UiO : University of Oslo

Department of Mathematics
Section of Statistics and Data Science

Seminar Series in Statistics and Data Science

15.10.2019, 14:15 @ Erling Sverdrups plass, Niels H. Abels hus, 8th floor

Umberto Picchini: Stratified sampling and bootstrapping for approximate Bayesian computation

Abstract: Approximate Bayesian computation (ABC) is the most popular methodology for likelihood-free inference. Its main feature is the ability to bypass the explicit calculation of the likelihood function, by only requiring access to a model simulator to generate many artificial datasets. However, ABC is computationally intensive for complex model simulators. To exploit expensive simulations, nonparametric bootstrapping was used with success in [1] to obtain many artificial datasets at little cost and construct a "synthetic likelihood" (another likelihood-free procedure). When using the same approach within ABC to produce a pseudo-marginal ABC-MCMC algorithm, the posterior variance results inflated, thus producing biased posterior inference. Here we construct approximations of the ABC likelihood using stratified Monte Carlo, to considerably reduce the bias induced by bootstrapping. We show that it is possible to obtain reliable inference using a larger than usual ABC threshold, by employing stratified Monte Carlo. Finally, we show that by averaging over multiple bootstrapped datasets, we obtain a less variable ABC likelihood and smaller integrated autocorrelation times. [joint work with Richard Everitt]

[1] Everitt (2017). Bootstrapped synthetic likelihood. arXiv preprint arXiv:1711.05825.

Umberto Picchini
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Umberto Picchini is an Associate Professor at the Department of Mathematical Sciences of the Chalmers University of Technology and University of Gothenburg (SWE). He is interested in statistical inference for stochastic modelling, and especially Bayesian computational methods. For example, he is interested in MCMC, sequential Monte Carlo (particle filters) and especially âĂIJlikelihood-freeâĂİ methods, such as approximate Bayesian computation (ABC). He has a special interest in stochastic modelling (e.g. stochastic differential equations) and applications in biomedicine.

Next seminar

22.10.2019 @ 14:15 **Stefan Michiels**
Inst. Gustave Roussy and Univ. Paris-Saclay (FRA)

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