Contingency periodogram

Description

Function `periodograph` computes a contingency periodogram for a univariate series of qualitative data.

Usage

```
periodograph(x, T1=2, T2=NULL, nperm=NULL, alpha=0.05, graph=TRUE)
```

Arguments

x	A vector of qualitative values (classes).
T1	First period included in the calculations (default: T1 = 2).
T2	Last period included in the calculations (default: T2 = n/2).
nperm	Number of permutations for the chi-square test. For chi-square tests using the chi-square distribution, use the default nperm=NULL.
alpha	Significance level for computation of the confidence limits.
graph	TRUE (default) if a graph is requested.

Details

The contingency periodogram of Legendre et al. (1981) identifies periodic components in qualitative data vectors. The vector may contain classes of a qualitative variable or the classes obtained by hierarchical clustering or partitioning of a multivariate data table. The method is also described in Legendre & Legendre (2012).

The optional graph produced by the function shows the following information:

   - In red: the B statistics (information in common).

   - In blue: Confidence limits for B without correction.

   - In green: Bonferroni-corrected limits of the confidence intervals.

   - In black: Confidence limits with progressive Bonferroni correction.

Value

out	A table with the statistics for the selected periods: • Wilks' chi-square statistic (Wilks.chisq), • information in common (B), • degrees of freedom (df), • p-value (prob).

Confidence interval limits:
• critical value of B without correction (B.crit),
• critical value of B with Bonferroni correction based on the number of periods
   studied in the periodogram (B.crit.Bonf),
• critical value of B with progressive Bonferroni correction (B.prog.Bonf).

References

Legendre, L., M. Fréchette & P. Legendre. 1981. The contingency periodogram: a method of identifying rhythms in series on nonmetric ecological data. *Journal of Ecology* 69: 965-979.

Legendre, P. and Legendre, L. 2012. *Numerical Ecolog*y. 3rd English ed. Elsevier, Amsterdam.

Author

Pierre Legendre, Departement de Sciences Biologiques, Universite de Montreal.

Example

```
# Data from the numerical example of Subsection 12.4.2 of Legendre and Legendre (2012).

test.vec <- c(1,1,2,3,3,2,1,2,3,2,1,1,2,3,3,1)

# Periodogram with tests using the chi-square distribution
res <- periodograph(test.vec)

# Periodogram with permutation tests
res <- periodograph(test.vec, nperm=2000, graph=FALSE)
```