WINTER 2014 COURSE ANNOUNCEMENT

STATISTICS 542

MULTIVARIATE STATISTICAL ANALYSIS: CLASSICAL THEORY AND RECENT DEVELOPMENTS

Time: MWF 2:30-3:20pm
Place: C301 Padelford Hall
Instructor: Michael Perlman, Statistics Dept, B310 Padelford
michael@stat.washington.edu

Prereq: STAT 581-2, including familiarity with hypothesis testing, decision theory, and invariance, plus linear algebra and matrix theory. BIOSTAT/STAT 533 (univariate linear models) is also helpful.

The first 2/3 of the course will concentrate on "classical" multivariate analysis, i.e, distribution theory and statistical inference based on the multivariate normal distribution. The last 1/3 will cover special topics of interest to the instructor and/or requested by the class. There will be several homework assignments. Time permitting, each registered student will report on a topic of interest to her/him.

Topics include (as time permits):
0. Brief review of the multivariate normal distribution: pdf, marginal and conditional distributions, covariance matrix, correlations and partial correlations.
1. The Wishart distribution: definition and properties, distribution of the sample covariance matrix, marginal and conditional distributions.
2. Estimation and testing: likelihood inference and invariance. Hotelling's $T^2$ test, multivariate linear models and MANOVA, testing independence, Bartlett's tests for equality of covariance matrices. The James-Stein estimator for the mean vector, the Stein estimator for the covariance matrix.
3. Group symmetry in estimation and testing (the Copenhagen theory.)
5. Multivariate probability inequalities and their applications to the power of multivariate tests and multiparameter confidence intervals.
6. Lattice conditional independence models and their applications to missing data problems and "seemingly unrelated regression" models.
REFERENCES
Books/Notes:

Articles by the instructor and/or colleagues: