



Possible topics for master theses

Riccardo De Bin

debin@math.uio.no

Research interests



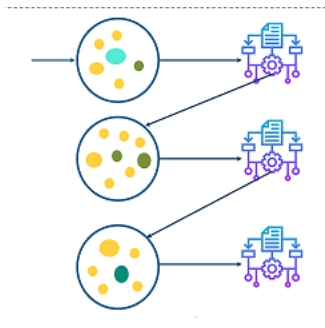
Research interests:

- statistical learning (STK-IN4300);
- boosting;
- high-dimensional data;
- pseudo-likelihoods.

Topics for master theses:

- statistical boosting;
- identification of influential points in HDD;
- publication bias and p-hacking in meta-analyses;
- Treatment of nuisance parameters.

Statistical Boosting



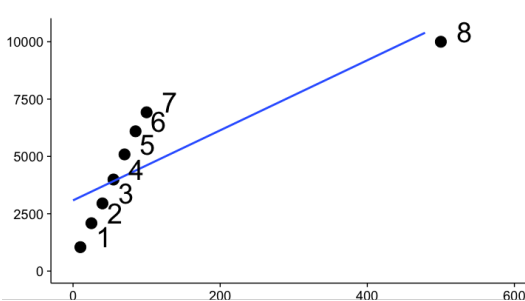
Master theses project:

- application to FHT models with Vegard Stikbakke;
- working in HDD;
- now limited to Wiener process;
- extension to other stochastic processes (e.g., Poisson, Gamma, ...).

Statistical boosting:

- statistics $\cup$ machine learning;
- works in HDD
- excellent performance.

Identification of influential points



Master theses project:

- many approaches for LDD;
- developed an extension to HDD for ridge regression with Kristoffer Hellton and Camilla Lingjærde;
- adapt to other approaches (lasso, boosting, ...).

Influential points:

- observations that influence the model fitting process;
- may compromise the analysis.

Publication bias and p-hacking in meta-analyses



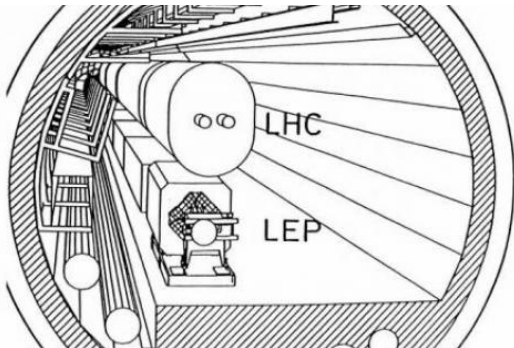
Master theses project:

- new models developed with Jonas Moss;
- direct effect, no covariates involved;
- PB and PH may depend on some, e.g., sample size;
- extend the models to include the sample size.

Publication bias and p-hacking:

- PB: only part of the results available;
- PH: hack the results;
- strong negative effect on meta-analyses.

Treatment of nuisance parameters



Master theses project:

- contrast simple methods (profile likelihood) with higher order tools (e.g., MPL, IL, ...);
- simplified problem;
- real data from physics.

Treatment of nuisance parameters:

- data from HEP;
- search for new physics;
- many nuisance parameters;