PhD School in Statistics
XXIV cycle, 2009

Theory and Methods of Statistical Inference

(first part: A. Salvan, N. Sartori, L. Pace)
(second part: G.S. Datta, R. Maronna)

Syllabus (first part)

Statistical models and likelihood: Review (parametric, semiparametric and nonparametric models). Approaches to statistical inference.

Data and model reduction: Sufficiency and conditioning upon distribution constant statistics. Pivotal quantities, estimating equations, composite likelihood.

Basic techniques: Moments, cumulants and generating functions. Basic ideas on asymptotic techniques. Review and further results on asymptotic likelihood theory. Empirical distribution function. Simulation techniques. Optimal inference procedures.

Data and model reduction in the presence of nuisance prameters: Marginal and conditional likelihoods, profile and adjusted profile likelihoods, quasi-likelihood, empirical likelihood.

Exponential families: Mathematical theory. Parameterizations and variance function. Optimal and likelihood inference.

Exponential dispersion families: Exponential dispersion families and introduction to generalized linear models.

Group families: Group families as an extension of scale and location families. Mathematical theory. Optimal and likelihood inference. Some nonparametric problems.

Lectures and topics (first two weeks only, dates from March 16 will be added later on)

date		**topic**	instructor
03/03/09:	9.00–11.00	course presentation, some prerequisites	AS
06/03/09:	9.00–11.00	*Sweave* =R x LaTeX^2	NS
10/03/09:	9.00–11.00	statistical models: data variability and sampling variability	AS
13/03/09	9.00–11.00	generating functions, moment approximations, transformations	AS
17/03/09	9.00-11.00	likelihood: observed and expected quantities, exact sampling properties	AS
20/03/09	9.00-11.00	review-exercises	AS
24/03/09	9.00-11.00	likelihood inference (first-order asymptotics)	NS
27/03/09	9.00-11.00	likelihood inference (first-order asymptotics)	NS
31/03/09	9.00-11.00	review-exercises	AS
03/04/09	9.00–11.00	lab. on "likelihood: graphical and numerical techniques with R, I "	NS
07/04/09	9.00–11.00	estimating equations and pseudolikelihoods	NS
17/04/09	9.00–11.00	data and model reduction by marginalization and conditioning	AS
21/04/09	9.00–11.00	lab. on "likelihood: graphical and numerical techniques with R, II "	NS
24/04/09	9.00–11.00	the frequency decision paradigm	AS
28/04/09	9.00–11.00	exponential families	AS
30/04/09	9.00–11.00	exponential dispersion models, generalized linear models	AS
05/05/09	9.00–11.00	group families	AS
08/05/09	9.00–11.00	higher-order likelihood theory	NS
12/05/09	9.00–11.00	review-exercises	
13/05/09	9.00–11.00	exam on the first part	
18/05/09	14.00-15.00	writing papers or reports+ paper assignment	

Instructors: AS is Alessandra Salvan, NS is Nicola Sartori.

First part of course (excluding Bayesian Inference by Gauri S.Datta and Robust Inference by Ricardo Maronna) will finish by May 12. Exam on first part: May 13.

Final paper presentation: June 4 within 24.00

Seminars: June 8.

References

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