n	*m*
8	8-26
9	9-22
10	10-18
11	11-16
12	12-14
13	13

Because *n* and *m* are interchangeable, *n* should always be the smaller value. For *n*>8 the upper limit in the table matched the maximum that can be computed using the Burr algorithm. There is no point in using method 0 with *m* values exceeding these limits.

References

Burr, E.J., Small sample distributions of the two sample Cramer-von Mises' W^2 and Watson's U^2, *Ann. Mah. Stat. Assoc*., *64*, 1091-1098, 1964.

Tiku, M.L., Chi-square approximations for the distributions of goodness-of-fit statistics, *Biometrica*, *52*, 630-633, 1965.

See Also

Chapter III-12, **Statistics** for a function and operation overview; the **StatsWatsonUSquaredTest** and **StatsInvUSquaredCDF** functions.

StatsVariancesTest

`StatsVariancesTest [`*`flags`*`] [`*`wave1, wave2,… wave100`*`]`

The StatsVariancesTest operation performs Bartlett's or Levene's test to determine if wave variances are equal. Output is to the W_StatsVariancesTest wave in the current data folder or optionally to a table.

Flags

/ALPH = *val*	Sets the significance level (default *val*=0.05).
/METH=*m*	Specifies the test type. *m*=0: Bartlett test (default). *m*=1: Levene's test using the mean. *m*=2: Modified Levene's test using the median. *m*=3: Modified Levene's test using the 10% trimmed mean.
/Q	No results printed in the history area.
/T=*k*	Displays results in a table. *k* specifies the table behavior when it is closed. *k*=0: Normal with dialog (default). *k*=1: Kills with no dialog. *k*=2: Disables killing. The table is associated with the test, not the data. If you repeat the test, it will update any existing table with the new results.
/WSTR=*waveListString*	Specifies a string containing a semicolon-separated list of waves that contain sample data. Use *waveListString* instead of listing each wave after the flags.
/Z	Ignores errors. V_flag will be set to -1 for any error and to zero otherwise.

Details

All tests define the null hypothesis by

$$H_0: \qquad \sigma_1^2 = \sigma_2^2 = \ldots = \sigma_k^2,$$

against the alternative

$$H_a: \qquad \sigma_i^2 \neq \sigma_j^2 \ \ for\ at\ least\ one\ i \neq j.$$

Bartlett's test computes:

$$T = \frac{(n-k)\ln\left(\sigma_w^2\right) - \sum_{i=1}^{k}(n_i - 1)\ln\left(\sigma_i^2\right)}{1 + \frac{1}{3(k-1)}\left[\sum_{i=1}^{k}\frac{1}{n_i - 1} - \frac{1}{N-k}\right]}.$$

Here $\sigma^2{}_i$ is the variance of the *i*th wave, N is the sum of the points of all the waves, n_i is the number of points in wave i, and k is the number of waves. The weighted variance is given by

$$\sigma_w^2 = \sum_{i=1}^{k}\frac{(n_i - 1)\sigma_i^2}{N-k}.$$

H_0 is rejected if T is greater than the critical value taken from the χ^2 distribution computed by solving for x:

$$1 - alpha = 1 - gammq\left(\frac{k-1}{2}, \frac{x}{2}\right).$$

Levene's test computes:

$$W = \frac{(N-k)\sum_{i=1}^{k} n_i\left(\overline{Z}_i - \overline{Z}\right)^2}{(k-1)\sum_{i=1}^{k}\sum_{j=1}^{k}\left(Z_{ij} - \overline{Z}_i\right)^2},$$

where

$$Z_{ij} = \left|Y_{ij} - \overline{Y}_i\right|,$$

$$\overline{Z}_i = \frac{1}{n_i}\sum_{j=1}^{k} Z_{ij},$$

$$\overline{Z} = \frac{1}{N}\sum_{i=1}^{k}\sum_{j=1}^{k} Z_{ij}.$$

$\bar{Y}_i$ depends on /METH.

H_0 is rejected if W is greater than the critical value from the F distribution computed by solving for x:

$$1 - alpha = 1 - betai\left(\frac{\nu_2}{2}, \frac{\nu_1}{2}, \frac{\nu_2}{\nu_2 + \nu_1 x}\right).$$