F TEST

PURPOSE

Perform a two sample F test to determine whether the two standard deviation are equal.

DESCRIPTION

The hypothesis test is:

H0: $\sigma_1 = \sigma_2$
Ha: $\sigma <> \sigma_2$
Test Statistic:

$$F = S1^2/S2^2$$

where S1 and S2 are the sample standard deviations
Significance level: Typically set to .05
Critical Region:

$F < f(1-\alpha/2)(v1,v2)$ and
$F > f(\alpha/2)(v1,v2)$

where the critical region is determined from the F distribution function with (N1-1) and (N2-1) degrees of freedom and a significance level of 0.05.
Conclusion: Reject null hypothesis if T in critical region

DATAPLOT states the acceptance interval in terms of the F cumulative distribution function and calculates the F cdf value for the computed statistic.

SYNTAX

F TEST <y1> <y2> <SUBSET/EXCEPT/FOR qualification>
where <y1> is the first response variable;
<y2> is the second response variable;
and where the <SUBSET/EXCEPT/FOR qualification> is optional.

EXAMPLES

F TEST Y1 Y2
F TEST Y1 Y2 SUBSET Y2 > 0

NOTE 1

To use an alternate value of alpha, simply compare the value on the line labeled F TESTD CDF VALUE to the proper acceptance interval. For example, for alpha = .10, the acceptance interval is:

(0.000,0.900)

NOTE 2

The various values printed by the F TEST command are saved as parameters

DEFAULT

None

SYNONYMS

None

RELATED COMMANDS

CONFIDENCE LIMITS	=	Compute the confidence limits for the mean of a sample.
T TEST	=	Performs a two-sample t test.
CHI-SQUARE TEST	=	Performs a one sample chi-square test that the standard deviation is equal to a given value.
STANDARD DEVIATION	=	Computes the standard deviation of a variable.

REFERENCE

F tests are discussed in most introductory statistics books.

APPLICATIONS

Confirmatory Data Analysis

IMPLEMENTATION DATE

94/2 (the automatic saving of the parameters was implemented 94/12)

PROGRAM

```
SKIP 25
READ AUTO83B.DAT Y1 Y2
DELETE Y2 SUBSET Y2 < 0
.
F TEST Y1 Y2
STATUS PARAMETERS
```

The following output is generated.

```
                      F TEST
HYPOTHESIS BEING TESTING--SIGMA1 = SIGMA2

SAMPLE 1:
   NUMBER OF OBSERVATIONS      =      249
   MEAN                        =    20.14458
   STANDARD DEVIATION          =    6.414700

SAMPLE 2:
   NUMBER OF OBSERVATIONS      =       79
   MEAN                        =    30.48101
   STANDARD DEVIATION          =    6.107710

TEST:
   STANDARD DEV. (NUMERATOR)   =    6.414700
   STANDARD DEV. (DENOMINATOR) =    6.107710
   F TEST STATISTIC VALUE      =    1.103052
   DEG. OF FREEDOM (NUMER.)    =    248.0000
   DEG. OF FREEDOM (DENOM.)    =    78.00000
   F TEST STATISTIC CDF VALUE  =    0.690318

  HYPOTHESIS    ACCEPTANCE INTERVAL    CONCLUSION
SIGMA1 = SIGMA2    (0.000,0.950)         ACCEPT



PARAMETER INFINITY  HAS THE VALUE:     0.3402823E+39
PARAMETER PI        HAS THE VALUE:     0.3141593E+01
PARAMETER STATVAL   HAS THE VALUE:     0.1103052E+01
PARAMETER STATNU1   HAS THE VALUE:     0.2480000E+03
PARAMETER STATNU2   HAS THE VALUE:     0.7800000E+02
PARAMETER POOLSD    HAS THE VALUE:     0.6342600E+01
PARAMETER STATCDF   HAS THE VALUE:     0.6903184E+00
PARAMETER CUTLOW95  HAS THE VALUE:     0.0000000E+00
PARAMETER CUTUPP95  HAS THE VALUE:     0.1373470E+01
PARAMETER CUTLOW99  HAS THE VALUE:     0.0000000E+00
PARAMETER CUTUPP99  HAS THE VALUE:     0.1571454E+01
```