

## TAGUCHI SN- PLOT

### PURPOSE

Generates a Taguchi signal-to-noise plot for the “smaller is better” case.

### DESCRIPTION

The Taguchi SN- plot answers the question: “What level of the independent variable yields the “best” value of the response (as measured by the largest value of the signal-to-noise ratio)?” The “-” in SN- stands for “smaller-is-better.” For this “smaller is better” case, the signal-to-noise ratio is defined as:

$$SN = -10 \times \log_{10} \left( \frac{\sum y^2}{N} \right) \quad (\text{EQ 2-35})$$

where N is the number of observations in the subsample and y is the data observations in the subset. The Taguchi SN+ plot consists of the following:

- Vertical axis = the Taguchi S/N value for each sub-group;
- Horizontal axis = sub-group designation.

A reference line is drawn for the full sample S/N ratio.

### SYNTAX

TAGUCHI SN- PLOT <y> <x> <SUBSET/EXCEPT/FOR qualification>

where <y> is the response (= dependent) variable that contains the raw data values;

<x> is an independent variable that contains the sub-group identifications;

and where the <SUBSET/EXCEPT/FOR qualification> is optional.

### EXAMPLES

TAGUCHI SN- PLOT YIELD CATALYST

TAGUCHI SN- PLOT Y X SUBSET MATERIAL 4

### DEFAULT

None

### SYNONYMS

The word TAGUCHI is optional (i.e., SN- PLOT is a synonym for TAGUCHI SN- PLOT).

S/N- and SNS are synonyms for SN-.

### RELATED COMMANDS

TAGUCHI SN PLOT	=	Generates a (target variable is dependent on the mean) signal-to-noise plot.
TAGUCHI SN+ PLOT	=	Generates a (larger is better) signal-to- noise plot.
TAGUCHI SN00 PLOT	=	Generates a (target variable is independent of the mean) signal-to-noise plot.
MEAN PLOT	=	Generates a mean plot.
SD PLOT	=	Generates a standard deviation plot.
CONTROL CHART	=	Generates a mean, range, standard deviation, P, NP, C, or U control chart.
Q CONTROL CHART	=	Generates a Quesenberry control chart.
CHARACTERS	=	Sets the types for plot characters.
LINES	=	Sets the types for plot lines.
SPIKES	=	Sets the on/off switch for plot spikes.

### REFERENCE

“Statistical Methods and Applications,” Jack Elliot, Allied Signal, 1987 (pp. 4-3, 4-4).

### APPLICATIONS

Experiment Design Analysis and Quality Control

### IMPLEMENTATION DATE

88/8

## PROGRAM

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SKIP 25
READ GEAR.DAT DIAMETER BATCH
CHARACTERS X ALL
CHARACTER SIZE 3 ALL
TITLE AUTOMATIC
X1LABEL BATCH
Y1LABEL DIAMETER
XTIC OFFSET 0.5 0.5
TIC LABEL SIZE 3
MULTIPLY 2 1; MULTIPLY CORNER COORDINATES 0 0 100 100
PLOT DIAMETER BATCH BATCH
CHARACTER X BLANK
LINE BLANK SOLID
Y1LABEL SN RATIO
TAGUCHI SN- PLOT DIAMETER BATCH
END OF MULTIPLY

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