Department of Decision Sciences
Statistics Seminar

Variance estimation in the particle filter

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12:30 pm Room 3-E4-SR03 Via Roentgen 1 Milano

Abstract

Particle filters, or sequential Monte Carlo methods, are random algorithms for approximating certain types of integrals that arise in the analysis of data. I will present new variance estimators for the resulting approximations that can be computed using a single run of the algorithm. This builds upon advances on the one hand by Chan and Lai, who proposed the first variance estimator with this feature, and by C´erou, Del Moral and Guyader, who derived non-asymptotic second moment expressions for particle filter approximations. As the number of particles grows, the variance estimators we propose are weakly consistent for asymptotic variances of the Monte Carlo approximations and some of them are also non-asymptotically unbiased. The asymptotic variances can be decomposed into terms corresponding to each time step of the algorithm, and we show how to estimate each of these terms consistently.

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