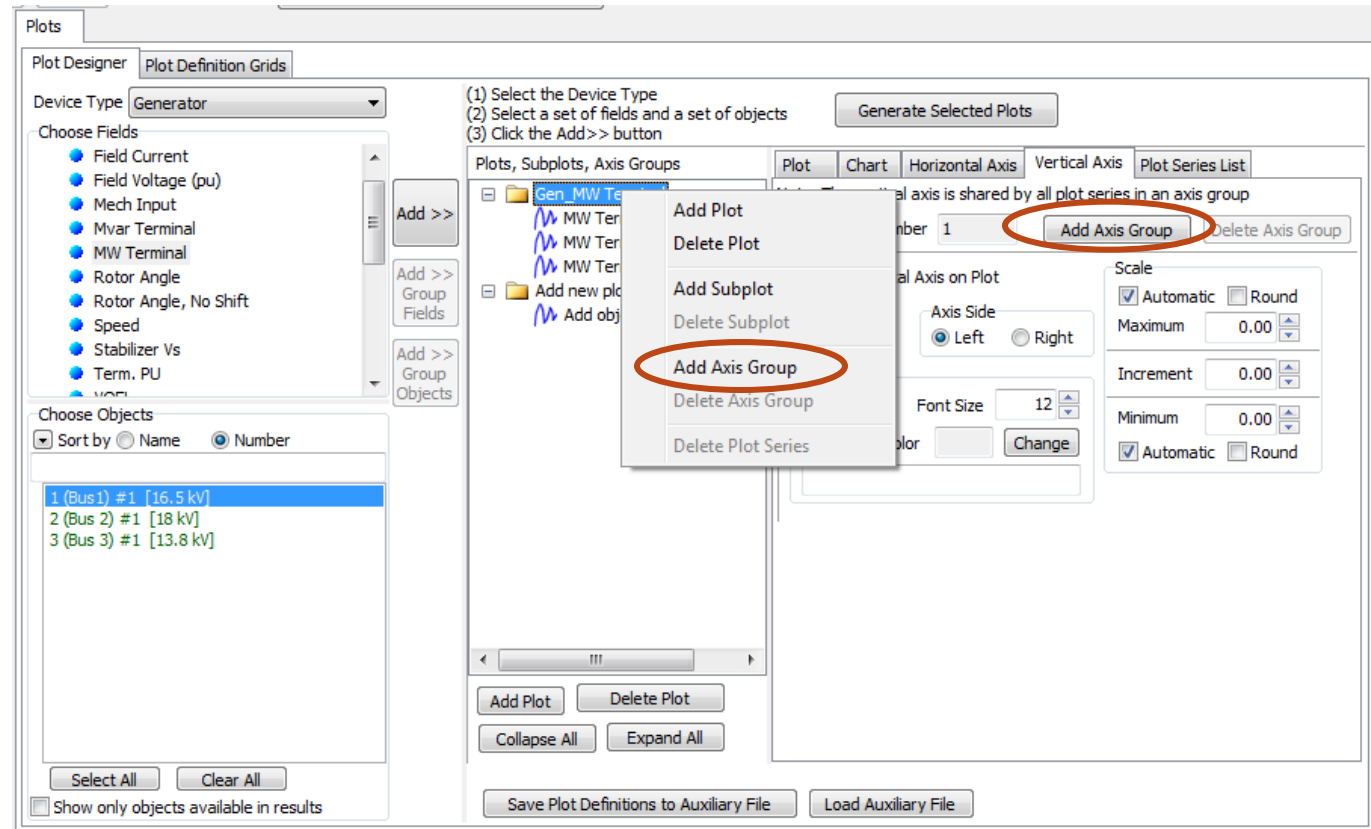
- Once the plot is designed, save the case as “**TS9Bus Bus Fault Plot2**” and rerun the simulation
- A single plot with three time series should now automatically appear



Example: Add an Axis Group



- Axis Groups are used to plot different values using different y-axes on the same plot
- This feature allows comparison of the time behavior of various fields
- Two ways to add an axis group
 - Right click on the plot series and select “Add Axis Group”
 - Select “Vertical Axis” tab and click “Add Axis Group”



Example: Add an Axis Group



- Select the Vertical Axis tab. Then click “Add Axis Group.” Next, set the Device Type to “Generator,” the Field to “Rotor Angle, No Shift,” and select all three buses as the Objects.
- Click the “Add” button. There are now two axis groups.

Plots

Plot Designer Plot Definition Grids

Two axis groups in the plot

1) Select the Device Type
2) Select a set of fields and a set of objects
3) Click the Add>> button

Generate Selected Plots

Device Type: Generator

Choose Fields

- Mech Input
- Mvar Terminal
- MW Terminal
- Rotor Angle
- Rotor Angle, No Shift
- Speed
- Stabilizer Vs
- Term. PII

Choose Objects

Sort by: Name Number

1 (Bus1) #1 [16.5 kV]
2 (Bus 2) #1 [18 kV]
3 (Bus 3) #1 [13.8 kV]

Add >> Group Objects

Plots, Subplots, Axis Groups

- Gen_MW Terminal
- PlotVertAxisGroup 1
 - MW Terminal _ Gen '1'
 - MW Terminal _ Gen '2'
 - MW Terminal _ Gen '3'
- PlotVertAxisGroup 2
 - Rotor Angle, No Shift
 - Rotor Angle, No Shift
 - Rotor Angle, No Shift
- Add new plots here
- Add objects/field combination

Add Plot Delete Axis Group Collapse All Expand All

Save Plot Definitions to Auxiliary File Load Auxiliary File

Plot Chart Horizontal Axis Vertical Axis Plot Series List

Note: The vertical axis contains the list of plot series below

Axis Group Number 2 Add Axis Group Delete Axis Group

	Object	Variable	Style	Visible	Color	Thickness	Das
1	Gen '1' '1'	TSGenDeltaNoshift	Line	YES		2	Solid
2	Gen '2' '1'	TSGenDeltaNoshift	Line	YES		2	Solid
3	Gen '3' '1'	TSGenDeltaNoshift	Line	YES		2	Solid

Customize as desired

All Settings From Show Transient Contour Toolbar

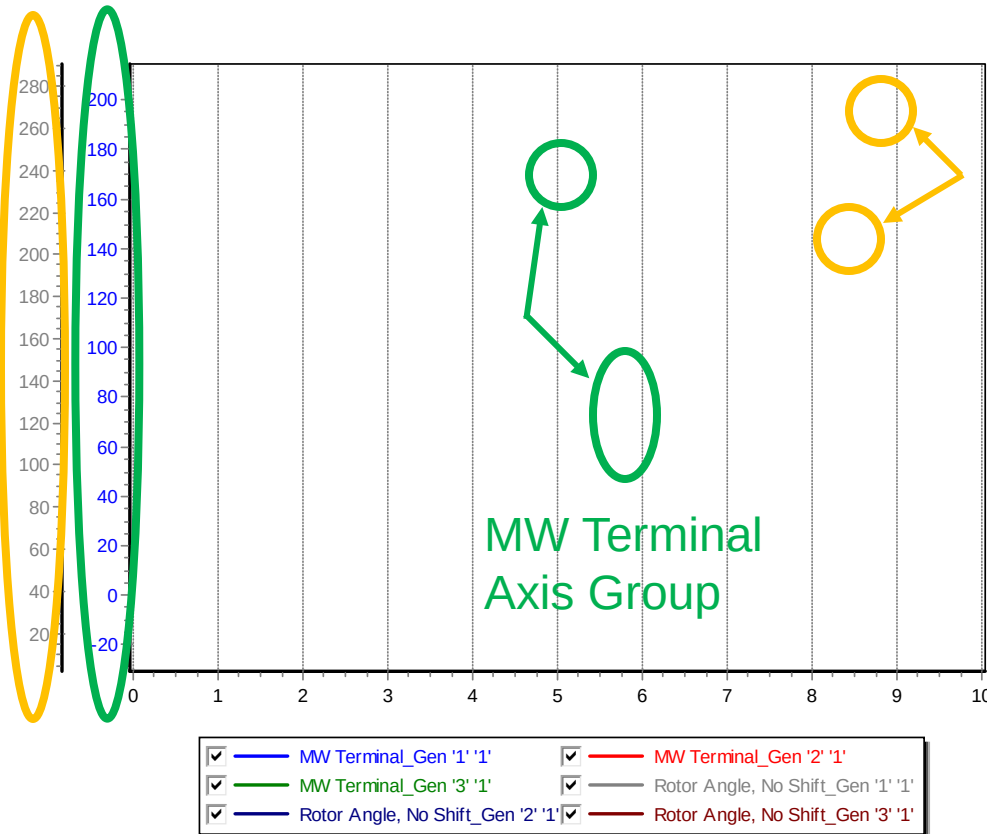
Close

“Vertical Axis” and “Plot Series List” tabs show options specific to the selected axis group

Plot Definition Example



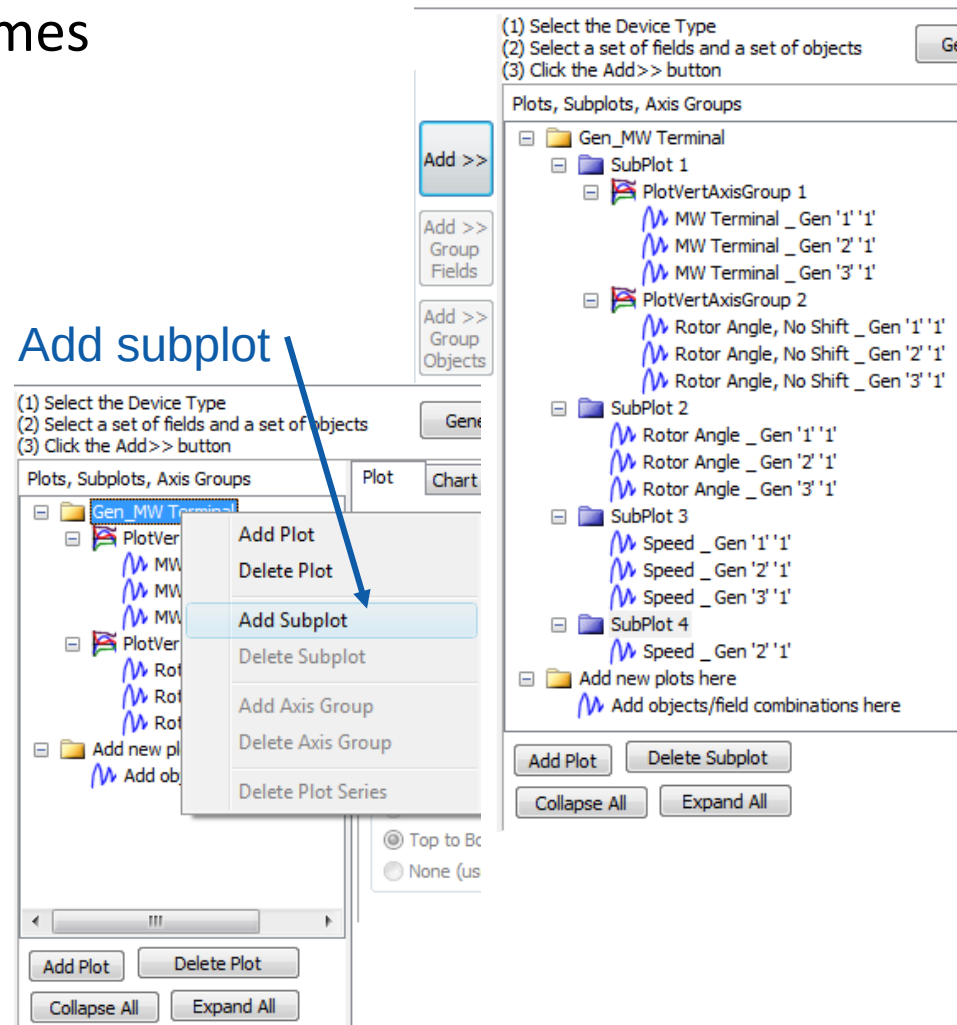
- Rerun the simulation
- A single plot with two different axis groups, each with three time series, should now automatically appear



Example: Add Subplots



- Click “Add Subplot” three times
- Make the following subplots
 - Subplot 2- add all Rotor Angle series
 - Subplot 3- add all Speed series
 - Subplot 4- add Speed of Generator 2
- For Subplot 4, instead of plotting time on the horizontal axis, we will plot the Generator 2 rotor angle



Example: Change Horizontal Axis Variable



- Select the fourth Subplot item, indicating the speed of Gen 2
- Select the “Horizontal Axis” tab
- On the Horizontal Axis Value Panel, we will change the “Object plotted” and “Field plotted” to Gen 2 Rotor Angle

(1) Select the Device Type
(2) Select a set of fields and a set of objects
(3) Click the Add >> button

Generate Selected Plots

Plots, Subplots, Axis Groups

- Gen_MW Terminal
 - SubPlot 1
 - PlotVertAxisGroup 1
 - MW Terminal _ Gen '1' '1'
 - MW Terminal _ Gen '2' '1'
 - MW Terminal _ Gen '3' '1'
 - PlotVertAxisGroup 2
 - Rotor Angle, No Shift _ Gen '1' '1'
 - Rotor Angle, No Shift _ Gen '2' '1'
 - Rotor Angle, No Shift _ Gen '3' '1'
 - SubPlot 2
 - Rotor Angle _ Gen '1' '1'
 - Rotor Angle _ Gen '2' '1'
 - Rotor Angle _ Gen '3' '1'
 - SubPlot 3
 - Speed _ Gen '1' '1'
 - Speed _ Gen '2' '1'
 - Speed _ Gen '3' '1'
 - SubPlot 4
 - Speed _ Gen '2' '1'
- Add new plots here
 - Add objects/field combinations here

Add Plot Delete Subplot Collapse All Expand All

Plot Chart **Horizontal Axis** Vertical Axis Plot Series

Note: The horizontal axis is shared by all plot series on a subplot

Subplot Number 4 Add Subplot Delete Subplot

☒ Show Horizontal Axis on Plot ☐ Inverted ☐ Logarithmic

Title ☒ Visible Font Size 12 Specify Color Change

Scale ☒ Automatic ☐ Round Maximum 0.00 Increment 0.00 Minimum 0.00 ☒ Automatic ☐ Round

Horizontal Axis Value

Clear

Object plotted Gen '2' '1' Choose...

Field plotted Rotor Angle Choose...

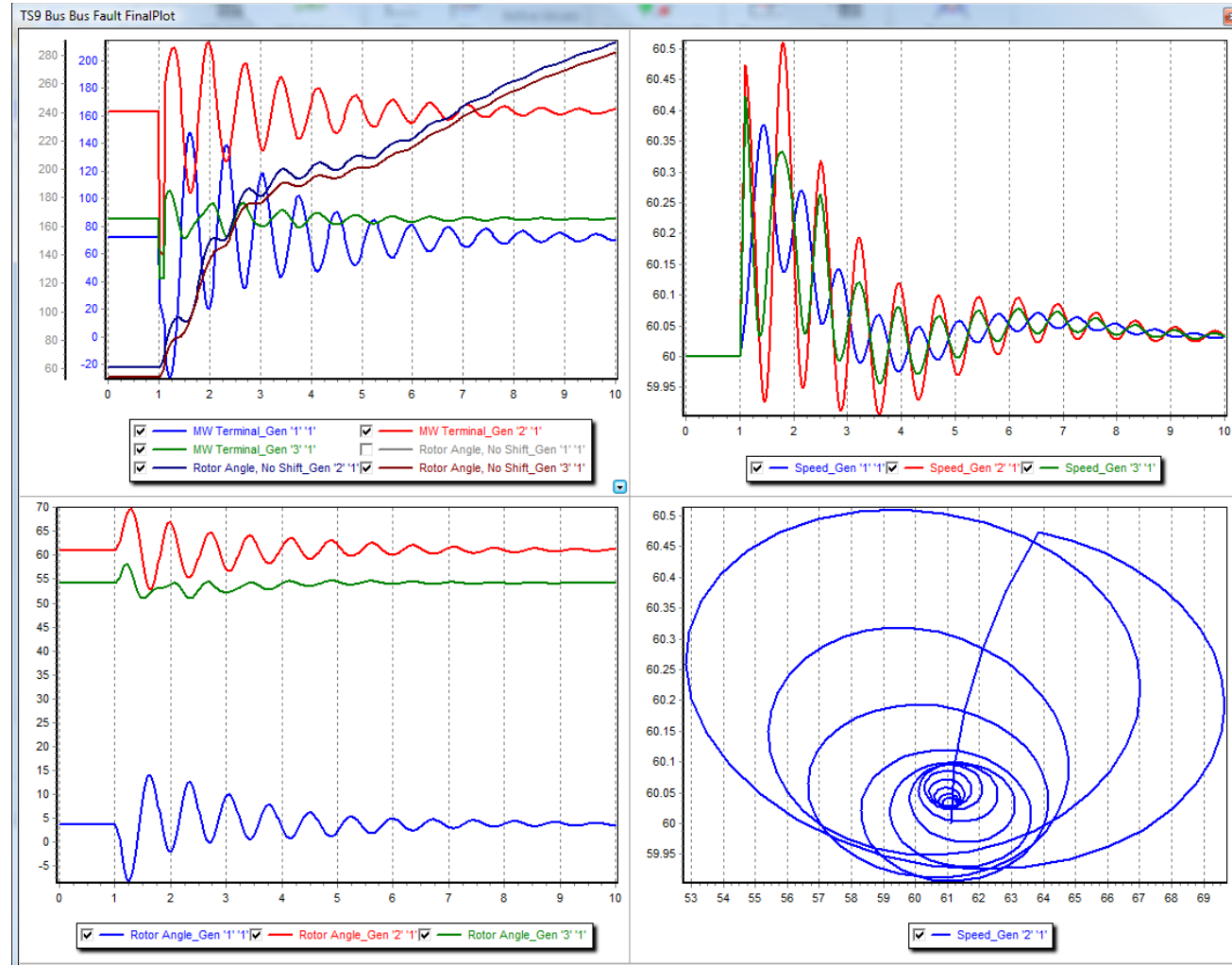
Setup plot of speed vs. rotor angle

Plot Definition Example



- Rerun the simulation
- If desired, save the case as

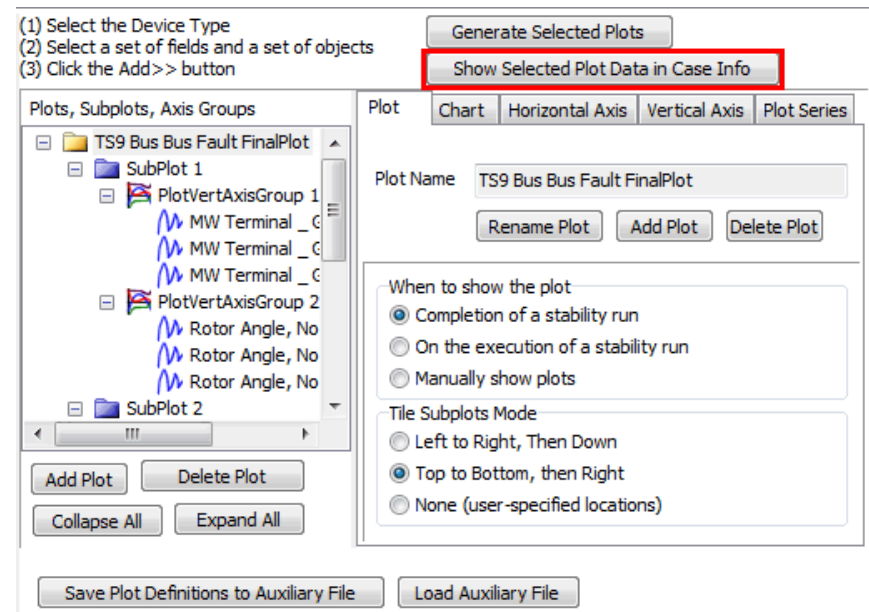
“TS9Bus Bus Fault Final Plot”



Using Plot Definitions to Design a Case Information Display



- Ultimately, the plot definition defines a list of plot series to show on the chart.
- Each plot series specifies a particular field for a particular object
- The time values for these plot series can be displayed
- Click the **Show Selected Plot Data in Case Info** button



Show Selected Plot Data in Case Info



- Columns show the data relevant to the selected plot

Stability Data for Plot: TS9 Bus Bus Fault FinalPlot

Records Geo Set Columns

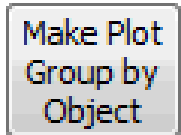
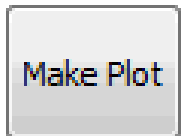
	Time	Gen Bus1 #1 MW Terminal	Gen Bus 2 #1 MW Terminal	Gen Bus 3 #1 MW Terminal	Gen Bus1 #1 Rotor Angle, No Shift	Gen Bus 2 #1 Rotor Angle, No Shift	Gen Bus 3 #1 Rotor Angle, No Shift	Gen Bus1 #1 Rotor Angle	Gen Bus 2 #1 Rotor Angle	Gen Bus 3 #1 Rotor Angle	Gen Bus1 #1 Speed	Gen Bus 2 #1 Speed	Gen Bus 3 #1 Speed	Gen Bus 2 #1 Speed
49	0.96	71.645	163	85	3.586	61.1	54.138	3.586	61.1	54.138	60	60	60	60
50	0.98	71.645	163	85	3.586	61.1	54.138	3.586	61.1	54.138	60	60	60	60
51	1	71.645	163	85	3.586	61.1	54.138	3.586	61.1	54.138	60	60	60	60
52	1	26.764	65.208	43.684	3.586	61.1	54.138	3.586	61.1	54.138	60	60	60	60
53	1.02	24.237	62.82	42.416	3.627	61.43	54.435	3.404	61.207	54.212	60.012	60.093	60.084	60.093
54	1.04	21.266	61.155	41.799	3.754	62.435	55.342	2.852	61.532	54.44	60.024	60.187	60.169	60.187
55	1.06	17.897	60.089	41.745	3.973	64.123	56.868	1.926	62.076	54.821	60.037	60.282	60.255	60.282
56	1.08	14.188	59.513	42.166	4.289	66.499	59.01	0.631	62.841	55.352	60.051	60.378	60.34	60.378
57	1.1	10.201	59.337	42.961	4.709	69.564	61.76	-1.027	63.828	56.023	60.066	60.474	60.423	60.474
58	1.1	1.228	174.186	91.552	4.709	69.564	61.76	-1.027	63.828	56.023	60.066	60.474	60.423	60.474
59	1.12	-6.966	179.859	95.88	5.248	72.934	64.758	-2.79	64.895	56.72	60.085	60.46	60.405	60.46
60	1.14	-14.23	185.345	99.514	5.93	76.183	67.594	-4.364	65.888	57.3	60.106	60.44	60.379	60.44
61	1.16	-20.306	190.536	102.351	6.768	79.275	70.214	-5.71	66.797	57.737	60.128	60.416	60.346	60.416
62	1.18	-24.966	195.327	104.324	7.772	82.176	72.579	-6.796	67.608	58.012	60.152	60.387	60.309	60.387
63	1.2	-28.02	199.618	105.396	8.951	84.854	74.661	-7.596	68.306	58.114	60.176	60.354	60.268	60.354
64	1.22	-29.313	203.302	105.564	10.309	87.28	76.444	-8.094	68.876	58.041	60.201	60.318	60.227	60.318

Close

Create Plot Definitions from Results to Save Grids



- Plot Definitions can be created from “Results to Save” grids
 - Select objects (rows)
 - Select fields (columns)
 - Choose Make Plot
 - Make Plot – everything plotted on same axis group
 - Group by Field – each field on different axis group
 - Group by Object – each object on different axis group
- Open “**TS9 Bus Bus Fault NoPlot**”
- Open the Transient Stability Analysis dialog to the Result Storage page
- Click “Set All to NO for All Types”
- Move the Speed column next to the Rotor Angle Column



Example: Plot Definitions from Results to Save Grids

- Select Speed and Rotor Angle for all generators; three options appear
- Click “Make Plot Group by Field” to put each field type in its own axis group
- Two axis groups are created

Result Storage

Where to Save/Store Results: ☒ Store Results to RAM ☐ Save Results to Hard Drive

Save Results Every n Timesteps: 1

Load from Hard Drive File into RAM results specified by Store to RAM Options

☐ Save the Results stored to RAM in the PWB file

Store to RAM Options Save to Hard Drive Options

Note: All fields that are specified in a plot series of defined plot will also be stored to RAM.

☐ Store Results for Open Devices Set All to NO for All Types Set Save All by Type ...

Generator	Bus	Load	Branch	DC Transmission Line	Multi-Terminal DC Converter	Area	Zone
1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3

From Selection:

Make Plot

Make Plot Group by Field

Make Plot Group by Object

Click Group Plots by Field

Plots, Subplots, Axis Groups

Gen_Rotor Angle,Speed

PlotVertAxisGroup 1

- Rotor Angle _ Gen '1' '1'
- Rotor Angle _ Gen '2' '1'
- Rotor Angle _ Gen '3' '1'

PlotVertAxisGroup 2

- Speed _ Gen '1' '1'
- Speed _ Gen '2' '1'
- Speed _ Gen '3' '1'

Add new plots here

Add objects/field combination

Add Plot Delete Plot

Collapse All Expand All

- Save the Results stored to RAM in the PWB file

Store to RAM Options | **Save to Hard Drive Options**

Note: All fields that are specified in a plot series of defined plot will also be stored to RAM.

☒ Store Results for Open Devices | **Set All to NO for All Types** | Set Save All by Type ...

Generator | Bus | Load | Branch | DC Transmission Line | Multi-Terminal DC Converter | Area

Set All NO | | | | | | | | | Records ▾ | Geo ▾ | Set ▾ | Columns ▾

From Selection:	Numt of Bu	Name of Bus	ID	Area Name of Gen	Save All	Rotor Angle	Speed	Rotor Angle, No Shift
1	1	Bus 1	1	1	NO	NO	NO	NO
2	2	Bus 2	1	1	NO	NO	NO	NO
3	3	Bus 3	1	1	NO	NO	NO	NO

Make Plot | **Make Plot Group by Field** | **Make Plot Group by Object**

Click to Group Plots by Object

Plot Definition Grids



- Plot Definition Grids Tab appears next to Plot Designer Tab on Plots Page
- Plot Definition Grids show case information displays which provide a summary of various components comprising a plot
- Can create plots with Plot Designer and modify them using Plot Definition Grids
- Full functionality of case information displays is available
- The Plot Definition Grids provide the format for storing plot definitions in auxiliary files
- Auxiliary files of plot definitions can be saved from here

Plot Definition Grids



- Plot definition grids are case information displays which provide access to all plot elements
 - Plots
 - Sub Plots
 - Axis Groups
 - Plot Series Tab
- Same information as Plot Designer, just displayed in a grid format

Plot Definition Grids

On
Plots
Page

Plot Series Tab

	Plot	Subplot	Axis Group	Object	Variable	Style	Visible	Color	Thickness	Dashed	Stairs	Symbol Every	Symbol	Width	Height
1	Gen_Rotor Angle,Speed	1	1 Gen '1' '1'		TSGenDelta	Line	YES	Blue	1	Solid	No	0	Diamond	5	5
2	Gen_Rotor Angle,Speed	1	1 Gen '1' '1'		TSGenW	Line	YES	Blue	1	Solid	No	0	Diamond	5	5
3	Gen_Rotor Angle,Speed	1	2 Gen '2' '1'		TSGenDelta	Line	YES	Green	1	Solid	No	0	Diamond	5	5
4	Gen_Rotor Angle,Speed	1	2 Gen '2' '1'		TSGenW	Line	YES	Green	1	Solid	No	0	Diamond	5	5
5	Gen_Rotor Angle,Speed	1	3 Gen '3' '1'		TSGenDelta	Line	YES	Blue	1	Solid	No	0	Diamond	5	5
6	Gen_Rotor Angle,Speed	1	3 Gen '3' '1'		TSGenW	Line	YES	Blue	1	Solid	No	0	Diamond	5	5

Save Plot Definitions to Auxiliary File Load Auxiliary File