Bayesian Statistical Theory II

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Course description

The course builds on the course *Bayesian Theory I*, developing theoretical concepts and fundamental methodological ideas for Bayesian learning in several classes of problems, beyond the basic case of exchangeable data. Examples will include multiple experiments, structured data and temporal data.

Syllabus

- Decision theoretical foundations: historical overview.
  Admissibility and Bayesian decision rules.
  Summaries of posterior and predictive distributions in a decision setting.

- Elicitation of the prior distribution.
  Bayes and Empirical Bayes.
  Predictive characterizations.

- Conditional independence, hierarchical models, latent variables models.
  Example: Modeling heterogeneity. Mixture models.

- Partial exchangeability.
  Theoretical properties and examples.
  Bayesian regression.

- Markov exchangeability.
  Bayesian inference for Markov chains.
  Johnson's sufficientness postulate. Predictive constructions.

- Bayesian state-space models for temporal data.
  Hidden Markov models.
  Dynamic linear models.

References will be provided along the course.

Exam: periodic assignments; oral presentation and discussion.