C CONTROL CHART

PURPOSE

Generates a (Poisson) counts control chart.

DESCRIPTION

A C chart is a data analysis technique for determining if a measurement process has gone out of statistical control. The C chart is sensitive to changes in the number of defective items in the measurement process. The "C" in C CONTROL CHART stands for "counts" as in defectives per lot. The C control chart consists of:

Vertical axis   =   the number defective for each sub-group;
Horizontal axis   =   sub-group designation.

The C chart assumes that each sub-group has an equal sample size (this sample size does not need to be specified). A sub-group is typically a time sequence (e.g., the number of defectives in a daily production run where each day is considered a sub-group). If the times are equally spaced, the horizontal axis variable can be generated as a sequence (e.g., LET X = SEQUENCE 1 1 N where N is the number of sub-groups).

In addition, horizontal lines are drawn at the mean number of defectives and at the upper and lower control limits. The control limits are calculated as:

$$LCL = \bar{c} - 3\sqrt{\bar{c}}$$ **(EQ 2-4)**

$$UCL = \bar{c} + 3\sqrt{\bar{c}}$$ **(EQ 2-5)**

where $\bar{c}$ is the mean number of defectives. Also, zero serves as a lower bound on the LCL.

SYNTAX

C CONTROL CHART <y1> <x>   <SUBSET/EXCEPT/FOR qualification>
where <y1> is a variable containing the number of defective items in each sub-group;
       <x> is a variable containing the sub-group identifier (usually 1, 2, 3, ...);
and where the <SUBSET/EXCEPT/FOR qualification> is optional.

EXAMPLES

C CONTROL CHART Y X
C CONTROL CHART D X SUBSET X > 2

NOTE 1

The distribution of the number of defective items is assumed to be Poisson. This assumption is the basis for the calculating the upper and lower control limits.

NOTE 2

The U CONTROL CHART is similar to the C CONTROL chart. The distinction is that the C CONTROL CHART is used when the material being measured is constant in area and the sub-groups have equal size. The U CONTROL CHART is used when either of these assumptions is not valid.

NOTE 3

The attributes of the 4 traces that make up the C control chart are controlled by the standard LINES, CHARACTERS, SPIKES, and BAR commands. Trace 1 is the response variable, trace 2 is the mean line, and traces 3 and 4 are the upper and lower control limits. Some analysts prefer to draw the response variable as a character or a spike rather than a connected line. The example program demonstrates setting the line attributes (the control lines are drawn as dotted lines).

DEFAULT

None

SYNONYMS

C CHART for C CONTROL CHART

RELATED COMMANDS

U CHART   =   Generates a U control chart.

P CHART	=	Generates a P control chart.
NP CHART	=	Generates an Np control chart.
CONTROL CHART	=	Generates a mean, standard deviation, or range control chart.
Q CONTROL CHART	=	Generates Quesenberry style control charts.
CHARACTERS	=	Sets the types for plot characters.
LINES	=	Sets the types for plot lines.
SPIKES	=	Sets the on/off switches for plot spikes.
PLOT	=	Generates a data or function plot.

REFERENCE

"Guide to Quality Control," Kaoru Ishikawa, Asian Productivity Organization, 1982 (Chapter 8).

APPLICATIONS

Quality Control

IMPLEMENTATION DATE

88/2

PROGRAM

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SKIP 25
READ CCC.DAT X NUMDEF SIZE
TITLE AUTOMATIC
LINES SOLID SOLID DOT DOT
Y1LABEL NUMBER OF DEFECTIVES
XLABEL SAMPLE ID
XLIMITS 0 20
XTIC OFFSET 0 1
YLIMITS 0 15
YTIC OFFSET 2 0
C CONTROL CHART NUMDEF SIZE X
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