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# Ordination analysis

## RDA, tb-RDA & CCA (constrained ordination)

Theory **R functions** Examples Exercise 

### R functions

- **rda** - this function calculates RDA if matrix of environmental variables is supplied (if not, it calculates PCA). Two types of syntax are available:
  - matrix syntax - `RDA = rda (Y, X, W)`, where Y is the response matrix (species composition), X is the explanatory matrix (environmental factors) and W is the matrix of covariables
  - formula syntax - `RDA = rda (Y ~ var1 + factorA + var2*var3 + Condition (var4), data = XW)` - as explanatory are used: quantitative variable var1, categorical variable factorA, interaction term between var2 and var3, whereas var4 is used as covariable and hence partialled out.
- **cca** - this function calculates CCA if matrix of environmental variables is supplied (if not, it calculates CA).
- **RsquareAdj** - in case of CCA, it extracts only the value of  $R^2$ , while values of adjusted  $R^2$  are not available (these need to be calculated by permutations and it is not available in R yet).
- **anova.cca** - tests the significance of the variation in species composition explained by explanatory variables, using Monte Carlo permutation test.

From:

<https://anadat-r.davidzeleny.net/> - **Analysis of community ecology data in R**

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Last update: **2019/01/26 18:36**