

# BIOMETRICS INFORMATION

(You're 95% likely to need this information)

PAMPHLET NO. # 42

DATE: October 13, 1992

SUBJECT: Labelling Curves in SAS/GRAPH

It is important that multiple curves on a graph be easily identified. This pamphlet describes two methods to plot multiple curves and four different ways to label the curves using SAS/GRAPH.

To illustrate the methods, let's consider a plot of power versus NC as shown in Figure 1.

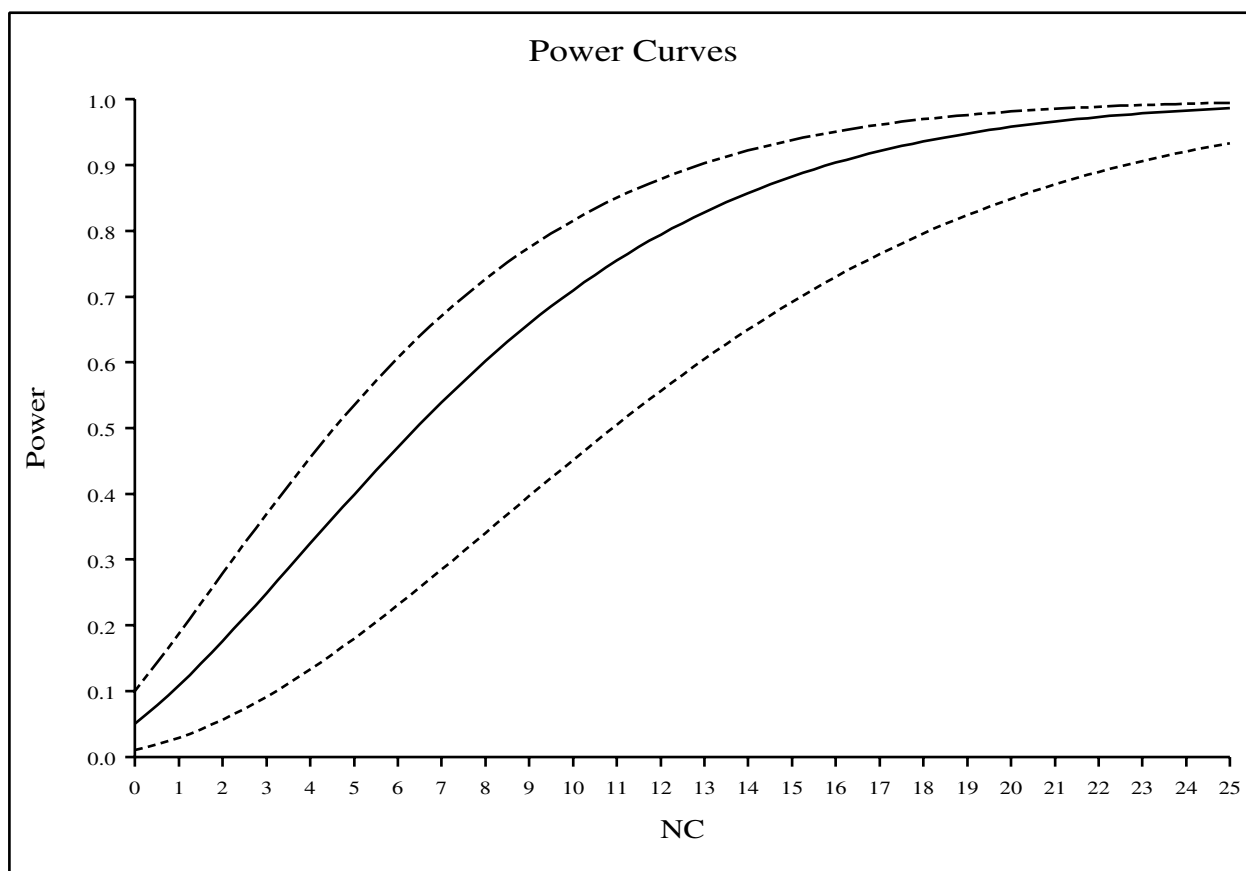


FIGURE 1: Power curves plot with OVERLAY option.

The three curves correspond to  $\alpha$ -levels: 0.01, 0.05, and 0.10 and need to be labelled. Figure 1 is generated from SAS/GRAPH using the OVERLAY option of the PLOT statement:

```
PROC GPLOT;  
  PLOT (POWER1 POWER2 POWER3) * NC / OVERLAY;  
RUN;
```

where POWER1, POWER2, and POWER3 are the y-values of the three curves.

Another way to plot multiple curves is to plot them by a third variable. If we combine the three power variables into one variable called POWER, and create a new variable ALPHA to identify the  $\alpha$ -level of each POWER value, then we can plot POWER against NC according the ALPHA. The following SAS codes produces Figure 2 below:

```
PROC GPLOT;
  PLOT POWER * NC = ALPHA;
RUN;
```

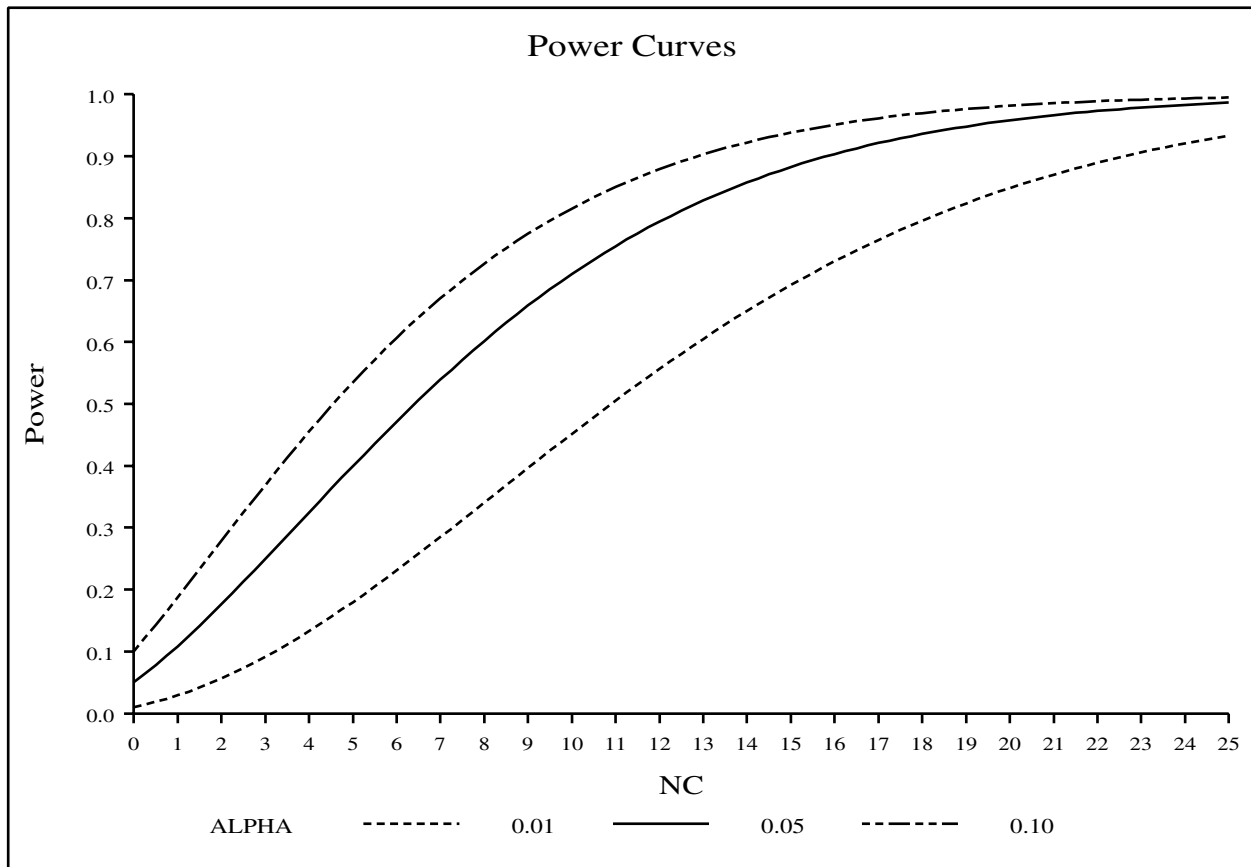


FIGURE 2: Power curves plot by ALPHA with default legend.

This plotting method automatically creates a legend at the bottom of the graph but the legend is not very attractive. Its appearance can be improved by specifying a LEGEND statement:

```
LEGEND1 ACROSS=2 SHAPE=LINE(0.5IN) FRAME;
PROC GPLOT;
  PLOT POWER * NC = ALPHA / LEGEND = LEGEND1;
RUN;
```

The resulting plot is shown in Figure 3.

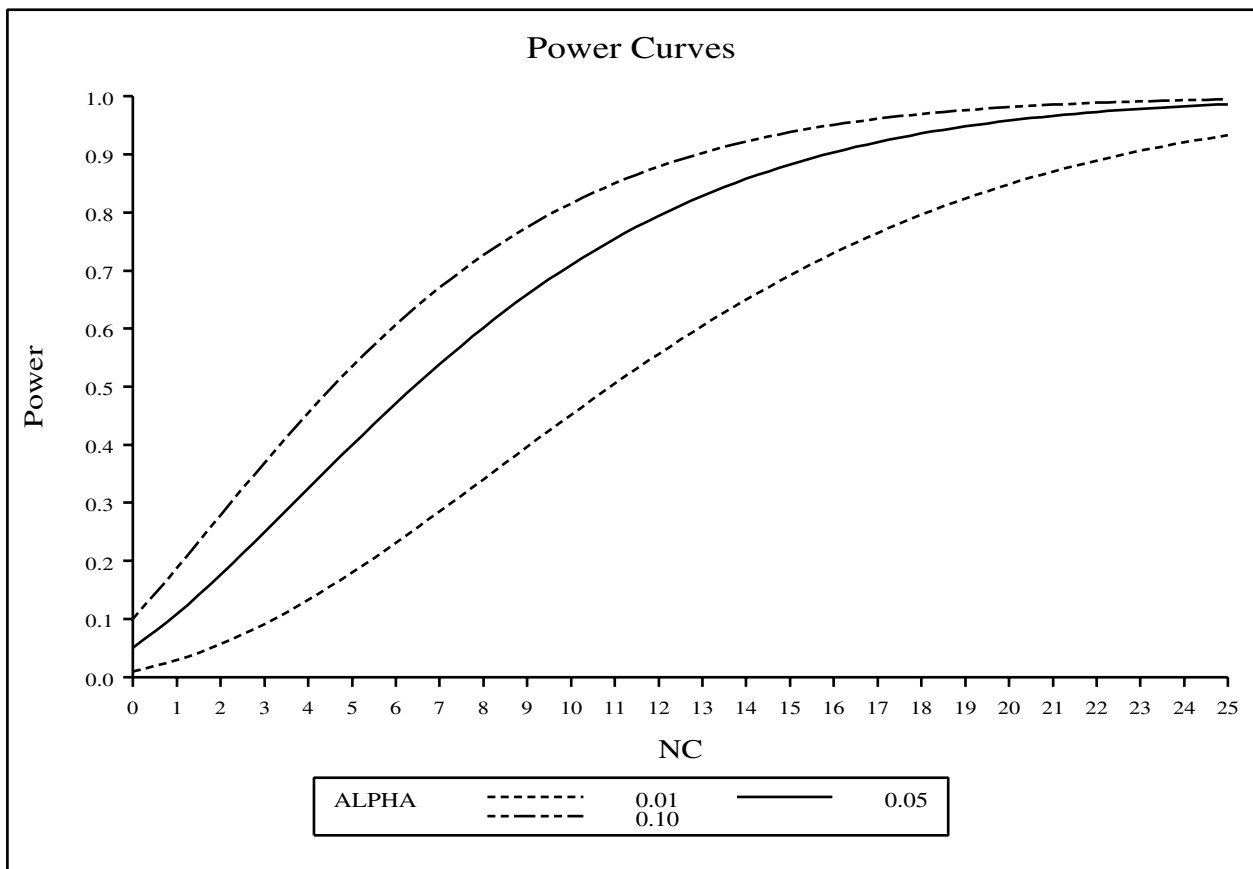


FIGURE 3: Power curves plot with user defined legend.

The LEGEND statement is only suitable for plots with default legends, as in the previous example. Also, this legend is always located at the bottom of the graph.

Instead of creating a legend, we can label the curves directly with the TITLE statement. A title can be placed anywhere in a plot at any angle with the M = and A = options. The following SAS program generates Figure 4 on the next page.

```
TITLEH=1.5  LS=1  FONT=NONE  'Power Curves'
      H=1.0  M=(24,31)  A=39.5  F=GREEK 'A = 0.10'
      M=(25.5,28.0)  A=39.5  F=GREEK 'A = 0.05'
      M=(29.0,22.0)  A=39.5  F=GREEK 'A = 0.10';
PROC Gplot;
  PLOT  POWER * NC = ALPHA / NOLEGEND;
RUN;
```

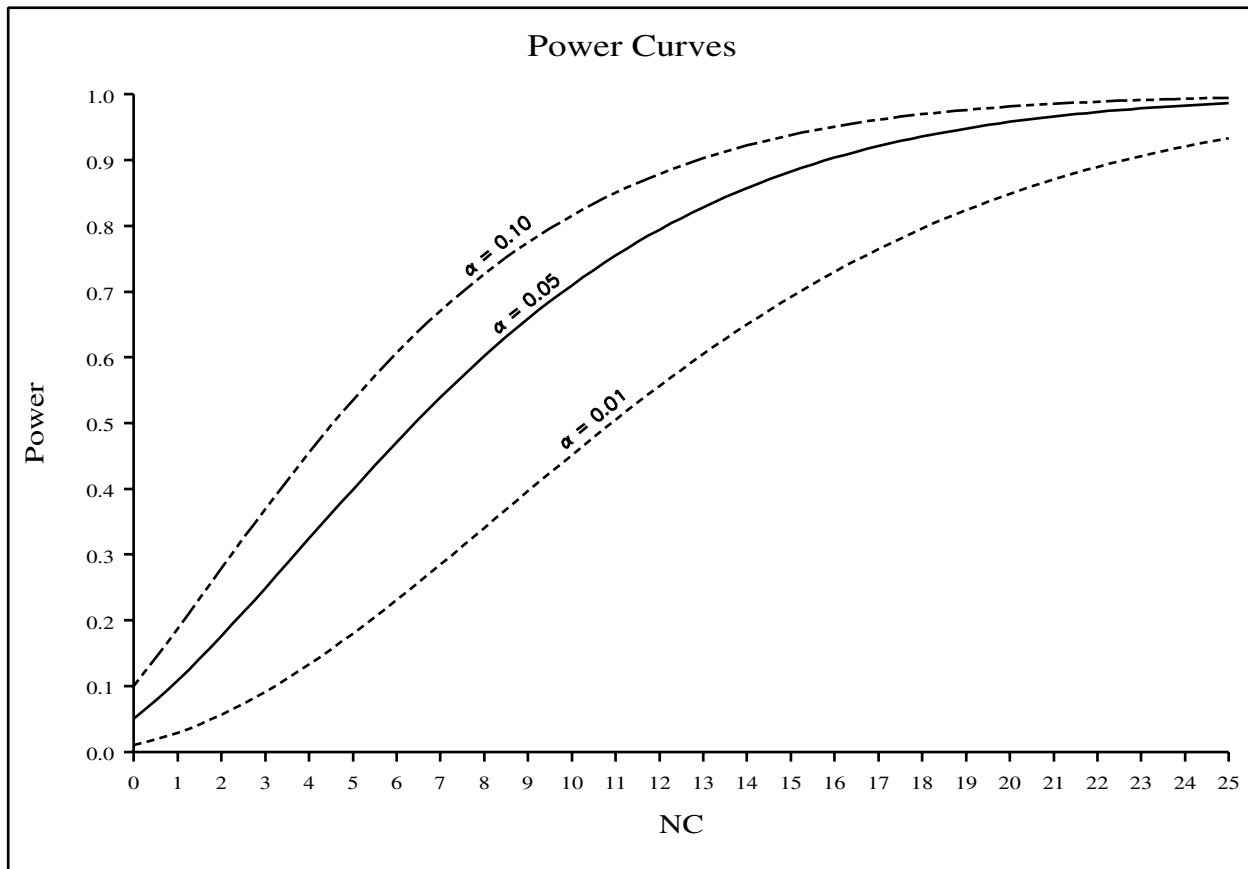


FIGURE 4: Power curves plot with labels using the TITLE statement.

This method of labelling can be quite time consuming since you must measure the location and the angle of each label precisely in order to get good results. It is not appropriate if the curves are too close together.

Lastly, an annotated data set can be created to specify exactly how you want SAS to make the legend. The SAS program below creates an annotated data set for printing a legend on the lower right corner of the graph. The resulting graph is shown in Figure 5.

```

DATA ANNOTE;
  LENGTH FUNCTION $8;
  X=47; Y=23; FUNCTION='MOVE' ; OUTPUT;
  X=60; Y=23; FUNCTION='DRAW'; OUTPUT;
  X=60; Y=12; FUNCTION='DRAW'; output;
  X=47; Y=12; FUNCTION='DRAW'; output;
  X=47; Y=23; FUNCTION='DRAW'; output;
  X=51; Y=21; FUNCTION='LABEL'; H=1.3; TEXT='ALPHA: ';
  OUTPUT;
  X=57; Y=19; FUNCTION='LABEL'; TEXT='0.01'; OUTPUT;
  X=57; Y=17; FUNCTION='LABEL'; TEXT='0.05'; OUTPUT;
  X=57; Y=15; FUNCTION='LABEL'; TEXT='0.10'; OUTPUT;
  X=49; Y=19; FUNCTION='MOVE'; OUTPUT;
  X=54; Y=19; FUNCTION='DRAW'; LINE=2; OUTPUT;
  X=49; Y=17; FUNCTION='MOVE'; OUTPUT;
  X=54; Y=17; FUNCTION='DRAW'; LINE=1 ; OUTPUT;
  X=49; Y=15; FUNCTION='MOVE'; OUTPUT;
  X=54; Y=15; FUNCTION='DRAW'; LINE=14; OUTPUT;
PROC Gplot ANNO=ANNOTE;
  PLOT POWER*NC = ALPHA / NOLEGEND;
RUN;

```

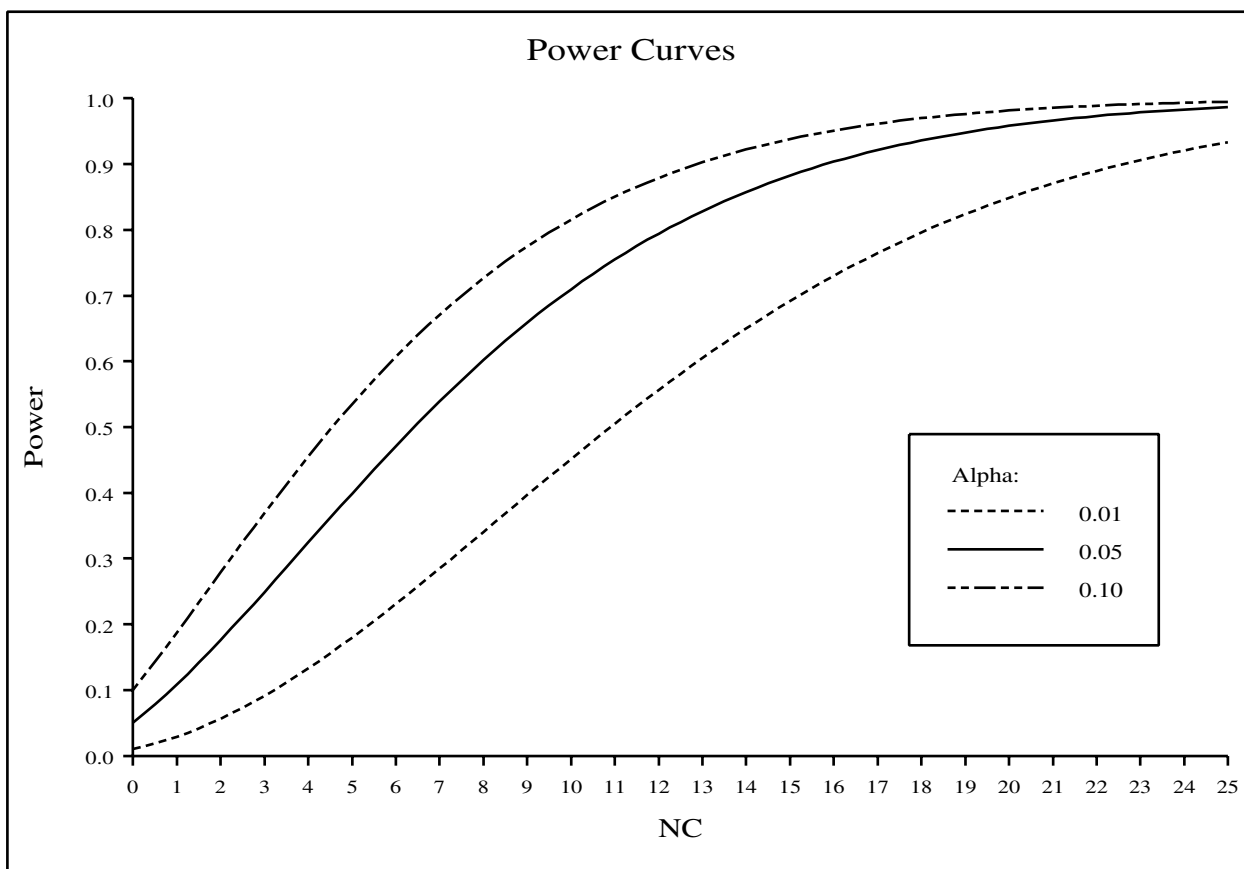


FIGURE 5: Power curves plot with annotated legend.

This method of labelling is also time consuming because every command for creating the legend must be specified in full. It is very versatile as the legend can be placed anywhere on a plot in any style.

All four labelling methods are readily available in SAS. The choice of the method depends on the appearance of the output you prefer.

## References

Sit, V. (1992). *Introduction to SAS/GRAPH*. Min. For., Res. Br., Victoria, B.C.

SAS Institute Inc. (1988). *SAS/GRAPH User's Guide*. Release 6.03 edition. SAS Institute Inc., Cary, N.C.

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