- Faculté des sciences
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Multivariate analysis (3ST2004)

Filières concernées	Nombre d'heures	Validation	Crédits ECTS
Master en statistique	**Cours: 2 ph**	**écrit: 2 h**	3

ph=période hebdomadaire, pg=période globale, j=jour, dj=demi-jour, h=heure, min=minute

Période d'enseignement:

- Semestre Automne

Equipe enseignante:

Prof. Yves Tillé
Institut de statistique

Objectifs:

This course is designed to broaden the student's understanding of the statistical processing of multi-variate data. It should enable him or her to master both the theoretical background and the context of applications of multivariate analysis. At the end, the student should be able to apply the multivariate techniques presented in this course to his or her own research studies and to carry out real life appli-cations with a critical appraisal of the results and conclusions. The main domains leading to multivariate data sets are socio-economic surveys, biometrics, behavioural sciences, geographic data bases, demography, marketing research.

Contenu:

1. Brief review of basics of statistics and matrix algebra.
2. Exploratory Multivariate Analysis: Principal axes techniques (singular value decomposition, principal component analysis, simple and multiple correspondence analysis, discriminant analysis).
3. Exploratory Multivariate Analysis: Clustering techniques (hierarchical clustering, k-means and re-lated methods, self organizing maps).
4. Links between these exploratory tools and some classical model based methods such as general-ised linear models, discriminant analysis, and regression trees.
Eventually, since hand calculations are virtually impossible in this field, illustrations will be performed with the aid of the software R.

Forme de l'évaluation:

2 hours written exam during the session.

Documentation:

- Y. Tillé, Multivariate Analysis (2011) Course notes.
- L. Lebart, A. Morineau, K. Warwick (1984) Multivariate Descriptive Statistical Analysis, Wiley (Wiley Series in Probability and Mathematical Statistics), New York
- L. Lebart, M. Piron, A. Morineau (2006) Statistique Exploratoire Multidimensionnelle, Dunod, 4ème édition, 480p (in French)
- K. V. Mardia, J. T. Kent, J. M. Bibby (1980) Multivariate Analysis London; Academic Press (Probability and mathematical statistics), New York.

Pré-requis:

basics in statistics and linear algebra

Forme de l'enseignement:

- 3 ECTS credits
- Compulsory course for master in statistics
- Autumn Semester