



An efficient way to create split Axis in Graph

Ryan Feng, Novartis

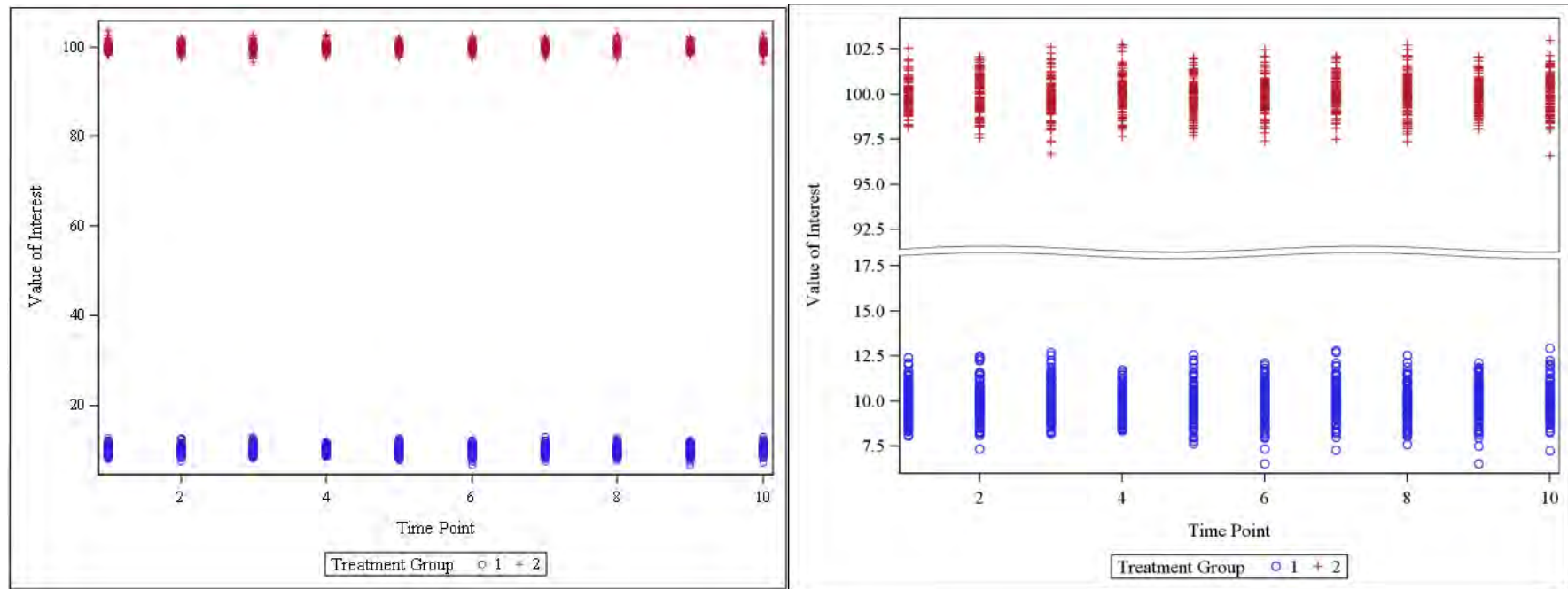
PharmaSUG China 2016

Background

- ▶ Data is extremely distributed, axis ‘cut off’ could do a better job presenting data;
- ▶ The data is sparse, then you might want to remove portion of the plot which is of little interest.



Case 1



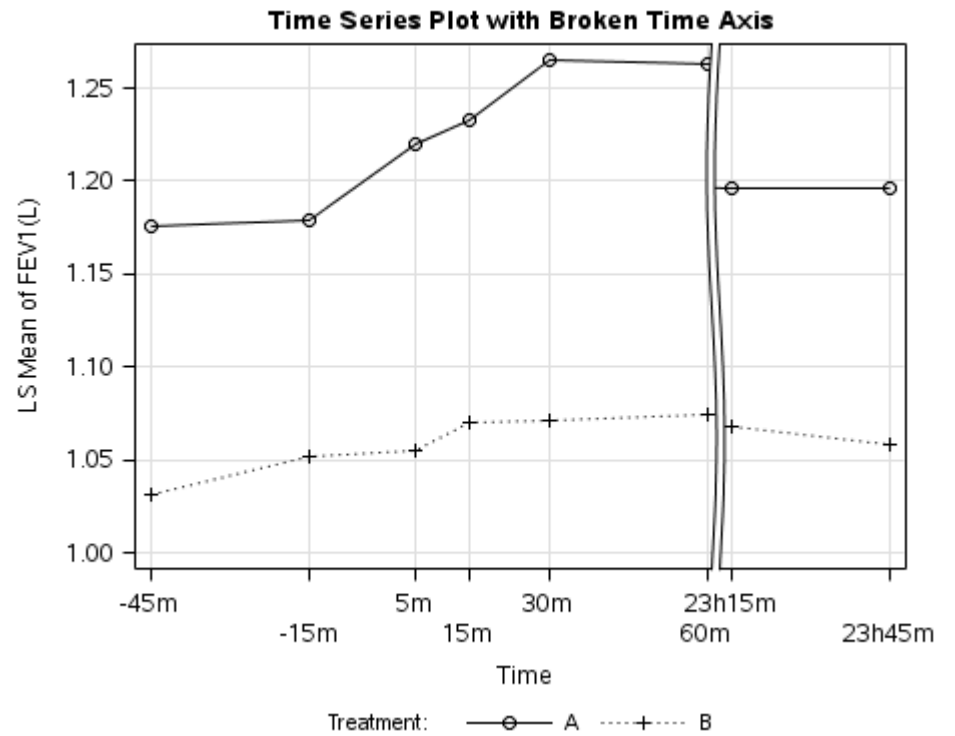
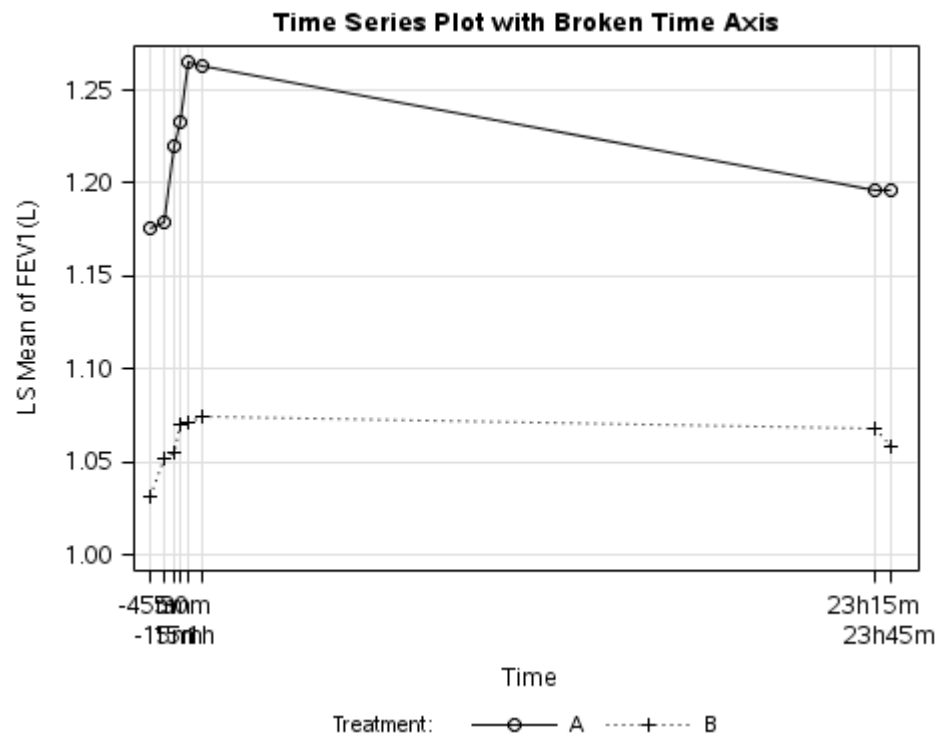
Cited from the reference paper

Case 2

- ▶ Some parameter has been collected at timepoint -45min, -15min, 5min, 15min, 30min, 1h, **23h15min and 23h45min**. And the x axis need to be displayed in a linear trend.

Timepoint	Numeric Value
-45min	-45
-15min	-15
5min	5
15min	15
30min	30
1h	60
23h15min	1395
23h45min	1425

Case 2



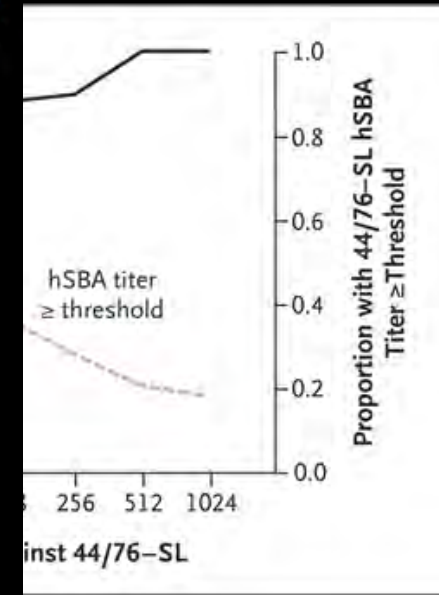
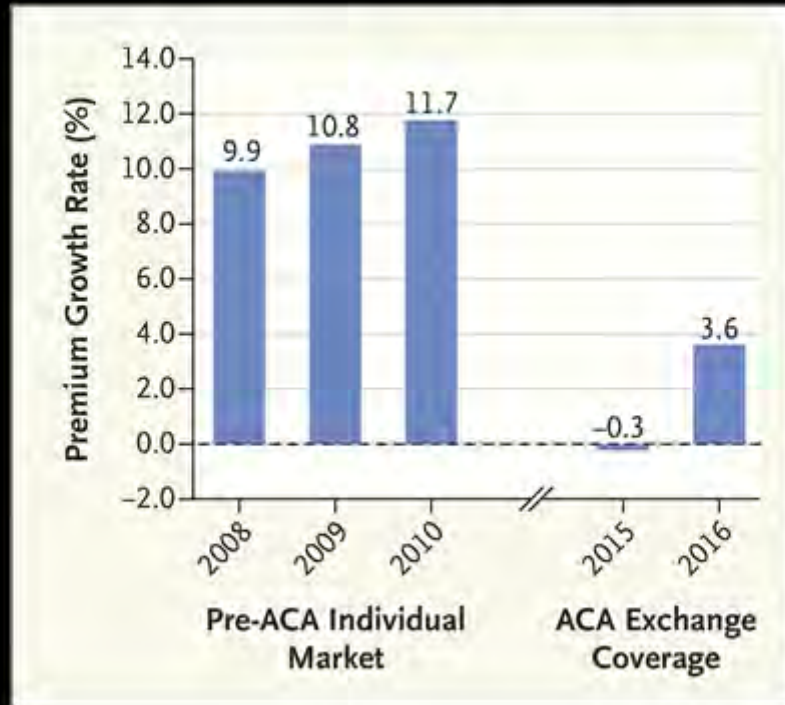
Split axis Graphs

C Diastolic Blood Pressure
P<0.001

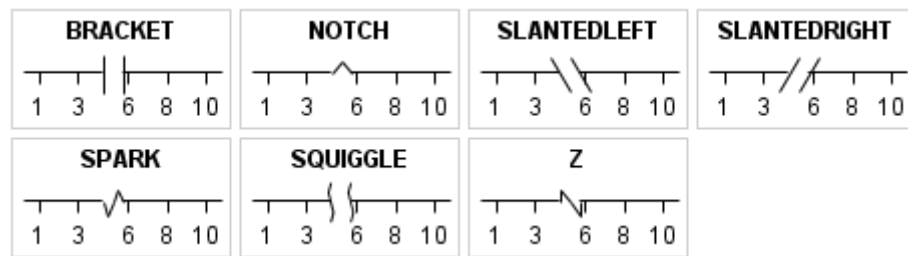
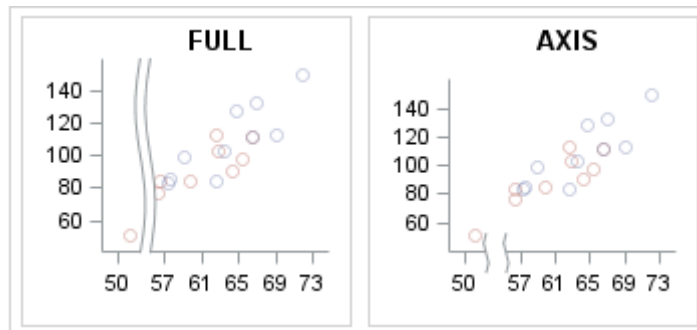
Positive Predictive Value for hSBA Immunity against the Outbreak Strain, According to the 44/76-SL Antibody Titer.

Premium Growth for Individual Health Insurance before and after the Affordable Care Act.

Diastolic Blood Pressure (mm Hg)



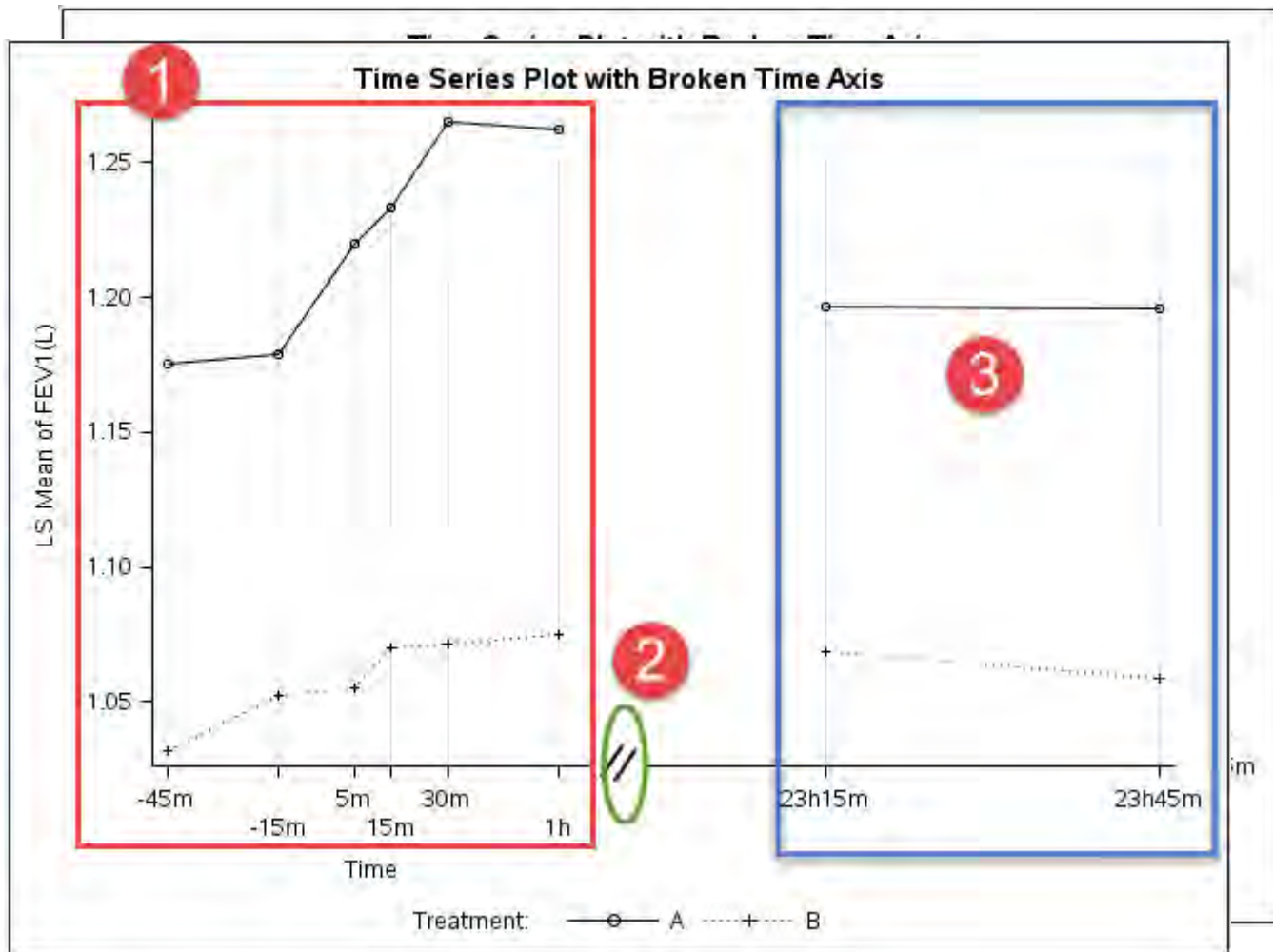
Split symbols and types in SAS



How to do that?

Annotation	RANGE Sin SGPLOT	INCLUDERANGES in LINEAROPTS	AXISBREAKSYMBOL AXISBREAKTYPE
	RANGES SAS 9.4 M2	SAS 9.4 M1	SAS 9.4 M3
	Axis break symbols SAS 9.4 M3		
		Axis break types(full)	Axis break types(full or axis)
The annotation can be used in any kind of data	Only applicable to linear or time type data.		

Method 1



Method 1

- ▶ Step 1. Define three parts of the graph.

```
layout lattice / columns=3 columnweights=(.48 .04 .48) rowdatarange=union;
```

- ▶ Step 2. Create the individual parts.

```
layout overlay / walldisplay=(fill)
    yaxisopts=(type=linear display=(line ticks tickvalues label) label='LS Mean of FEV1(L)'
    )
    1 xaxisopts=(griddisplay=on display=(line ticks tickvalues label) type=linear label='Time'
        linearopts=(viewmax=65
            tickvaluelist=(-45 -15 5 15 30 60 )
            tickdisplaylist=(' -45m' '-15m' '5m' '15m' '30m' '1h')
            tickvaluefitpolicy=stagger)) ;
    seriesplot x=time y=y1 / group=trt01pn display=(markers) markerattrs=(color=black) lineattrs=(color=black)
endlayout;
```

Method 1

```
layout overlay;  
  drawtext textattrs=(size=20pt) "/" / x=50 y=21 rotate=-15  
  drawspace=GRAPHPercent justify=right border=false TRANSPARENCY=0;  
endlayout;
```

2

```
layout overlay / walldisplay=(fill)  
  yaxisopts=(display=none)  
  xaxisopts=(griddisplay=on display=(line ticks tickvalues ) type=linear  
    linearopts=(viewmin=1380 viewmax=1425  
      tickvaluelist=( 1395 1425)  
      tickdisplaylist=( '23h15m' '23h45m')  
    )) ;  
  seriesplot x=time y=y2 / group=trt01pn display=(markers) markerattrs=(color=black) lineattrs=(color=black)  
endlayout;
```

3

Method 1

```
proc template;
  define statgraph BrokenTimeAxis1;
    beginnograph /attrpriority=none
      datalinepatterns=(solid dot);
    entrytitle 'Time Series Plot with Broken Time Axis';
    layout lattice / columns=3 columnweights=(.48 .04 .48) rowdatarange=union;
    layout overlay / walldisplay=(fill)
      yaxisopts=(type=linear display=(line ticks tickvalues label) label='LS Mean of FEV1(L)'
        )
      xaxisopts=(griddisplay=on display=(line ticks tickvalues label) type=linear label='Time'
        linearopts=(viewmax=65
          tickvaluelist=(-45 -15 5 15 30 60 )
          tickdisplaylist=(-'45m' '-15m' '5m' '15m' '30m' '1h')
          tickvaluefitpolicy=stagger) );
    seriesplot x=time y=y1 / group=trt01pn display=(markers) markerattrs=(color=black) lineattrs=(color=black)
    endlayout;
    layout overlay;
    drawtext textattrs=(size=20pt) "/" / x=50 y=21 rotate=-15
      drawspace=GRAPHPercent justify=right border=false TRANSPARENCY=0;
    endlayout;
    layout overlay / walldisplay=(fill)
      yaxisopts=(display=none)
      xaxisopts=(griddisplay=on display=(line ticks tickvalues ) type=linear
        linearopts=(viewmin=1380 viewmax=1425
          tickvaluelist=( 1395 1425)
          tickdisplaylist=( '23h15m' '23h45m')
          ));
    seriesplot x=time y=y2 / group=trt01pn display=(markers) markerattrs=(color=black) lineattrs=(color=black)
    endlayout;
    sidebar/ align=bottom ;
    discretelegend 'trt' / title='Treatment:' border=off ;
    endsidebar;
  endlayout;
endnograph;
end;
run;
```

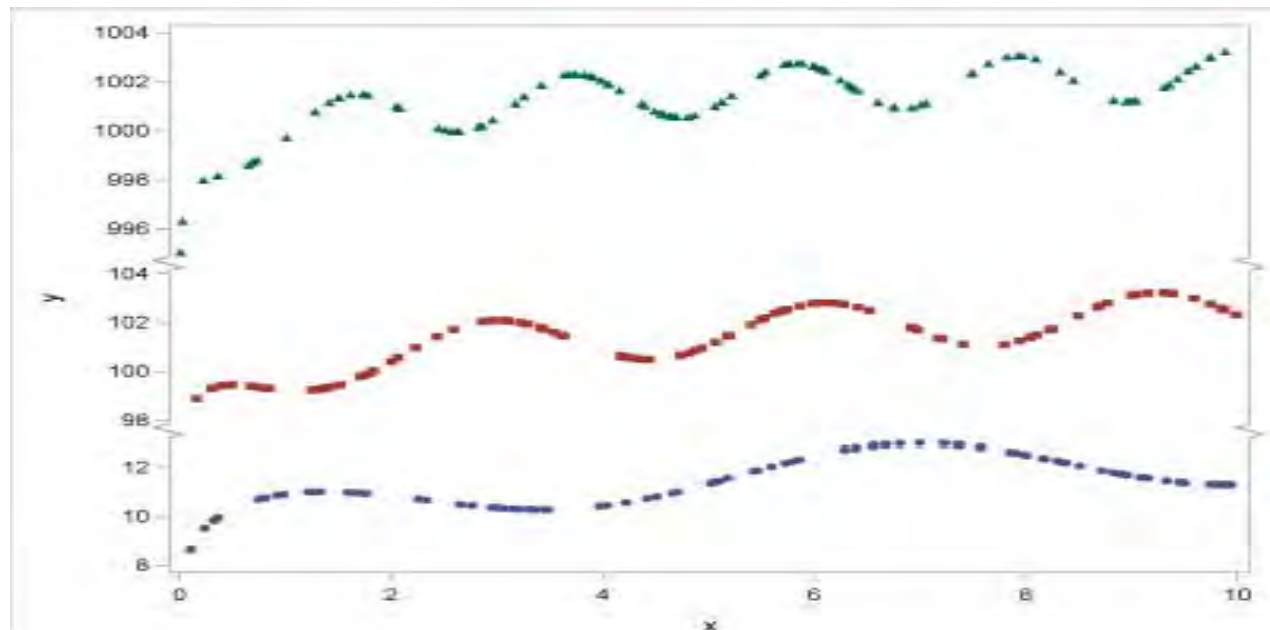
Method 2

- ▶ X|X2|Y|Y2 Statement <option(s)>;
 - ❑ RANGES=(start-end <start2-end2 startN-endN ...>)
specifies the ranges for a broken axis.

- ▶ STYLEATTRS Statement<option(s)>;
 - ❑ AXISBREAK=BRACKET | NOTCH | SLANTEDLEFT | SLANTEDRIGHT | SQUIGGLE | SPARK | Z
specifies a symbol to use on the axis lines to indicate a break in the axis.

Method 2

```
Proc sgplot data=x noautolegend;  
  styleattrs datasymbols=(circlefilled squarefilled trianglefilled)  
  axisbreak=spark;  
  scatter y=y x=x / group=g markerattrs=(size=5px);  
  yaxis ranges=(8-13 98-104 995-1004);  
run;
```



Method 3

Options in GTL

- ▶ `BEGINGRAPH </option(s)>;`
 - ❑ `AXISBREAKSYMBOL=BRACKET | NOTCH | SLANTEDLEFT | SLANTEDRIGHT | SQUIGGLE | SPARK | Z`

specifies a symbol to use on the axis lines to indicate a break in the axis.

- ❑ `AXISBREAKTYPE=FULL | AXIS`

specifies whether the axis break is indicated in the full display or only on the axis line.

- ▶ `LINEAROPTS (options)`
 - ❑ `INCLUDERANGES=(start-end <start2-end2 startN-endN ...>)`
- specifies the ranges for a broken axis.



Method 3

Code

```
proc template;
define statgraph sgplot;
begingraph / axisbreaksymbol=slantedright axisbreaktype=axis;
layout overlay / xaxisopts=( Label="time" labelFitPolicy=Split type=discrete discreteopts=( TickValueFitPolicy=SplitRotate )
yaxisopts=( Label="Y" type=linear
display=(line ticks tickvalues)
linearopts=( includeRanges=(-10-30 1920-2300 )) griddisplay=on );
```

References

- ▶ Advanced ODS Graphics Examples
- ▶ Breaking up (Axes) Isn't Hard to Do: A Macro for Choosing Axis Breaks
- ▶ <http://support.sas.com/documentation/cdl/en/grsttatproc/67909/HTML/default/viewer.htm#p07m2vpyq75fgan14m6g5pphnwlr.htm>
- ▶ <http://support.sas.com/documentation/cdl/en/grsttatgraph/67882/HTML/default/viewer.htm#n0j696v6yqkb79n12zed3am3omcx.htm>

THANKS!



Questions?



Name: Ryan

Organization: Novartis

Address: Zhangjiang, Pudong new area

City, State ZIP: Shanghai China

Work Phone: 021-61606768

E-mail: ryan.feng@novartis.com

