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R. Douc : Sampling by auxiliary target distributions: from the teleportation algorithm to the importance sampling Markov chain.

vendredi 13 septembre 2024 09:30 (40 minutes)

This review presentation brings together several works conducted in collaboration with Alain Durmus, Jimmy Olsson, Aurélien Enfroy, Charly Andral, Christian Robert, and Yazid Janati.

In this presentation, we will introduce the teleportation algorithm and the importance sampling algorithm by Markov chains. These two algorithms share the common principle of obtaining a chain targeting a given distribution from a simple transformation of a Markov chain aimed at an auxiliary distribution. Importance sampling by Markov chain is based on decimation and reproduction procedures that enable transitions between modes while reproducing points in the vicinity of the modes. The teleportation algorithm helps to diversify points around the modes and thus acts complementarily to importance sampling by Markov chain. We demonstrate that under weak conditions, essential properties such as the law of large numbers, geometric ergodicity, and the central limit theorem are preserved through these two operations. We will also present some approaches for sequentially combining these two algorithms to gradually transition through a sequence of intermediate laws, from a Markov chain targeting a standard distribution to a chain targeting the desired distribution, thereby providing a promising alternative to sequential Monte Carlo methods.