

PRESENTING DATA



Scope

- Types of Data
- Presenting Qualitative Information
- Presenting numbers
 - tables
 - charts
- Chart Design
- Chart Design Tips

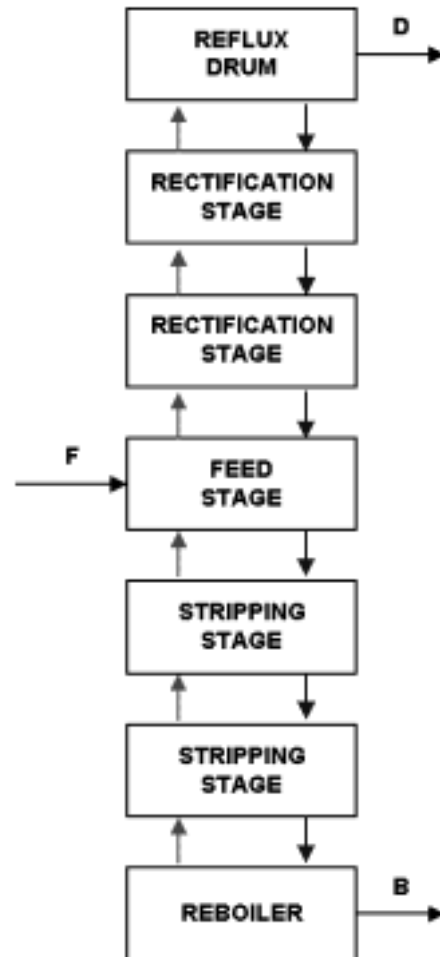


Types of data

- Qualitative
 - descriptions
 - procedures
 - hierarchies
 - logic
 - cause-and-effect
- Numerical
 - nominal or categorical
 - ordinal
 - integers or countables
 - real and complex numbers



Descriptive Schematic

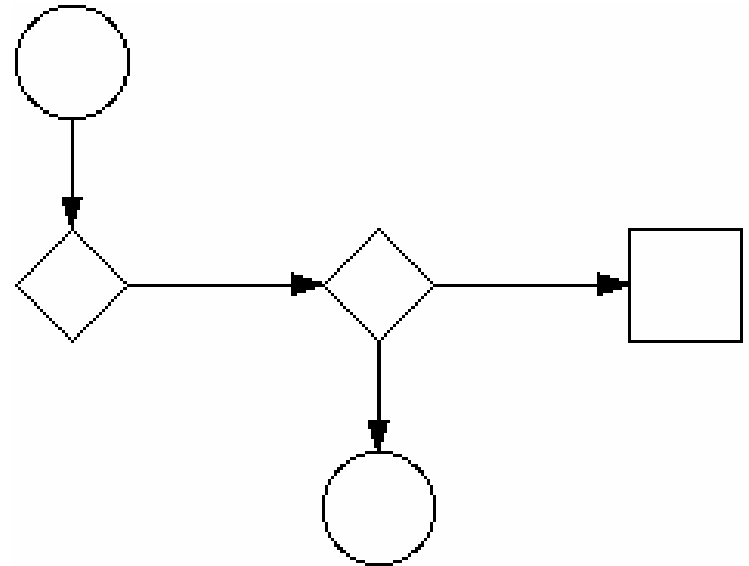


Flowchart of Procedure and Logic



Flow charts

- The flowchart lists the order of activities
- Helps identify the flow or sequence of events or information a process
- The circle symbol indicates the beginning or end of the process.
- The box indicates action items
- The diamond indicates decision points



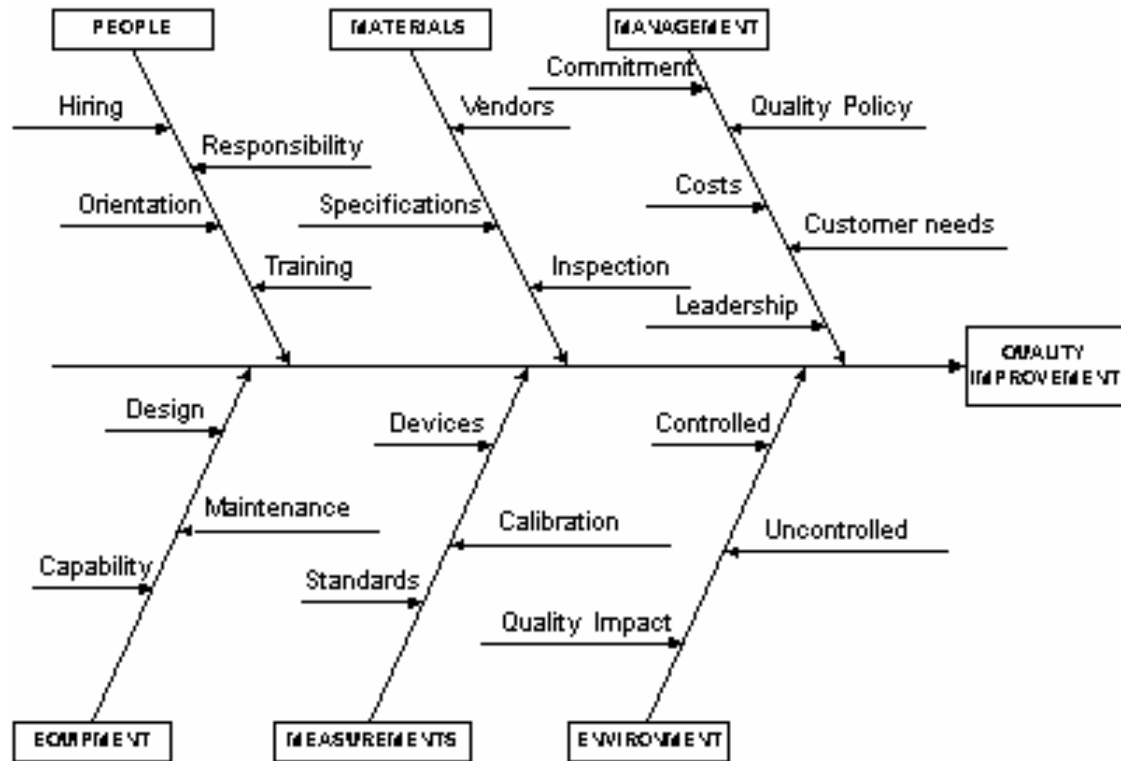
Cause-and-Effect Diagrams

- Also called the
 - “fishbone chart” because of its appearance
 - “Ishikawa chart” after the man who popularised its use in Japan.
- Used to
 - identify, explore, and display graphically, in increasing detail, all of the possible causes related to a problem or condition
 - discover or determine root cause(s) of particular problems

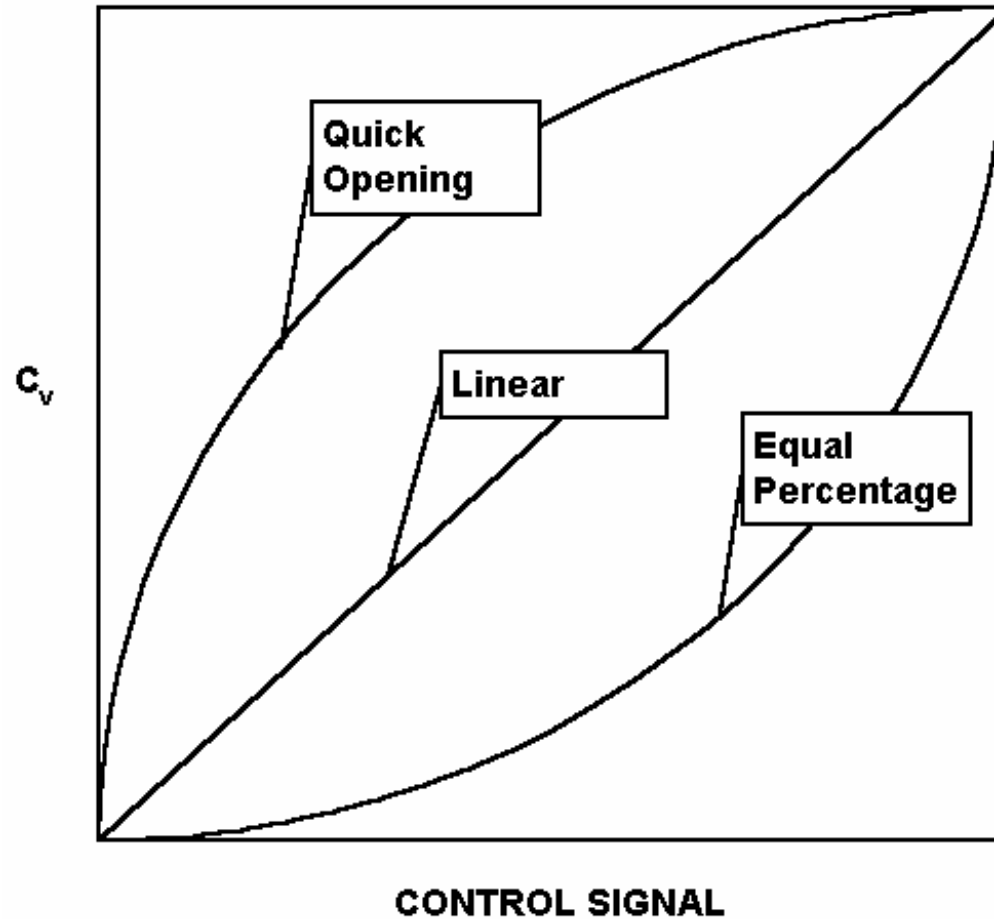


Cause-and-Effect Diagrams

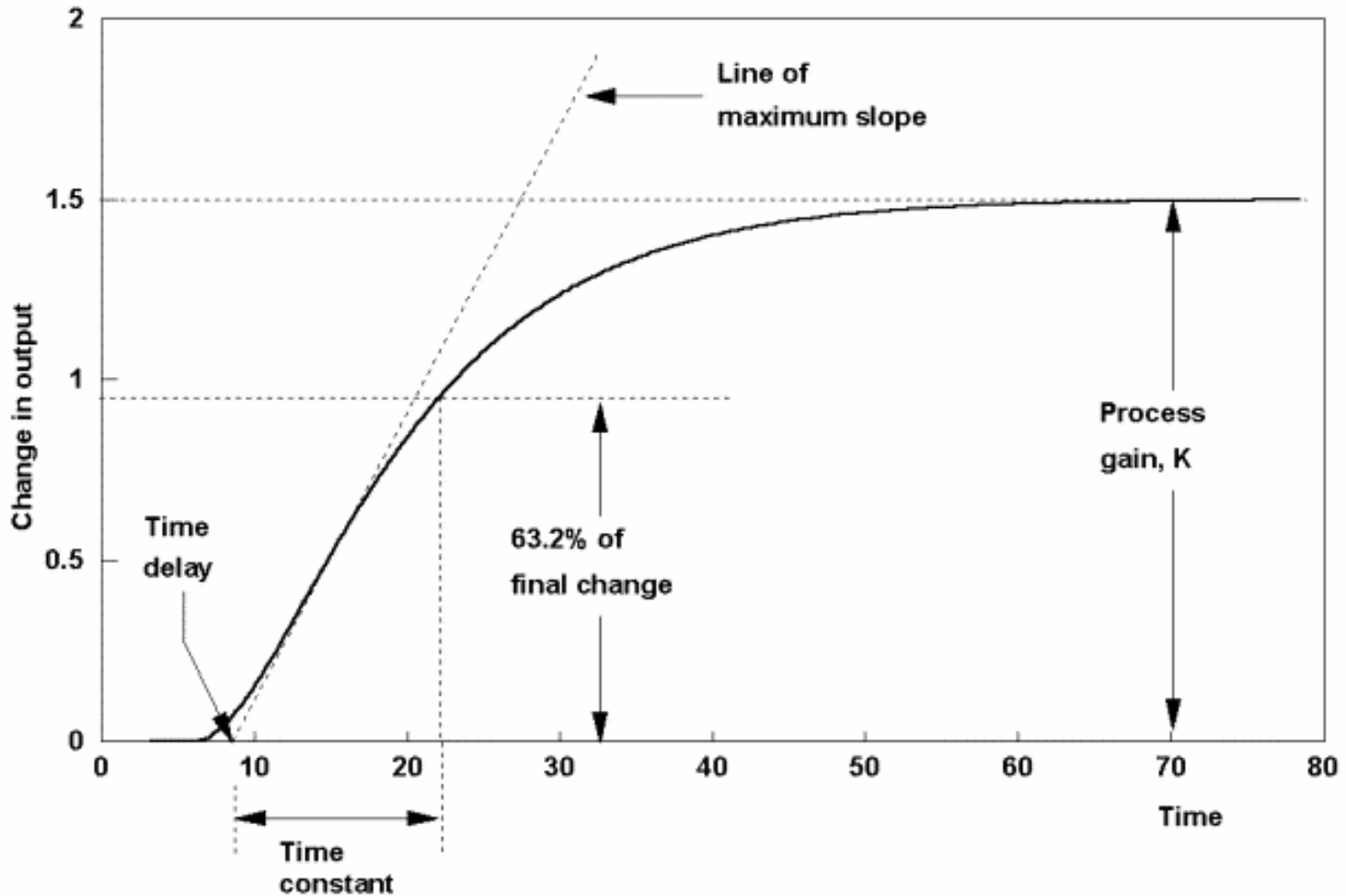
- The lines coming off the central horizontal line are the main causes
- The lines coming off those are sub causes.



Illustrative Description (scale not important)

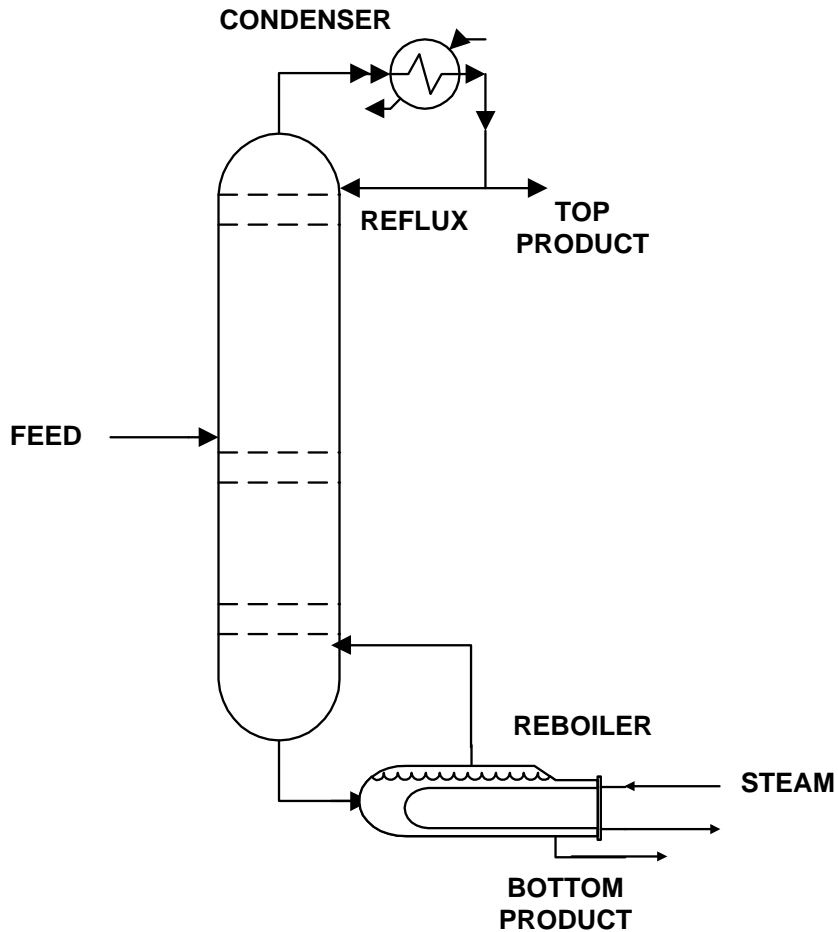


Illustrative Description (scale matters)

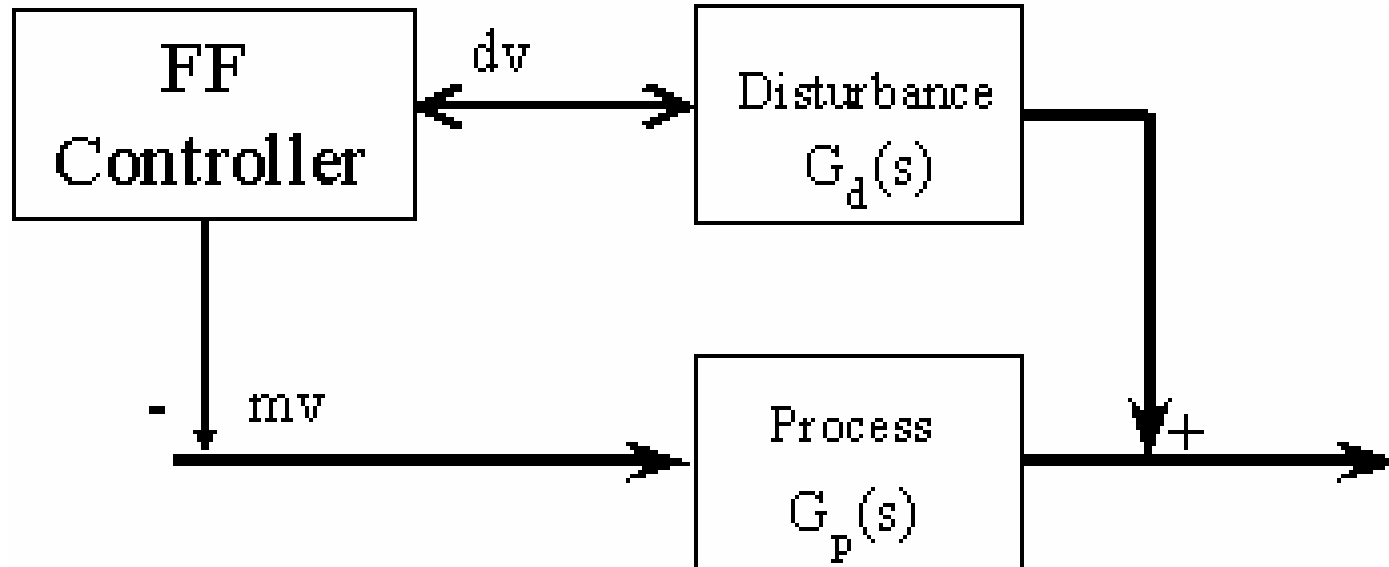


Illustrative Schematic

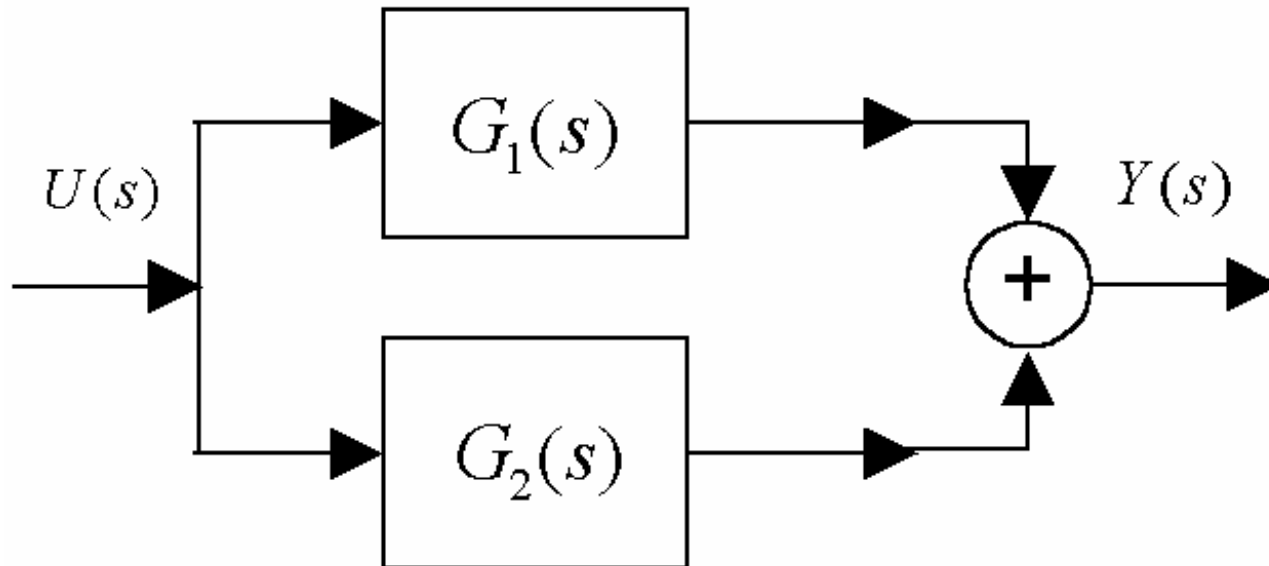
- Labelling must be clear



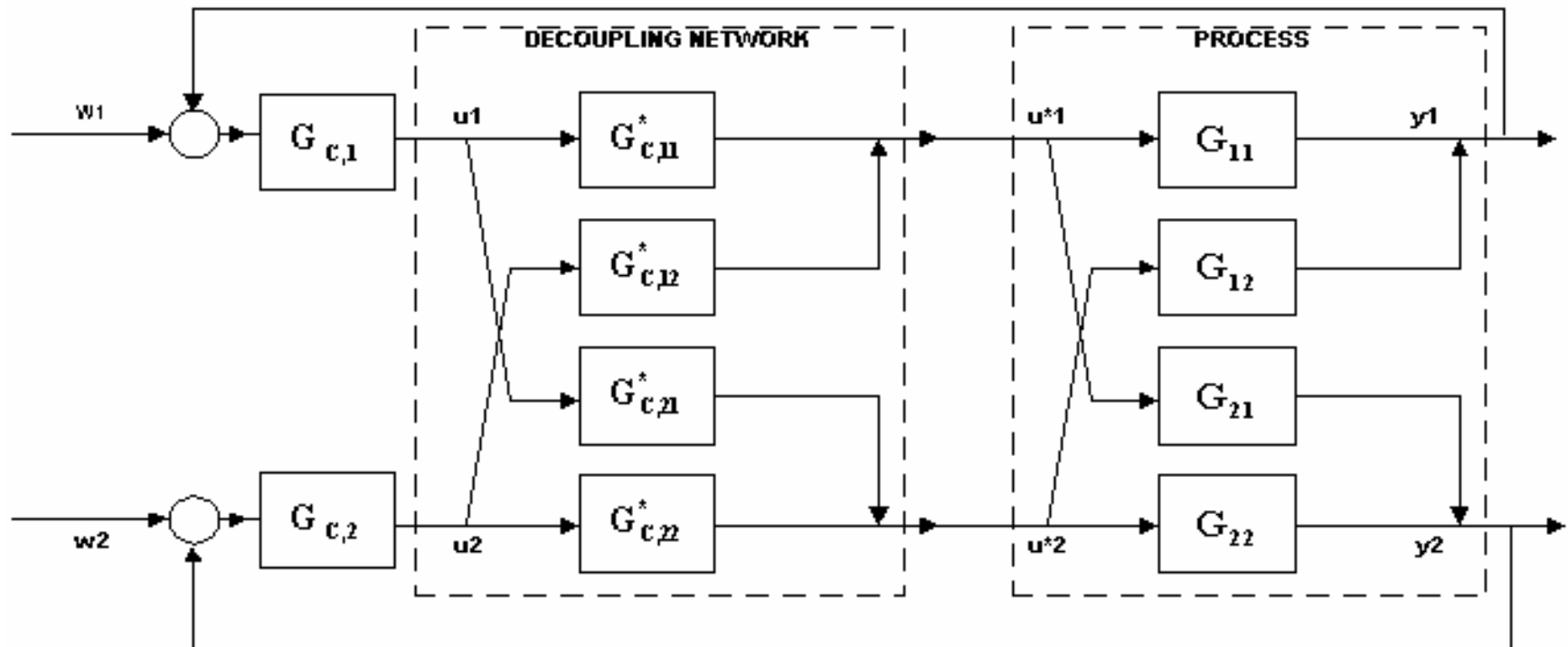
Poor Labelling



Better Labelling



Incorporate more Information



Presenting Numbers

- Do you need to show actual data values?
- Use tables if
 - trend is not important
 - number of values are small
- When using tables
 - line numbers up neatly and consistently
 - left-justify alphanumeric data
 - always include text labels and units to show what the numbers mean
 - use consistent units and scale factors
 - use consistent number of significant figures or decimal places
 - may use soft colours areas to highlight



Use of Tables to Present Associations

- Highlight headers

Loop Type	PB(%)	I (mins)	D (mins)
Liquid level	< 100	10	-
Temperature	20 - 60	2 - 15	I/4
Flow	150	0.1	-
Liquid Pressure ⁽¹⁾	50 - 500	0.005 - 0.5	-
Gas Pressure ⁽¹⁾	1- 50	0.1 - 50	0.02 - 0.1
Chromatograph ⁽¹⁾	100 - 2000	10 - 120	0.1 - 20



Use of Tables to Compare Values

- Use same number of significant figures
- Highlight
 - headers
 - key values

Correlation between input variables and product quality C_0						
Variable	$z_{i1}z_{k1}\lambda_1$	$z_{i2}z_{k2}\lambda_2$	$z_{i3}z_{k3}\lambda_3$	$z_{i4}z_{k4}\lambda_4$	$z_{i5}z_{k5}\lambda_5$	$z_{i6}z_{k6}\lambda_6$
A_{in}	-0.154	-0.060	0.003	0.178	0.079	-0.003
B_{in}	0.063	0.100	0.004	0.072	0.075	≈ 0
T_{in}	0.327	0.002	-0.023	0.005	0.041	0.010
T_{jm}	0.680	-0.006	0.013	0.056	-0.075	0.004
F	0.300	0.033	-0.013	0.052	-0.093	-0.016
F_j	0.445	0.020	-0.003	0.118	-0.121	0.010

Table 4. Correlation coefficients of quality output with inputs in the first six principal components.



Using Charts

- A chart is often an easier and better way to present trends or large amounts of information
- A chart gives an idea of the value, and also a visual indication of how the value is changing.
- Involves more than just drawing graphs.
- Effective use of charts requires an understanding of
 - the type of data to be presented
 - the key feature that is to be portrayed
 - how the information will be used
 - who the intended audience is

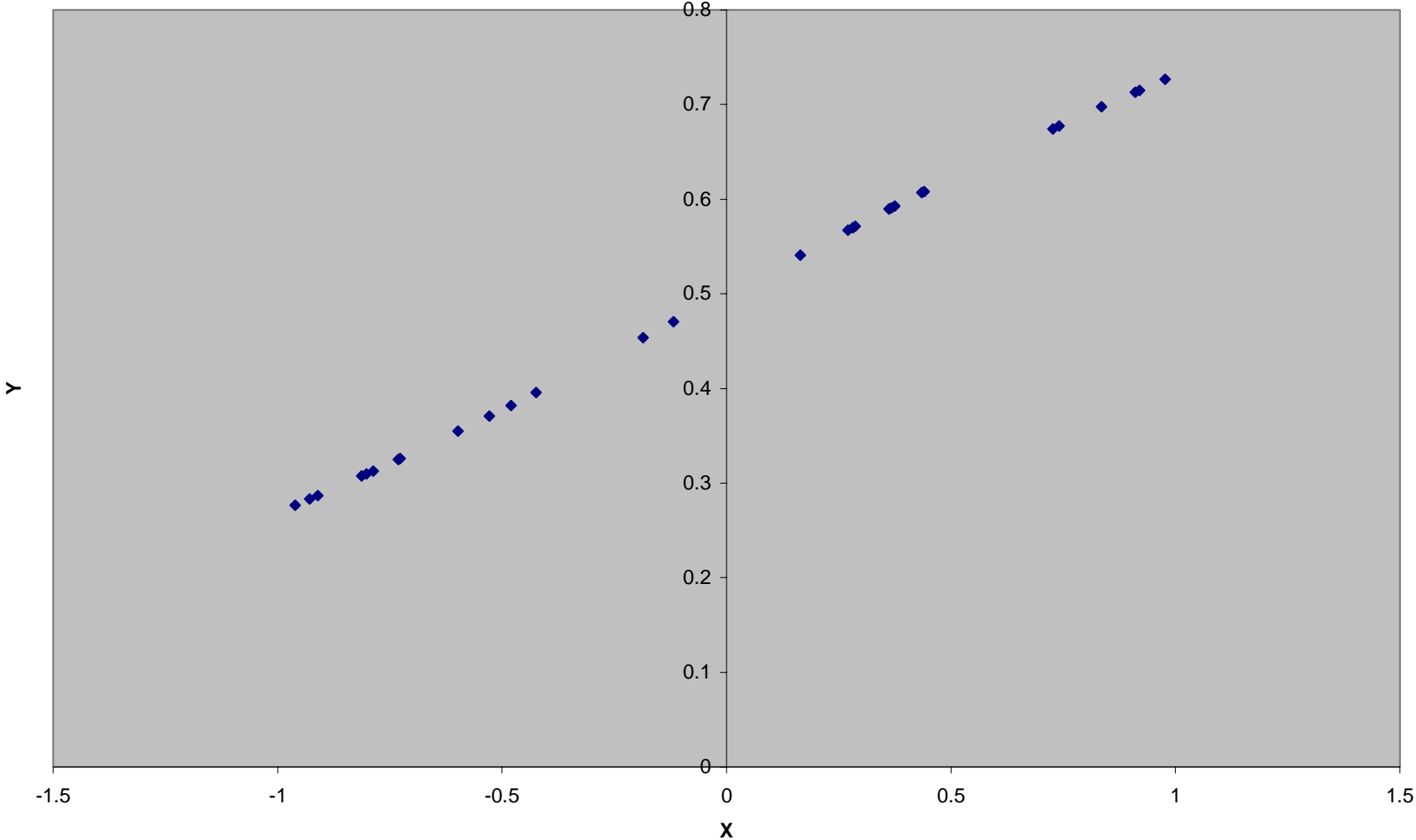


Chart Design

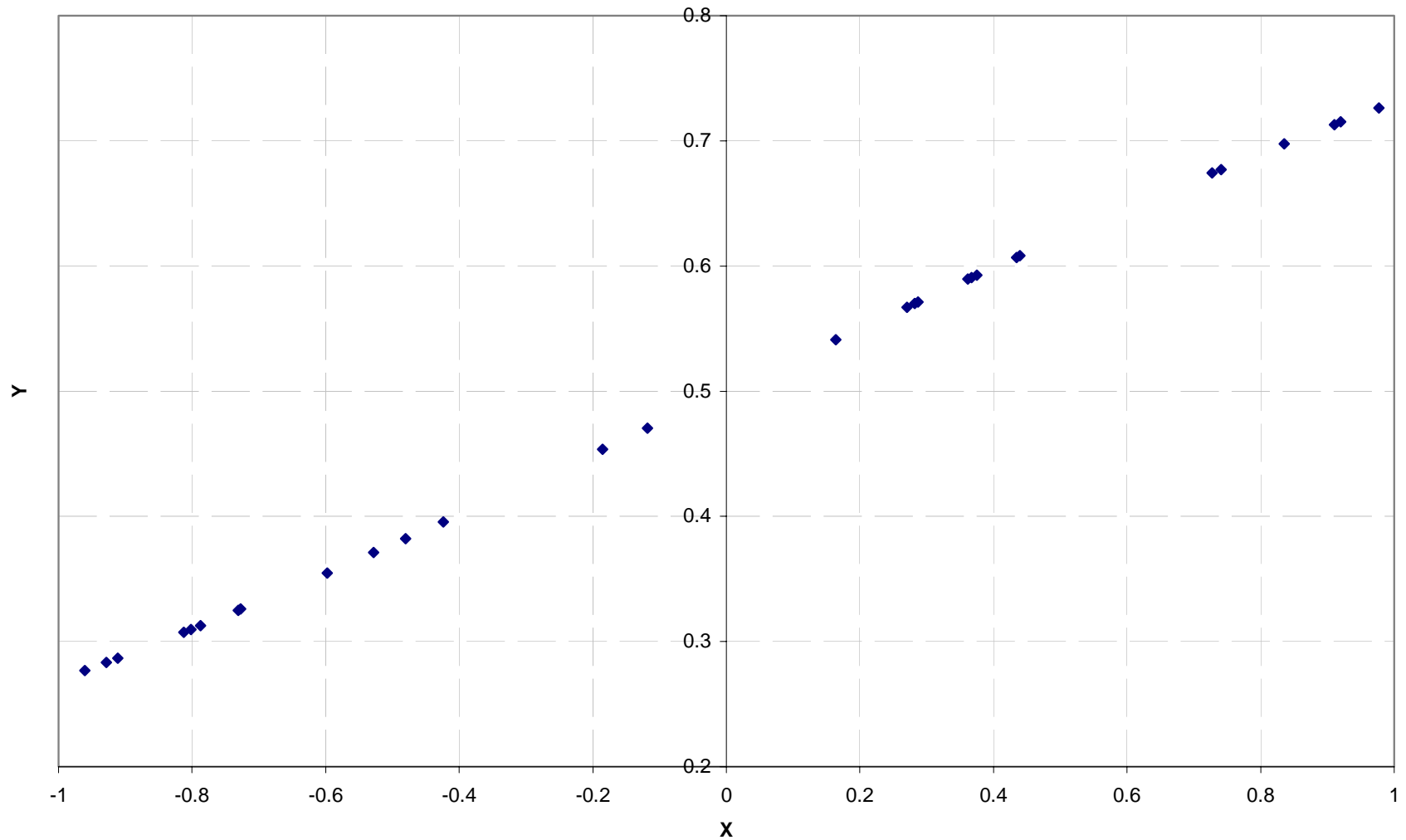
- The charting area is the focal point of the chart.
- The chart should communicate enough information to be a stand-alone
- Try to get your point across without footnotes, axis titles, or legends
- Data displayed on figures must also be described in the text.
- For example,
 - you should not just say, "the data are shown in Figure 3."
 - you must tell the reader (in some detail) what Figure 3 shows
- Do not rely on "default settings"



Using Default Settings



After Customisation

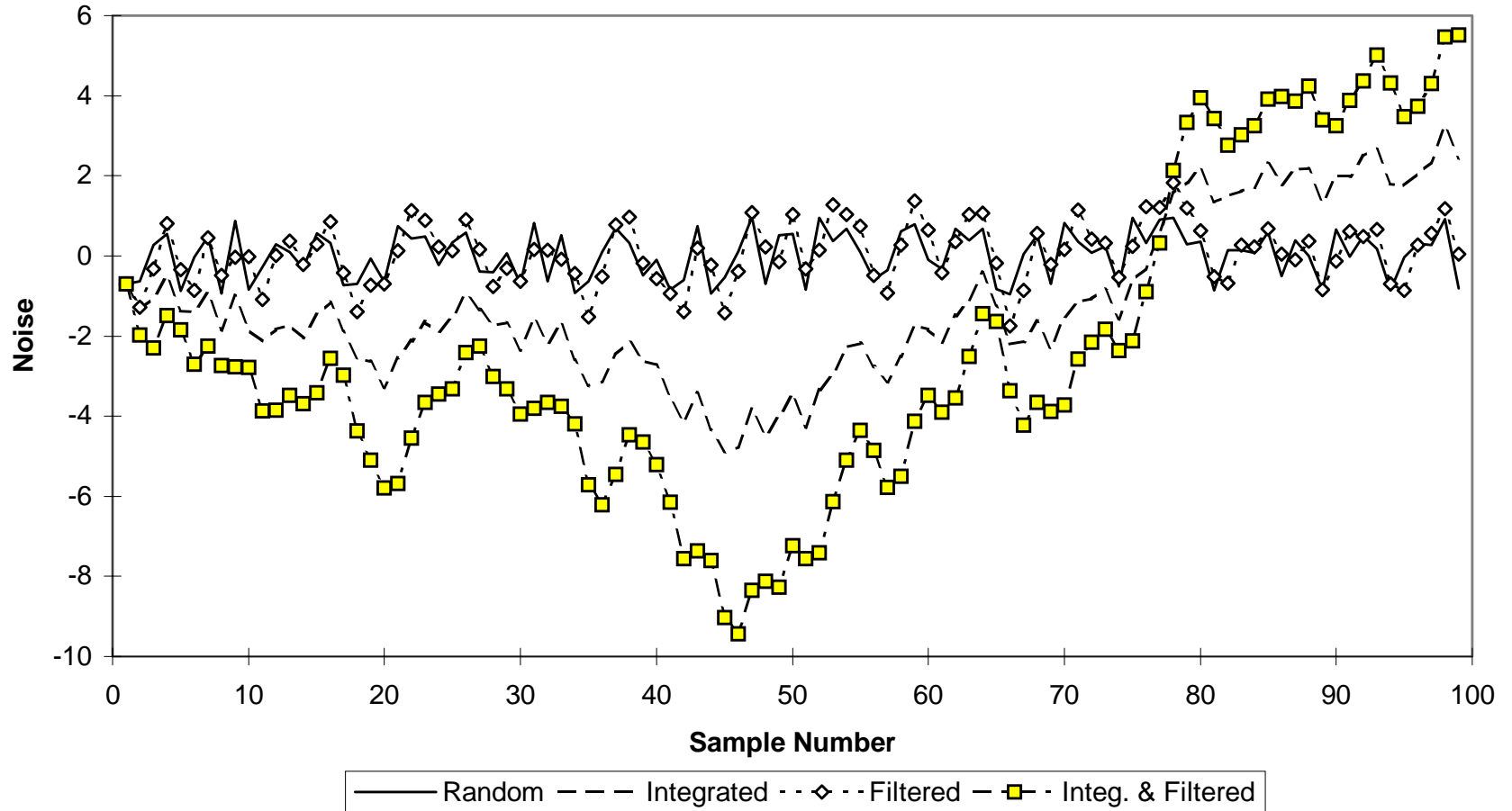


Less is More

- Do not try to put too many series in a chart.
- Line charts are especially intolerant of overcrowding.
- More than three or four lines is visually confusing, especially if the lines follow much the same direction
- The only exception to this rule is creating a line chart of several series that are not expected to be similar



Restrict the Number of Plots

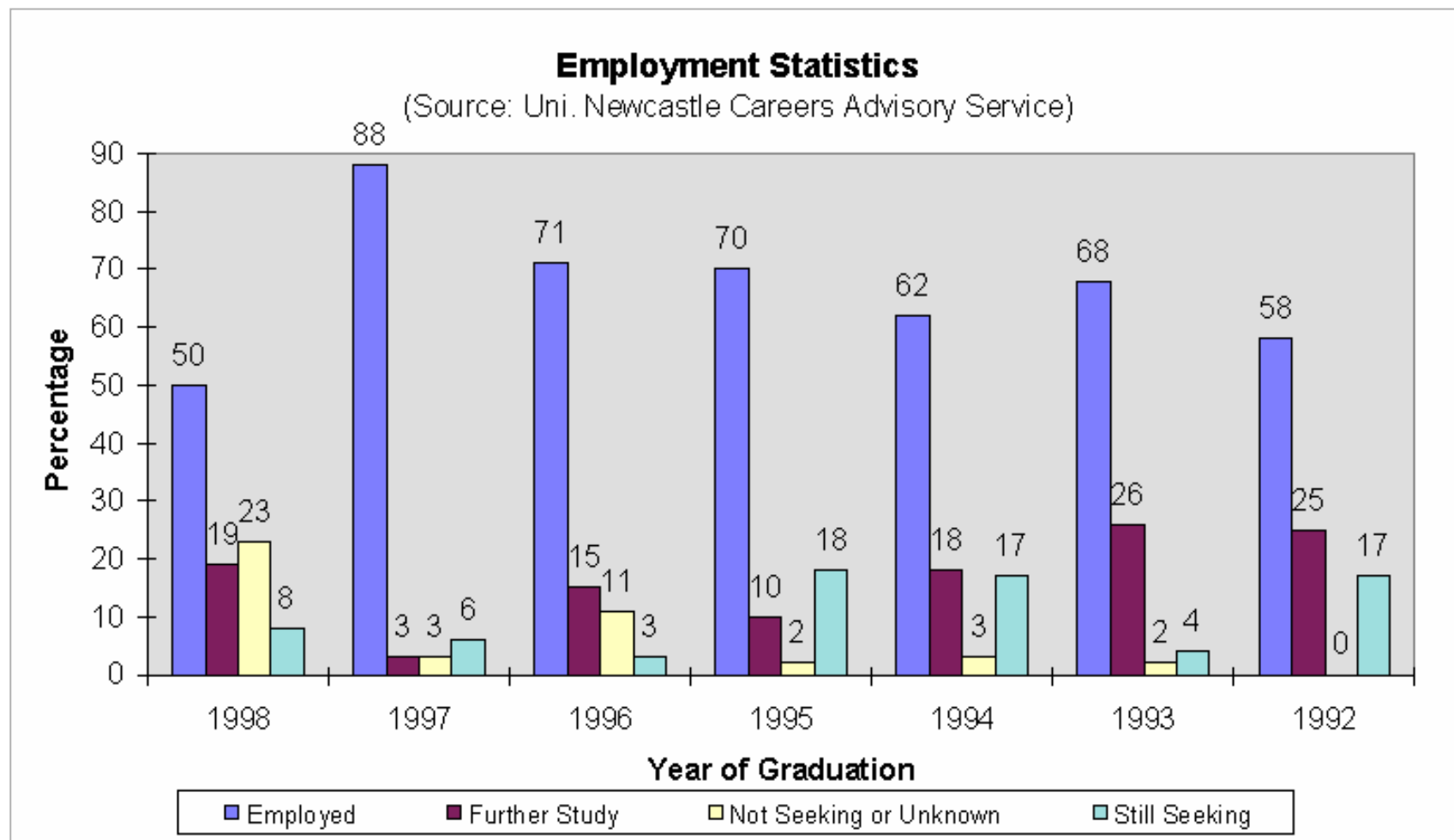


Grouping Bars

- Used grouped bars to show relationships
 - group together tightly if they belong to the same class or category
- When showing a group of bars over a series of years
 - cluster the bars for each year
 - leave a little extra space between years.
- Add enough space between bars so they are easier to see



Grouped Bar Chart with Numbers



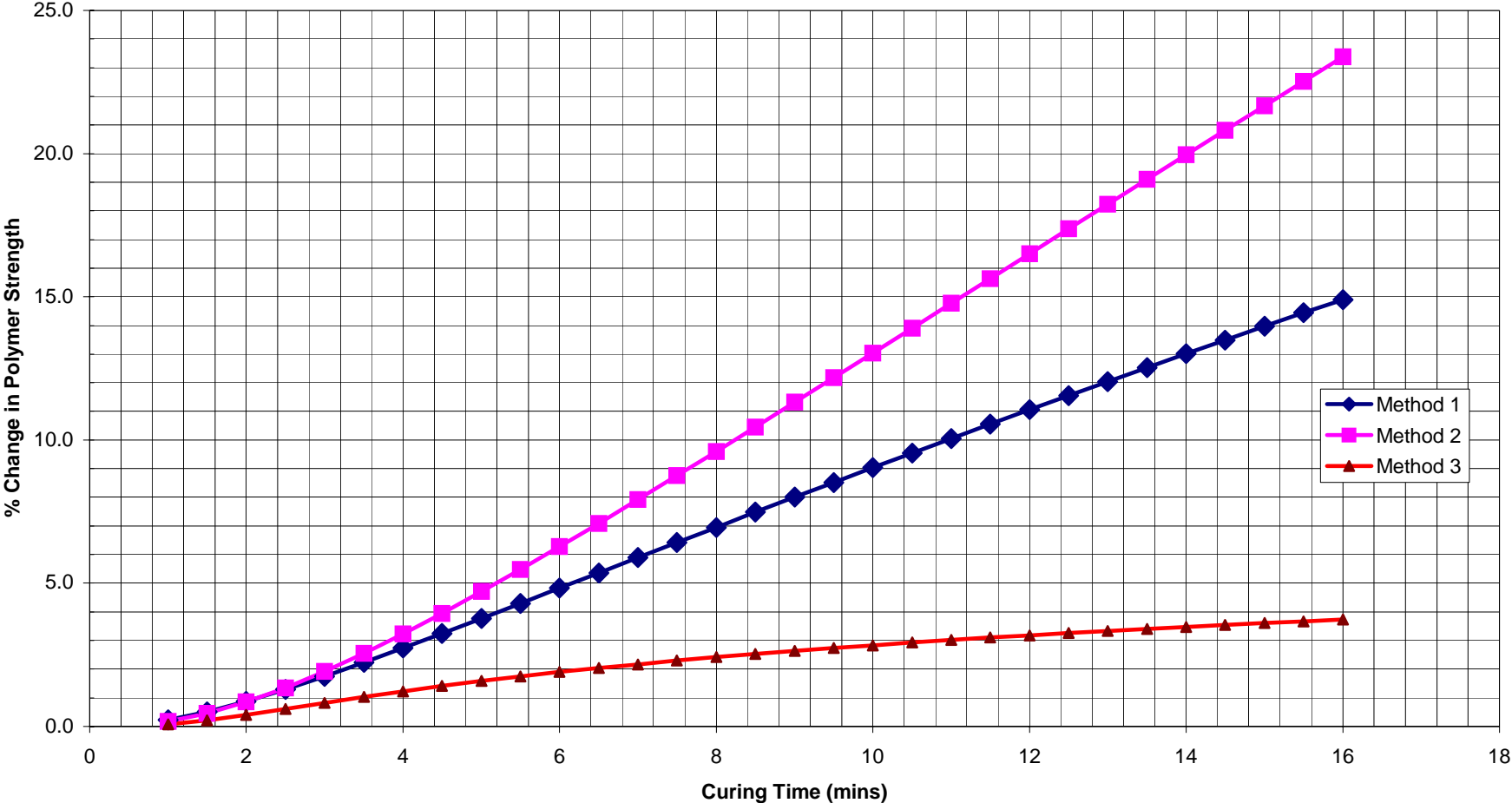
Use Grids in Moderation

- Use only as many as are needed to get an approximate idea of the value of any given data point in the chart
- Too many grid lines create visual clutter
- Balance horizontal and vertical grid lines so that the rectangles they create are not too long and narrow or tall and narrow
- Use soft colours, such as grey, for grid lines
- Make sure the chart frame (the frame around the charting area)
 - is black or a dark, brilliant color
 - heavier than the grid lines



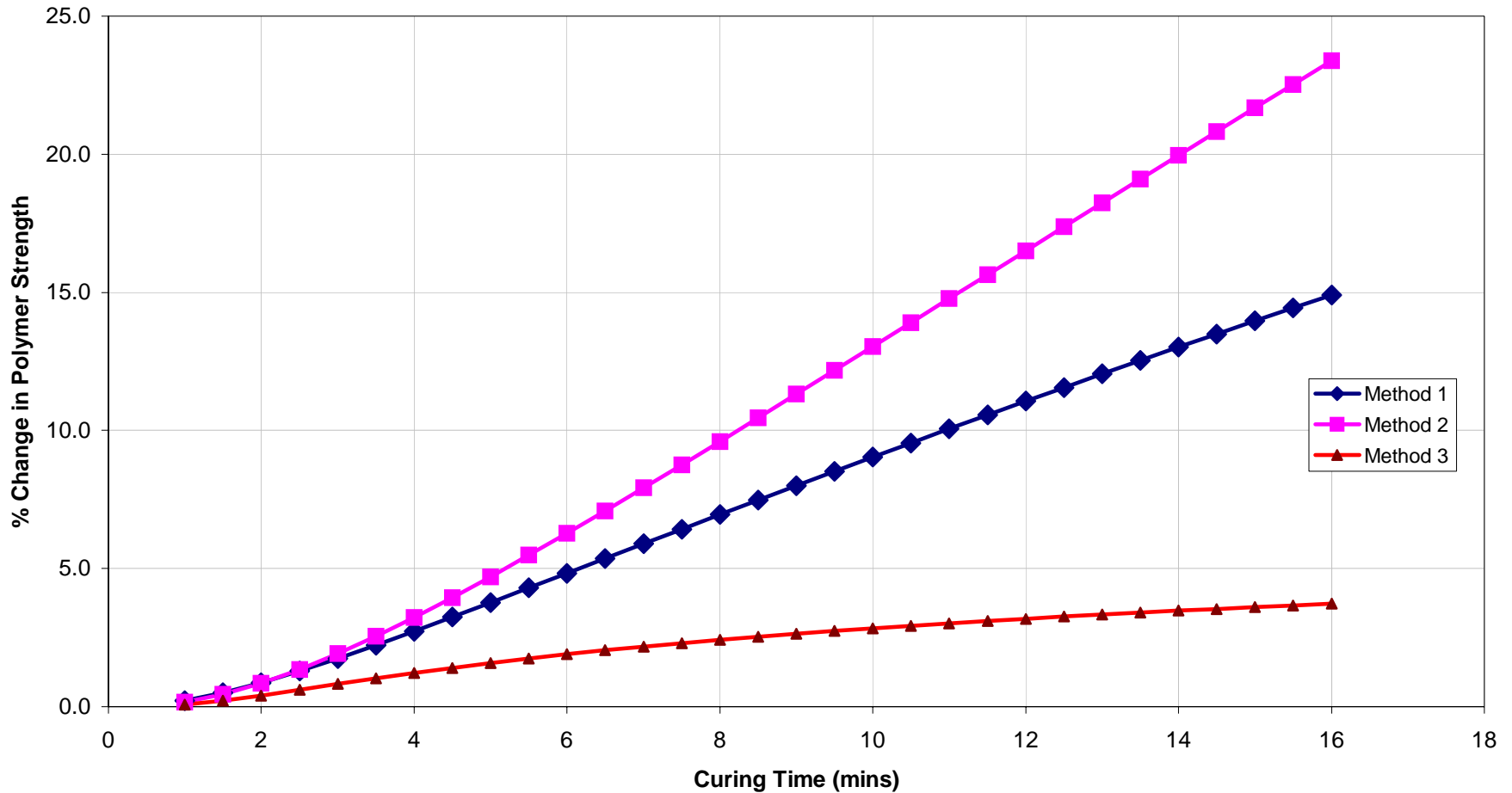
Go Easy on Gridlines

EFFECTIVENESS OF DIFFERENT POLYMER CURING METHODS



Faded and Well-spaced Gridlines

EFFECTIVENESS OF DIFFERENT POLYMER CURING METHODS



What is the Chart Supposed to Show?

- Present charts according to their purpose
- Can be used to show
 - show similarities
 - highlight differences
 - compare performances



Showing Data Values in Line Plots

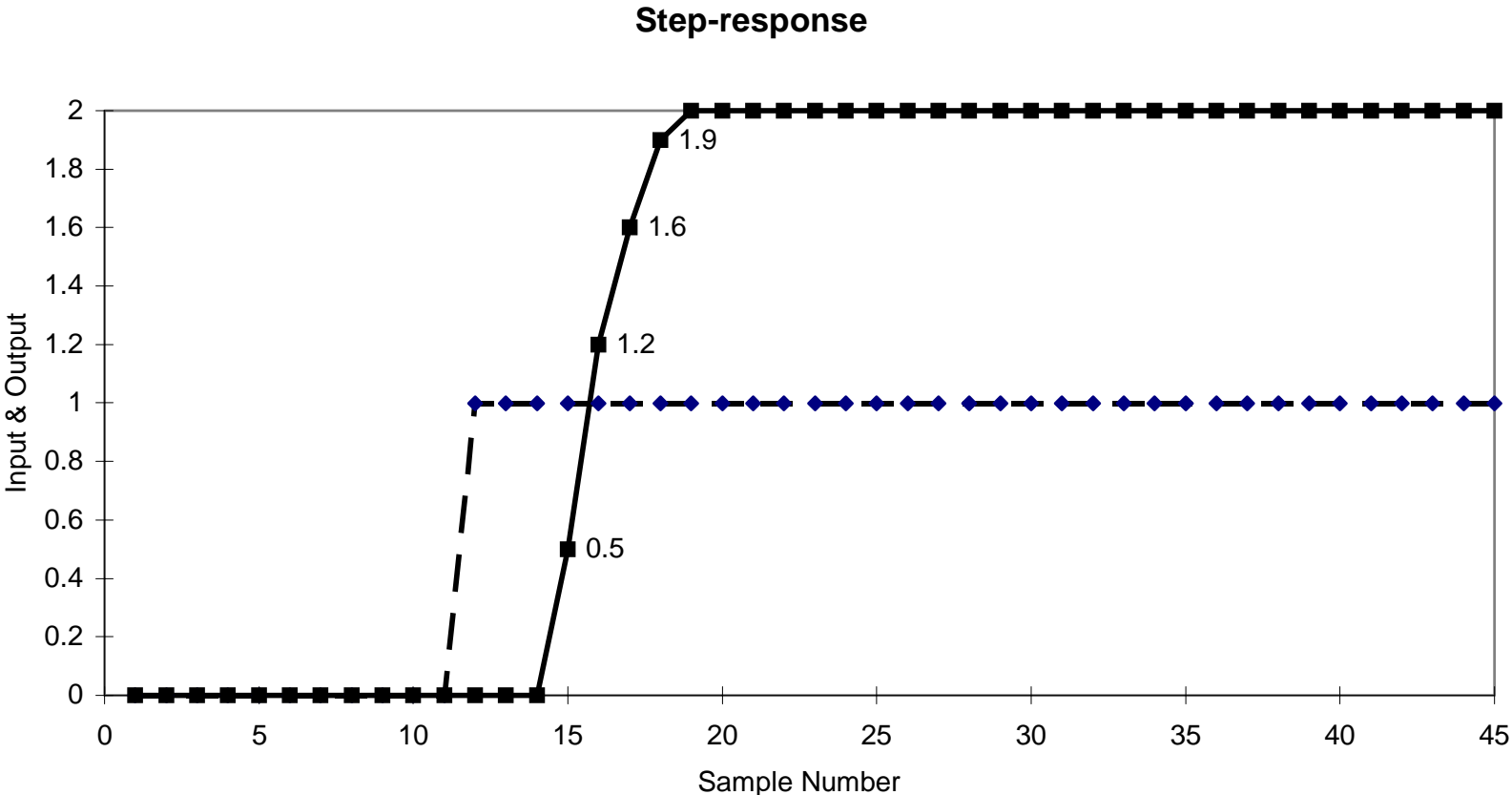


Chart to Illustrate Similarity

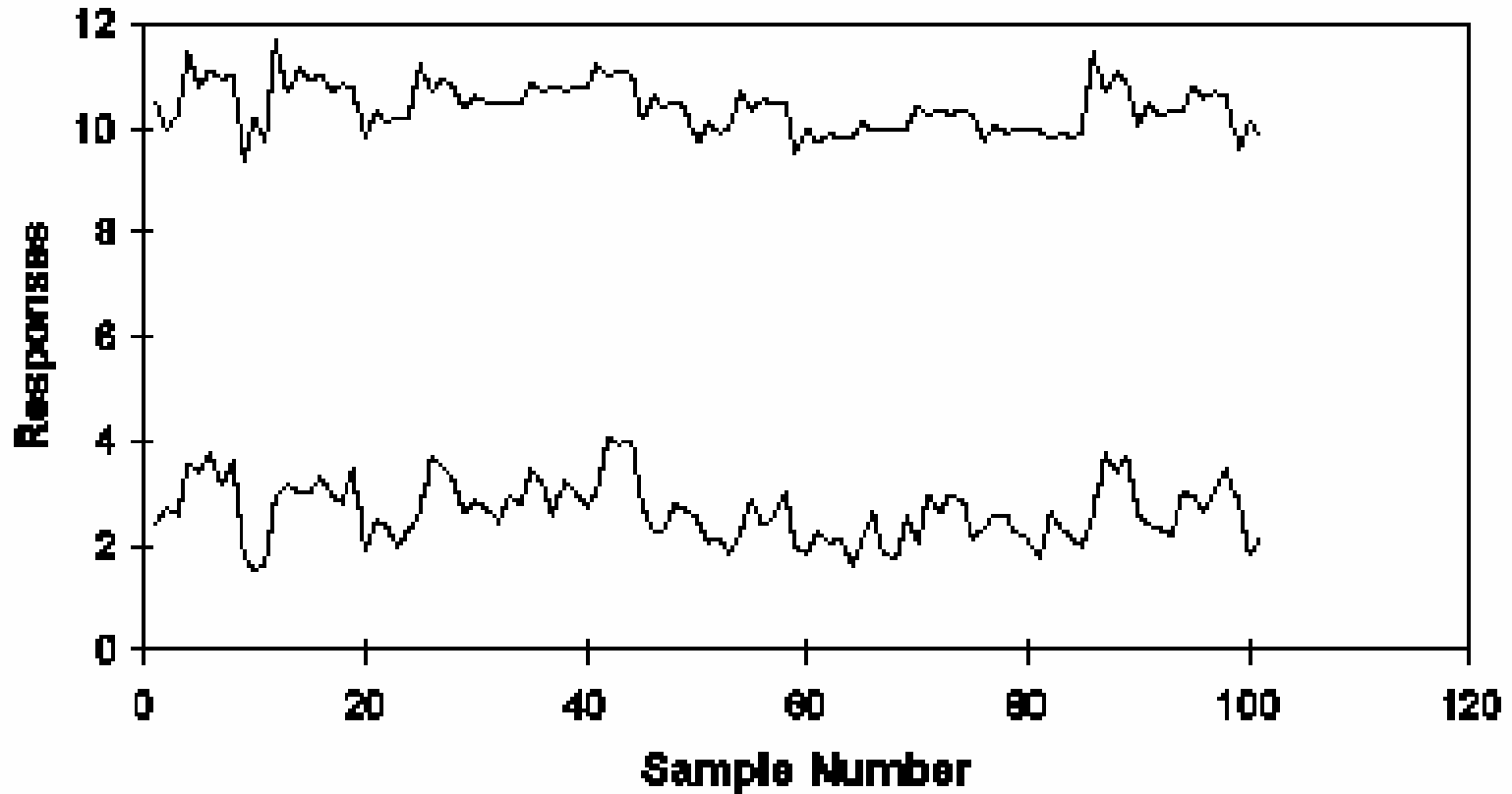


Chart to Show Differences

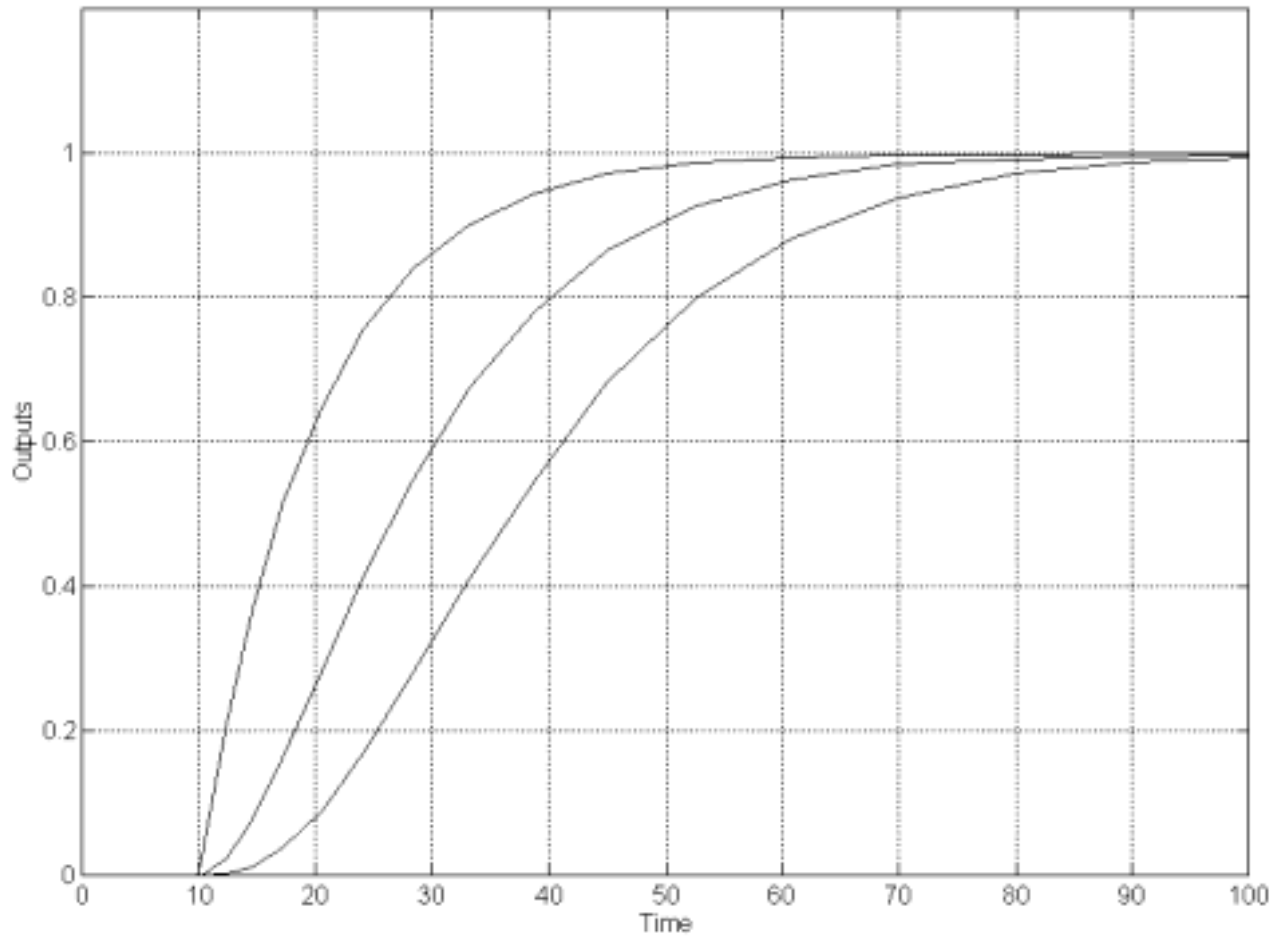
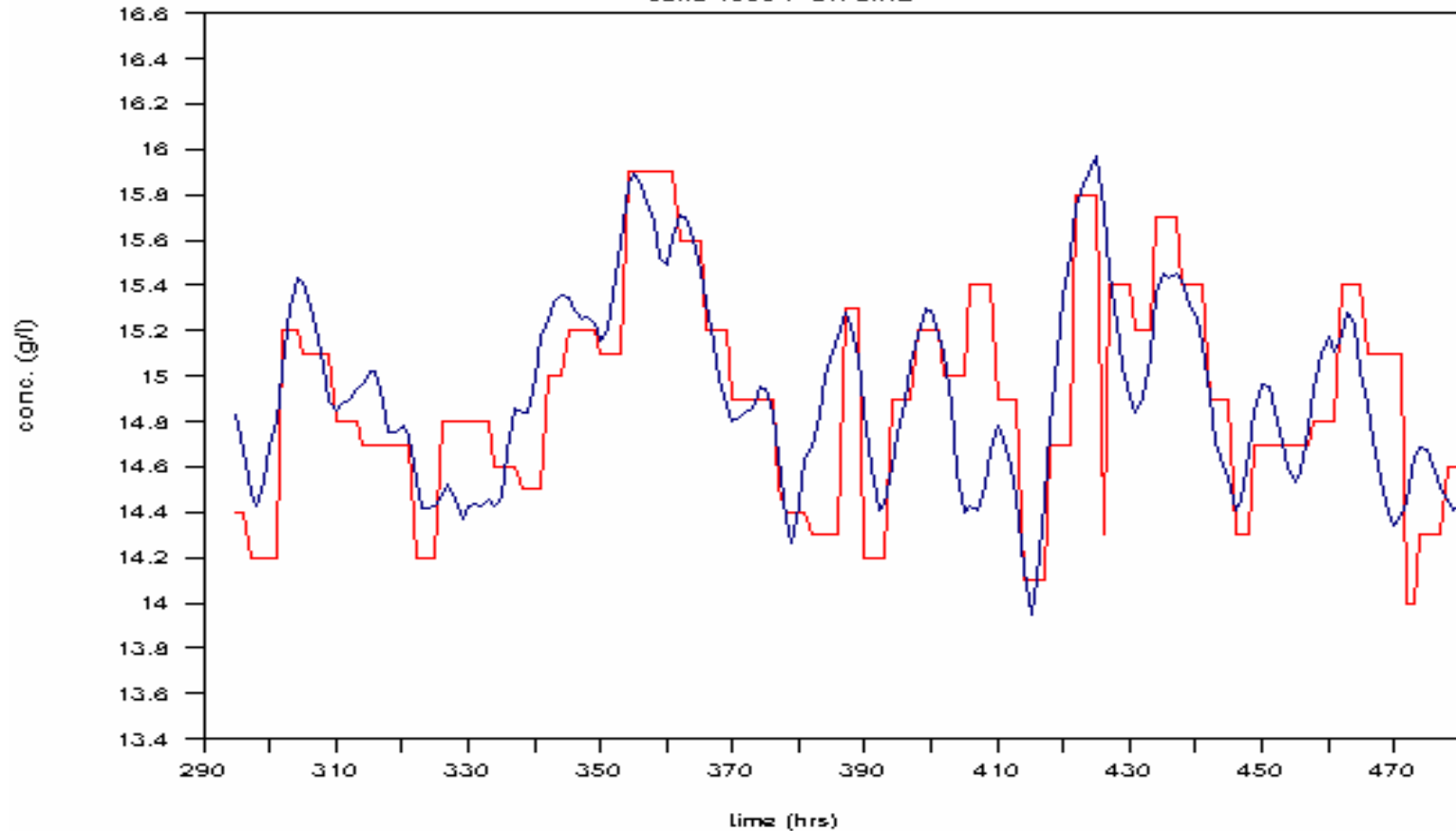


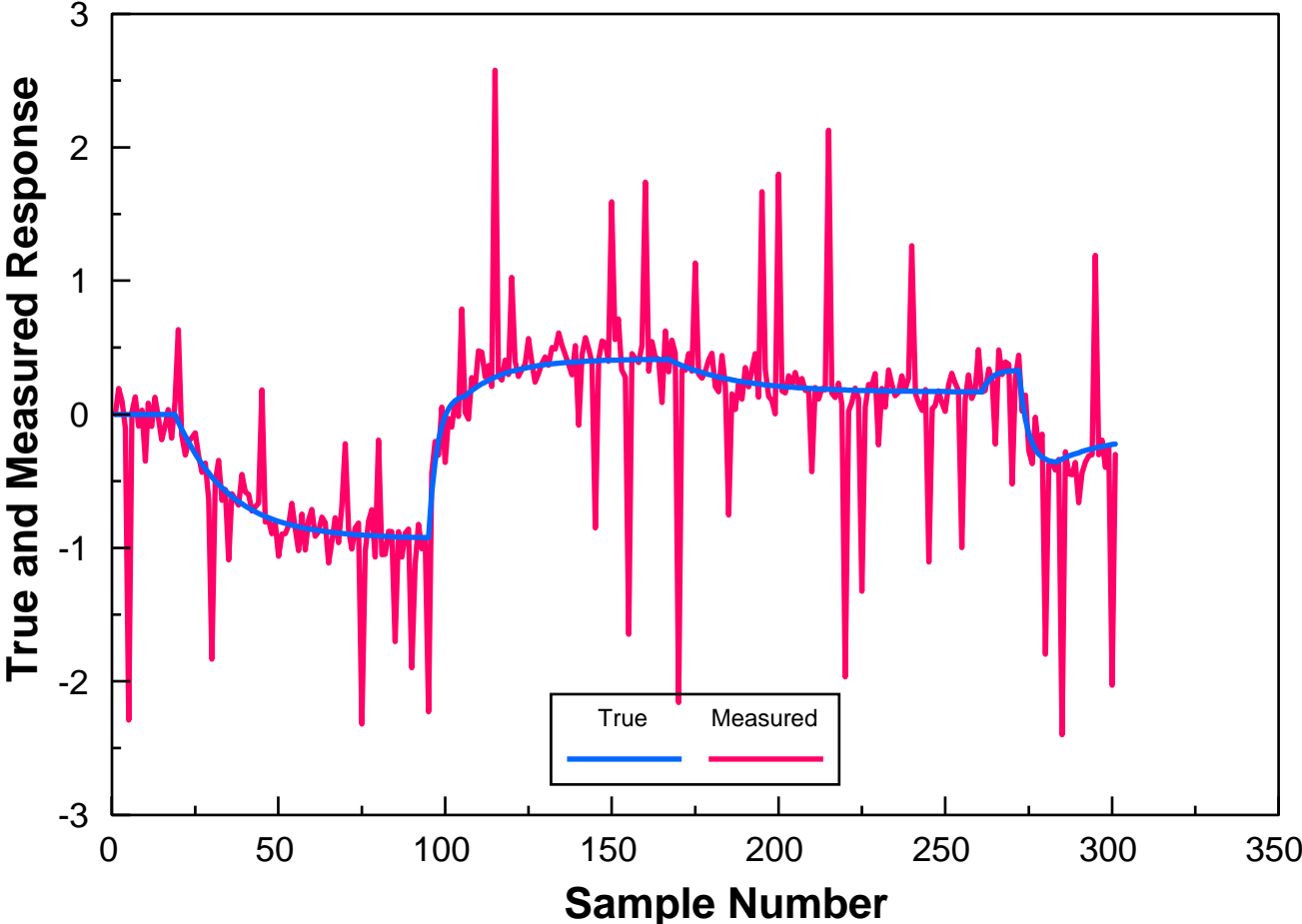
Chart to Compare Performances

Estimate vs Measurement

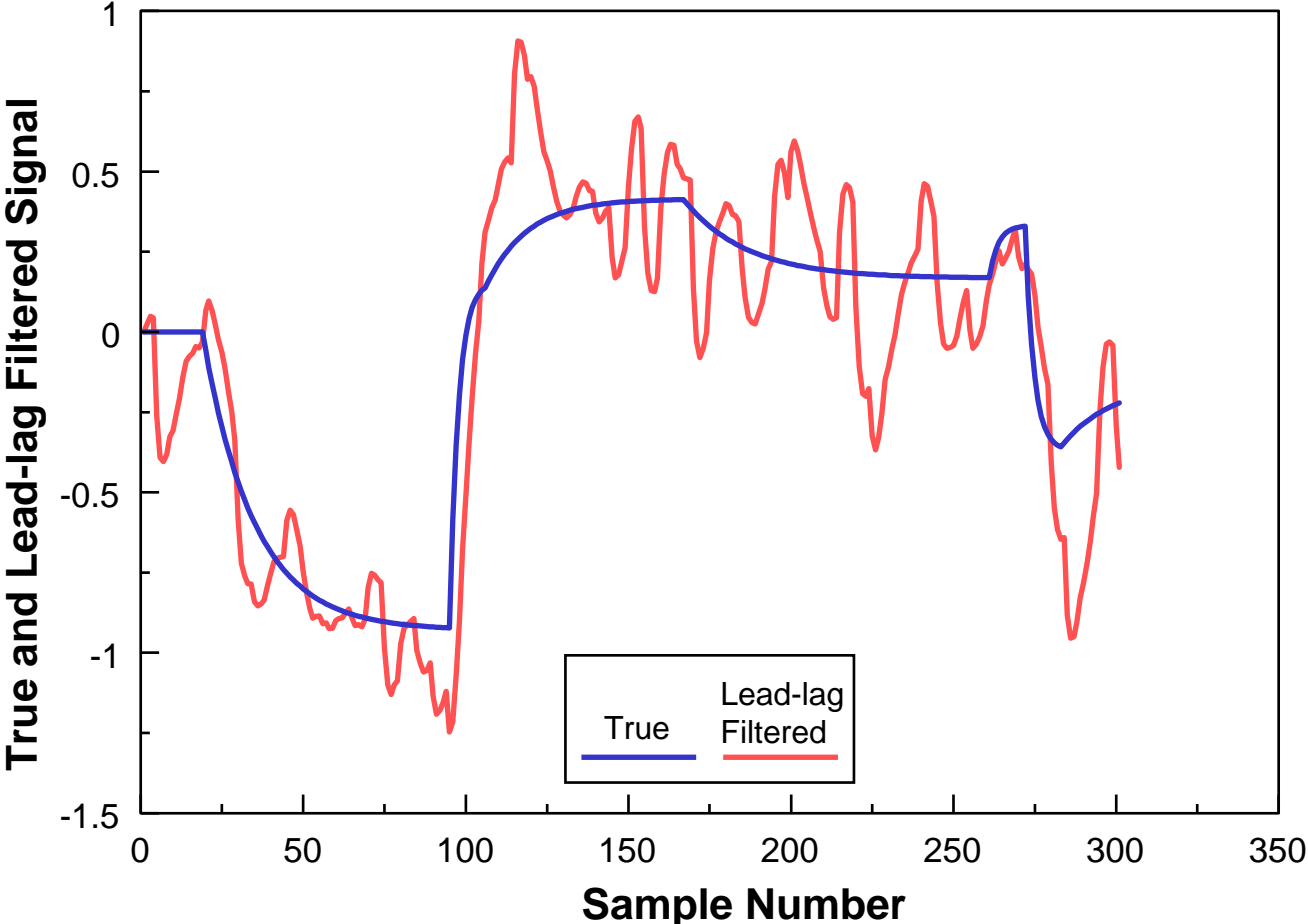
June 1990 :- ON LINE



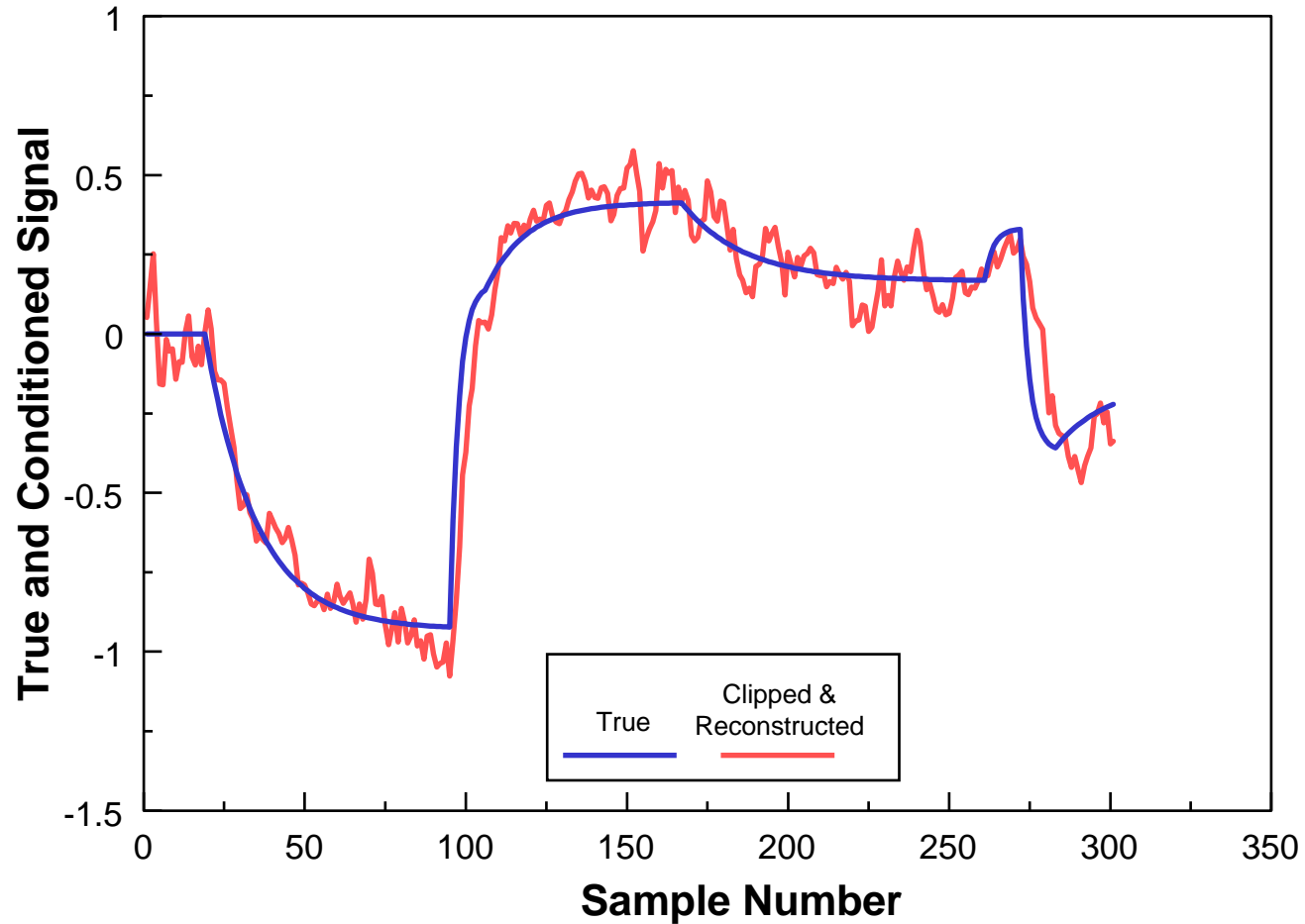
Choose Appropriate Scale



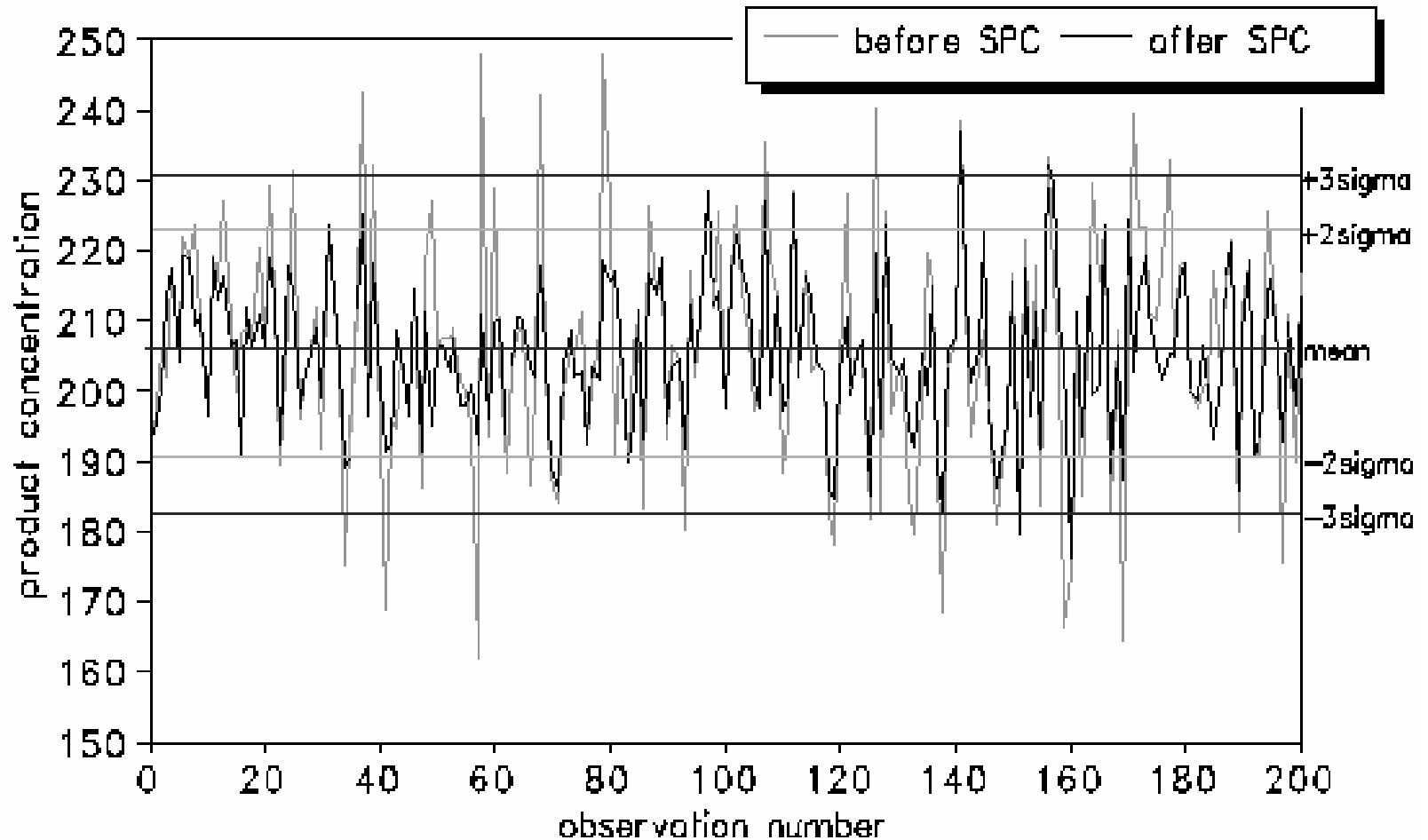
Choose Appropriate Scale



Choose Appropriate Scale



Use Different Colours or Shades



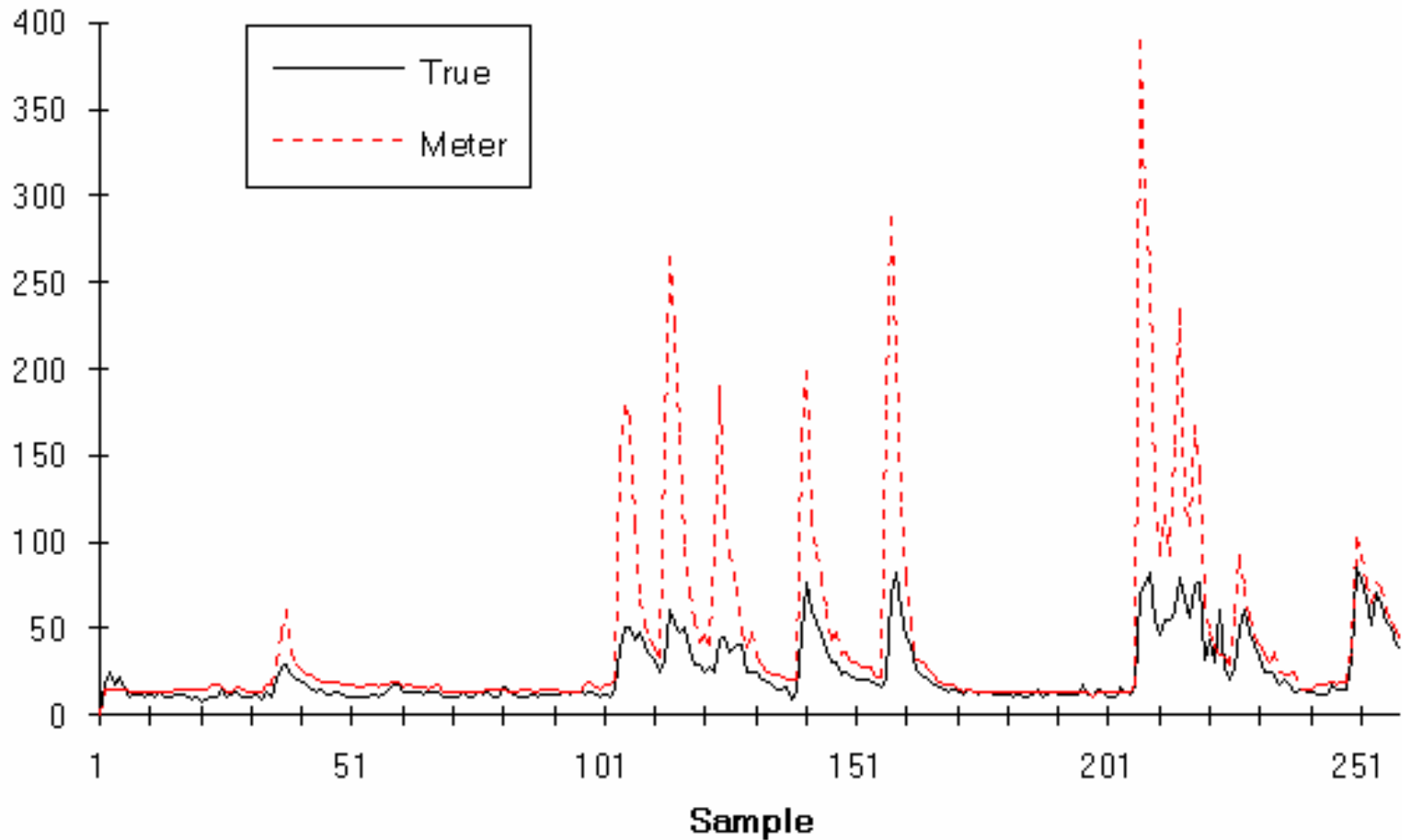
Choose Colours Carefully

- Consider where your chart will appear
- Strong, co-ordinating colours
 - computer based presentation
 - to attract attention
 - help distinguish between the individual series
- Soft colours
 - for print publication
 - should not to overwhelm the reader
 - blue does not photocopy well



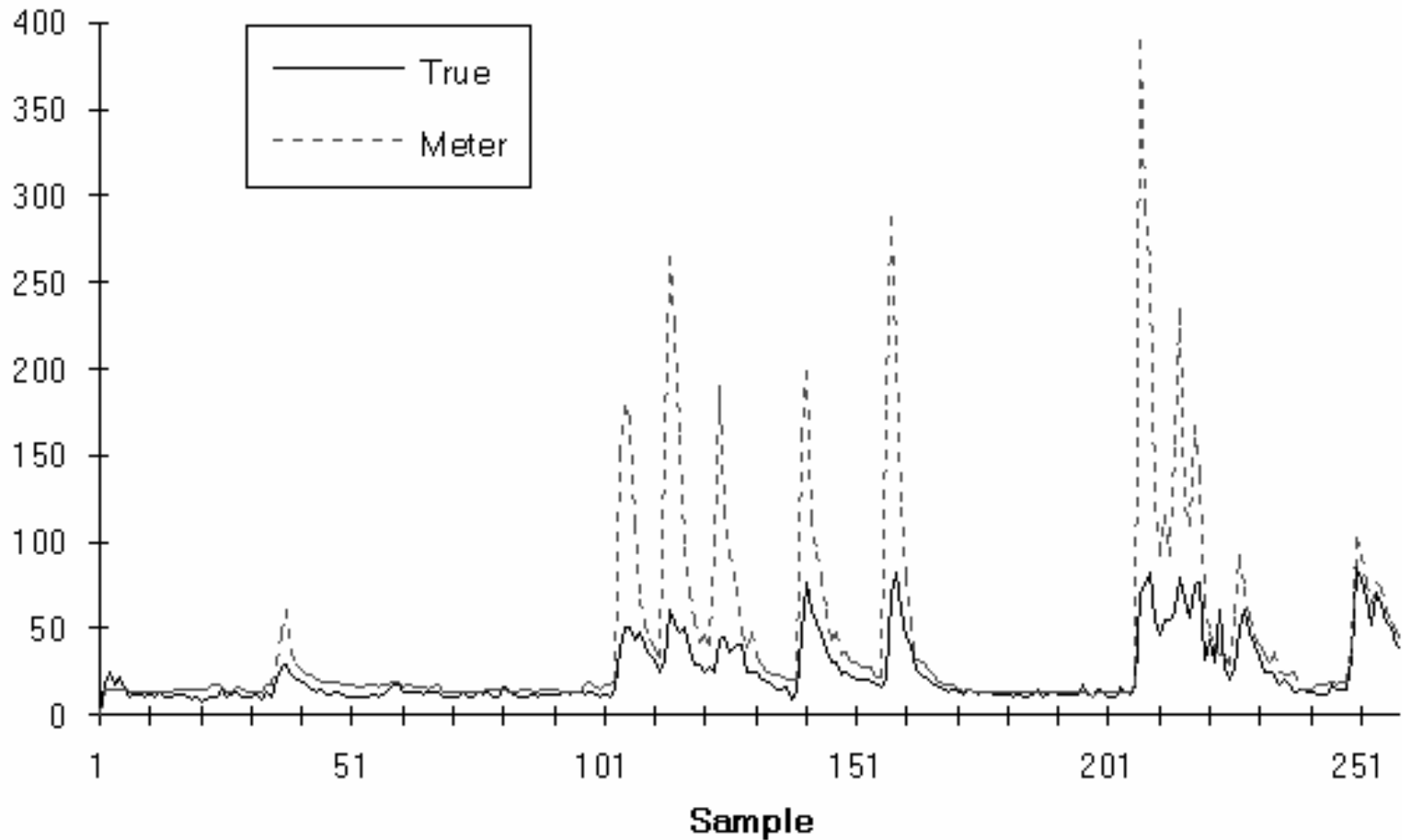
Careful with the Colours

- Original



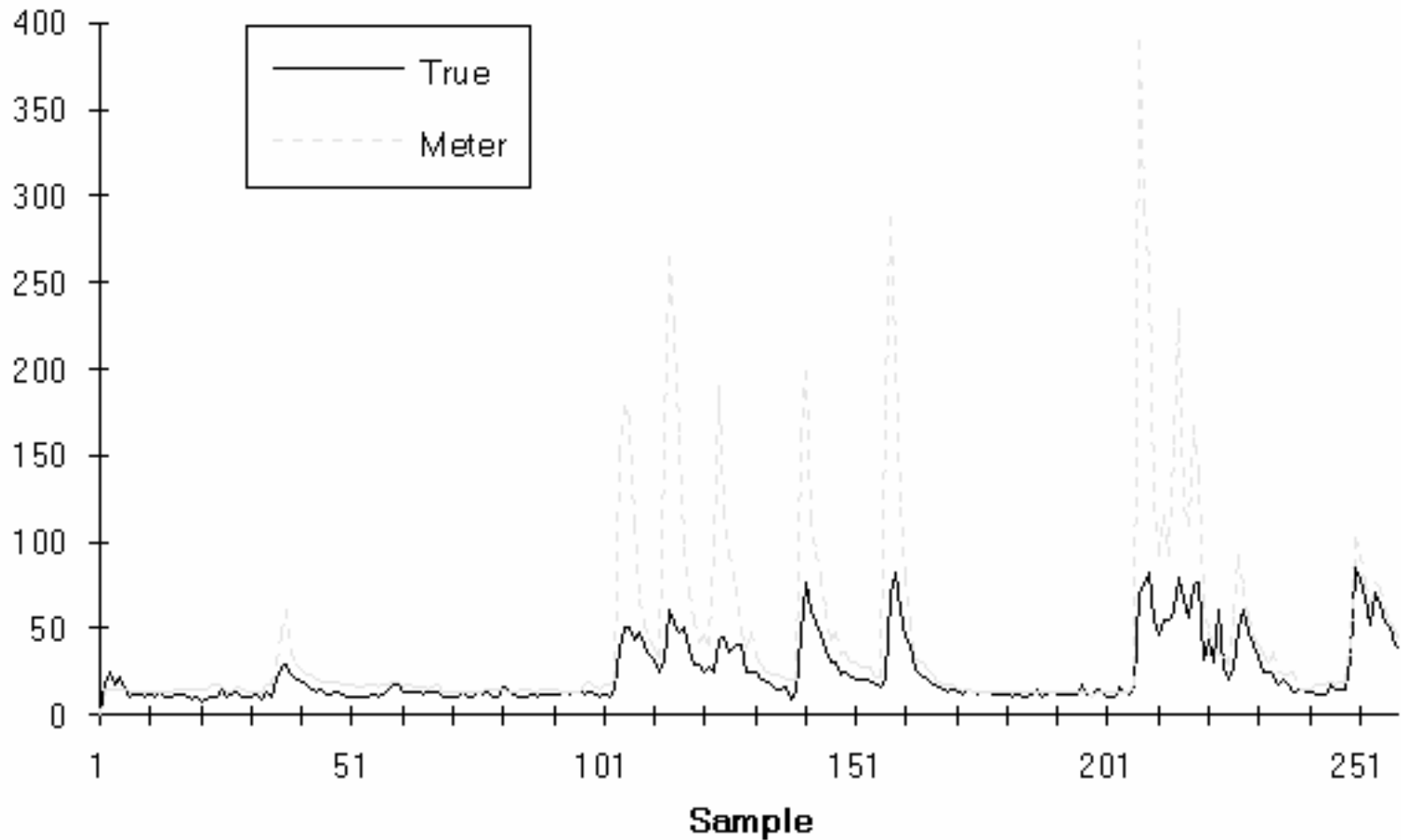
Careful with the Colours

- In black-and-white



Careful with the Colours

- If blue instead of red



Limit Use of Typefaces

- Use one typeface, or at most two, on each chart,
- Use the same size and weight for similar elements such as the axes and legend text
- A recommended setting is 12 to 18 points and bold
- Enough typographic variety can be generated without using another font type
 - using bold and italic fonts
 - different sizes



Choose Legible Fonts

- Pick a typeface that looks clear in smaller sizes and in bold
 - especially if your chart is to be printed in a small size in a publication, or
 - if it will be viewed by a large audience in a big room.
- If your title is big enough, you can use just about any typeface for it, and it will be legible.
- For legend text, axes, footnotes and the like, take more care.
- Use faces that are neither too light nor too heavy
- Arial font is good



Select an Appropriate Background

- Set type against an appropriate background
 - be careful about the background behind your type
 - some colour combinations, such as pink or violet type and a medium or dark blue background, could make your audience feel a little dizzy
 - if a dark background colour is used, the type must be bright enough to be readable; it should not look as if the background is trying to "swallow it up."
 - when using light type on a dark background, use a bold weight, especially with smaller type sizes.
 - complex fill patterns in the background can make type hard to read, particularly smaller items like legend text and axis scales



Patterns

- Use pattern fills with moderation
 - many charting software packages can create just about any kind of colour combination or fill pattern you can imagine
 - do not become carried away with colour and patterns without thinking about your output device
 - sophisticated fill patterns take up more disk space and take longer to print on colour printers

