

School of Environmental Systems Engineering
The University of Western Australia
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WWW page for free software: <http://www.bio.umontreal.ca/legendre/>

WWW page for this course : <http://biol09.biol.umontreal.ca/Perth09/>

Master Class on

Recent Advances in Spatial Analysis of Multivariate Environmental Data: Theory and Practice

Day 1

0. Introduction to data analysis.
1. Ordination in reduced space: principal component analysis (PCA), principal coordinate analysis (PCoA), correspondence analysis (CA).
2. Transformation of species abundance data tables prior to linear analyses.

Day 2

3. Measures of similarity and distance, especially for community composition data.
4. Multiple regression. R-square and adjusted R-square. Partial regression.

Day 3

5. Statistical testing by permutation.
6. Canonical redundancy analysis (RDA) and canonical correspondence analysis (CCA).
Multivariate analysis of variance by canonical analysis.

Day 4

7. Forward selection of environmental variables in RDA.
8. Spatial modelling: Origin of spatial structures. Multi-scale modelling of the spatial structure of ecological communities (PCNM). Extensions: MEM, AEM. Test of space-time interaction in repeated surveys.

Day 5, morning

9. Spatial structure functions: correlograms, variograms. Control for spatial autocorrelation in tests of species-environment relationships.
10. Cartographic interpolation, kriging.
11. Spatial variation partitioning: canonical analysis or Mantel test?

Day 5, afternoon

- Discussion of study cases presented by participants.

⇒ Afternoons, days 1–4: Practicals about these topics using the R language

- Introduction to the R statistical language (file: Introduction_to_R.pdf)
- Practicals in the R language: Basic matrix operations (file: Basic_matrix_operations.pdf)
- Practicals using the R statistical language (file: Practicals_in_R.pdf)