A short course in model selection and sparse models.

IFUM Montevideo 2011

Model selection is an important issue of modern statistics. Besides the classical results using penalties based on the size of the model: Cp AIC BIC, a new kind of techniques have appeared with $L^1$ penalties and the LASSO (Tibshirani, 1996) and the work of Donoho and Candes on sparse models.

Date

The duration of the course will be approximately ten days. Beginning 28th February and ending around March 11th.

Place of the meeting

This school will take place at Centro de Matemática Montevideo Uruguay. This centric place will allow the participation of students and researchers coming from various countries of Cono Sur.

Public

We hope the participation of both graduate students coming from regional Universities (Uruguay, Argentina and others) and researchers interested by the topic. We expect around 20-30 participants. There will be mainly 3 speakers:

- Jean-Marc Azaïs- Institut de Mathématiques de Toulouse.  
  http://www.math.univ-toulouse.fr/ azais/

- Fabrice Gamboa-Institut de Mathématiques de Toulouse.  
  http://www.math.univ-toulouse.fr/ gamboa/

- Guillaume Obozinsk-Ecole Normale Supérieure Paris.  
  http://www.stat.berkeley.edu/ gobo/
Mainly we will address new trends in mathematical statistics around sparse models. This includes recent development on $L^1$ methods. In particular, the following topics will be addressed:

- The problem of over-fitting when the sizes increase ([11]),
- Selection of models by classical tools: Mallows CP, BIC, penalized likelihood,..
- Model selection using Lasso, ([12], [10], [9]).
- Dantzig selector and compress sensing ([2],[3], [1],[4],[8],[5],[7],[6]),
- Oracle inequalities,
- Lasso and machine learning, application to genetics.

The courses will be illustrated by computer demonstrations. The languages will be spanish and english.

References


