CONFIDENCE LIMITS

PURPOSE

Generates a confidence interval for the mean.

DESCRIPTION

The confidence interval for the mean is defined by:

$$\bar{x} - \frac{t_{\alpha/2}s}{\sqrt{n}} < \mu < \bar{x} + \frac{t_{\alpha/2}s}{\sqrt{n}} \qquad \textbf{(EQ 3-40)}$$

where $\bar{x}$ is the sample mean, s is the sample standard deviation, n is the sample size, and μ is the population mean. The quantity s/sqrt(n) is the standard deviation of the mean.

SYNTAX

CONFIDENCE LIMITS <y1> <SUBSET/EXCEPT/FOR qualification>
where <y1> is the response variable;
and where the <SUBSET/EXCEPT/FOR qualification> is optional.

EXAMPLES

CONFIDENCE LIMITS Y1
CONFIDENCE LIMITS Y1 SUBSET TAG > 2

NOTE

A table of confidence intervals is printed for α levels of 50.0, 75.0, 90.0, 95.0, 99.0, 99.9, 99.99, and 99.999. The sample mean, sample standard deviation, and sample standard deviation of the mean are also printed. In addition to the lower and upper confidence limits, the t-value and t-value times standard deviation of the mean are printed in the table. These numbers can be used to construct the equivalent hypothesis test if desired (DATAPLOT does not currently support a hypothesis test command). The corresponding hypothesis test is constructed as follows ($\bar{x}$ = sample mean, S = sample standard deviation, N=sample size):

H0: population mean = u0
Ha: population mean <> u0
Test Statistic: T=($\bar{x}$ - u0)/(S/sqrt(N))
Alpha: .05 (corresponds to confidence value of 95.0%)
Critical Region: T < -t(α/2,N–1), T > t(α/2,N–1)
Conclusion: Rejec t null hypothesis if T in critical region

DEFAULT

None

SYNONYMS

None

RELATED COMMANDS

T-TEST	=	Perform a t-test.
CHI-SQUARE TEST	=	Perform a chi-square for the variance of a variable being equal to a given value.
F TEST	=	Perform an F test for the variances of two variables being equal.

REFERENCE

Consult any introductory statistics textbook.

APPLICATIONS

Confirmatory Data Analysis

IMPLEMENTATION DATE

Pre-1987 (the output from this command was reformatted 94/1)

PROGRAM

```
SKIP 25
READ GEAR.DAT DIAMETER BATCH
CONFIDENCE LIMITS DIAMETER
```

This command generates the following output.

```
                    CONFIDENCE LIMITS FOR MEAN
                           (2-SIDED)

           NUMBER OF OBSERVATIONS     =      100
           MEAN                       = .9976400
           STANDARD DEVIATION         = .6278908E-02
           STANDARD DEVIATION OF MEAN = .6278908E-03

   CONFIDENCE   T     T X SD(MEAN)     LOWER         UPPER
   VALUE (%)  VALUE                    LIMIT         LIMIT
 ---------------------------------------------------------------
      50.000   0.677  0.425067E-03  0.997215      0.998065
      75.000   1.157  0.726557E-03  0.996913      0.998367
      90.000   1.660  0.104254E-02  0.996597      0.998683
      95.000   1.984  0.124587E-02  0.996394      0.998886
      99.000   2.626  0.164910E-02  0.995991      0.999289
      99.900   3.392  0.212952E-02  0.995511      0.999770
      99.990   4.055  0.254609E-02  0.995094       1.00019
      99.999   4.656  0.292371E-02  0.994716       1.00056
```