

Sequential quasi-Monte Carlo: recent advances and new applications

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The objective of this talk is twofold. First, I would like to present SQMC (Sequential quasi-Monte Carlo), a class of algorithms that merges particle filtering and QMC. Contrary to previous presentations, I will not assume prior knowledge from the audience of particle filtering, state-space modelling and Feynman-Kac representations. I will thus take to introduce these notions and the motivation to perform particle filtering. Second, I would like to discuss some recent extensions and applications of SQMC, in particular to partly observed diffusion models, which are infinitely-dimensional. QMC techniques, and particularly SQMC, tend to suffer from a curse of dimensionality: their performance gain, relative to Monte Carlo tends to vanish for large-dimensional problems. However, by exploiting well-known properties of partly observed diffusion models, we are able to implement SQMC so that it outperforms significantly standard particle filtering.