The proposed topics are connected to my expertise in applied statistics, biostatistics and Bayesian inference methods:

- Smoothing methods and semi-parametric regression models based on penalized B-splines (Bayesian P-splines);
- Inference in models specified by differential equations;
- Analysis of time-to-event / survival data (including interval-censored and clustered data); specific interest in cure survival and multi-state models;
- ...

Depending on the specific interest and abilities of the student, the master thesis might be

(1) the study of a few research papers with a replication of the claimed results on an example or using simulations;
(2) a careful analysis of a database using advanced statistical tools;
(3) a project starting from a student proposal provided that it is closely connected to my expertise or interest for future research.

Bayesian inference will be the chosen paradigm in any case.

For more information, do not hesitate to come and see me at the stats institute or to contact me by email (p.lambert@uliege.be).

The following pages provide a non-exhaustive list of possible subjects:
Subject 1 - Auxiliary mixture sampling methods with applications

Description
Auxiliary mixture sampling is a data-augmentation method associating to a non-normal and non-linear regression model, a standard multiple regression model from which inference for the initial model parameters can easily be made.

That technique was successfully used in different frameworks including logistic, multinomial and log-linear regression models and their extensions to analyse longitudinal discrete data.

Goals

– Study and carefully describe that statistical inference method; review the statistical literature in the area.
– Delevop R code implementing that method in different contexts.

Prerequisites

– Basic knowledge in Bayesian inference and in discrete data models.
– Familiarity with the R software.

Some references


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