

Details

The input waves, *srcWave1* and *srcWave2*, each must contain at least two angles in radians (mod 2π), can have any number of dimensions, and can be single or double precision. They must not contain any NaNs or INFs.

The Watson U² H₀ postulates that the two samples came from the same population against the different populations alternative. In the calculation, StatsWatsonUSquaredTest ranks the two inputs, accounts for possible ties, computes the test statistic U², and compares it with the critical value. Because of the difficulty of computing the critical values, it always computes first the approximation due to Tiku and if possible it computes the exact critical value using the method outlined by Burr. You can evaluate the U2 CDF to get more information about the critical region.

V_flag will be set to -1 for any error and to zero otherwise.

References

We have found that this method leads to slightly different results depending on the compiler and the system on which it is implemented:

Burr, E.J., Small sample distributions of the two sample Cramer-von Mises' W2 and Watson's U2, *Ann. Math. Stat. Assoc.*, 64, 1091-1098, 1964.

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

See Also

Chapter III-12, Statistics for a function and operation overview; **StatsWatsonWilliamsTest**, **StatsWheelerWatsonTest**, **StatsUSquaredCDF**, and **StatsInvUSquaredCDF**.

StatsWatsonWilliamsTest

StatsWatsonWilliamsTest [*flags*] [*srcWave1*, *srcWave2*, *srcWave3*,...]

The StatsWatsonWilliamsTest operation performs the Watson-Williams test for two or more sample means. Output is to the W_WatsonWilliams wave in the current data folder or optionally to a table.

Flags

/ALPH = *val* Sets the significance level (default *val*=0.05).

/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.

Details

The StatsWatsonWilliamsTest must have at least two input waves, which contain angles in radians, can be single or double precision, and can be of any dimensionality; the waves must not contain any NaNs or INFs.

The Watson-Williams H₀ postulates the equality of the means from all samples against the simple inequality alternative. The test computes the sums of the sines and cosines from which it obtains a weighted r value (rw). According to Mardia, you should use different statistics depending on the size of rw: for rw>0.95 use the simple F statistic, but for 0.95>rw>0.7 you should use the F-statistic with the K correction factor. Otherwise you should use the t-statistic. StatsWatsonWilliamsTest computes both the (corrected) F-statistic and the t-statistic as well as their corresponding critical values.

V_flag will be set to -1 for any error and to zero otherwise.