rdaTest {sonarX} R Documentation

Compute a canonical redundancy analysis

Description

This function computes simple redundancy analysis (RDA) for partial RDA, with permutation tests, following the algorithm described in Numerical Ecology, Chapter 11 (Legendre & Legendre, 1998).

Usage

```
rdaTest(
        YY.mat, XX.mat, which.cov=NULL, scale.Y=FALSE, testF=NULL,
        nperm=999, print.res=TRUE, print.cum=FALSE)
```

Arguments

`YY.mat`	The (nxp) site-by-species data table.
`XX.mat`	The (nxm) table of explanatory variables. The number of variables (m) is recomputed after eliminating collinear explanatory variables, if any. Covariables, if any, are also found in that table.
`which.cov`	A vector (1xmax(m-1)) defining the covariables by their column numbers in XX.mat.
`scale.Y`	A logical value (TRUE or FALSE) defining if YY.mat should be standardized (TRUE), or only centred on the column means (FALSE).
`testF`	If NULL, the program will ask the user if he/she wishes to test the F statistic. If testF is TRUE or FALSE, no question will be asked; the program will perform the test, or not, in accordance with that indication.
`nperm`	Number of permutations for the F test. If NULL, a question will be asked by the program.
`print.res`	Prints most of the rdaTest output on the screen.
`print.cum`	Prints the fractions of the response variable's (e.g. species) variances explained by canonical axes 1, 2, 3, ... and by the whole canonical analysis.

Value

If print.res = TRUE, the function prints the following information to the R window: - The variance inflation factors for the explanatory variables (the covariables are not included in these calculations). - The bimultivariate redundancy statistic (canonical R-square), as well as the adjusted R-square when there are no covariables in the analysis. - Test of significance of the canonical relationship: the F statistic and permutational probability. Note: the degrees of freedom of F are not corrected for collinearity between the explanatory variables and the covariables. This has no influence on the associated permutational probability. - The number of objects, number of response variables, and number of explanatory variables after removing collinear variables; the number of canonical eigenvalues larger than 0. - The total variance in matrix YY.mat, i.e., the SS/(n-1). - The eigenvalues, relative eigenvalues, and the cumulative % the variance of

species data accounted for by the sucessive canonical eigenvalues. The function also returns an output list containing the following ELEMENTS:

`VIF`	Variance inflation factors for the explanatory variables X; the value is 0 for entirely collinear variables. The covariables are not included in this calculation.
`canEigval`	Canonical eigenvalues.
`U`	(pxk) Canonical eigenvectors normalized to 1 (scaling 1).
`USc2`	(pxk) Canonical eigenvectors normalized to sqrt(eigenvalue) (scaling 2).
`F`	(nxk) Matrix of object scores (scaling 1).
`Z`	(nxk) Matrix of fitted object scores (scaling 1).
`FSc2`	Matrix of object scores (scaling 2).
`ZSc2`	Matrix of fitted object scores (scaling 2).
`biplotScores1`	Biplot scores of explanatory variables (scaling 1).
`biplotScores2`	Biplot scores of explanatory variables (scaling 2).
`FitSpe`	Table of cumulative fit per species (in %) as fraction of variance of species.
`VarExpl`	Vector of total % fit per species after all canonical axes.
`ProbFrda`	Probability associated with F test of the canonical relationship.
`X.mat`	Original X matrix (required by the plotting function).
`AxisVar`	Eigenvalues as in Canoco: fraction of variance of YY.mat explained by each canonical axis.

Note

This is a beta version.

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References

Legendre, P. and L. Legendre. 1998. Numerical Ecology. Second English Edition. Elsevier, Amsterdam.

See Also

graph.rdaTest

Examples

```
# Example from Legendre & Legendre (1998), p. 590, Table 11.3
data(coral)
Table = as.matrix(coral)
Y=Table[,1:6]
X=Table[,7:10]
```

```
# Numerical Ecology
resultats <- rdaTest(Y,X,nperm=99,testF=TRUE)
graph.rdaTest(resultats,plot.type="F",stars=FALSE,lty.ell=3, centroid=FALSE)

#or
graph.rdaTest(resultats,plot.type="F",lty.ell=3,pos.site=4, mai.perc=0.15)

resultats <- rdaTest(Y,X,testF=TRUE,nperm=9,scale.Y=FALSE,
print.res=FALSE, print.cum=FALSE)
graph.rdaTest(resultats,xax=-1,yax=2, mul.spc=0.90,
mul.env=0.70, mul.text=0.10, scaling=1,
plot.type="F",mai.perc=0.15, stars=FALSE, pos.site=4, centroid=FALSE)
```

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