ON THE USE OF PARTICLE FILTERING FOR MAXIMUM LIKELIHOOD PARAMETER ESTIMATION (ThuAmOR5)

Author(s) :

Olivier Cappé (Centre National de la Recherche Scientifique, France)
Eric Moulines (Ecole Nationale Supérieure des Télécommunications, France)

Abstract :

Particle filtering − perhaps more properly named Sequential Monte Carlo − approaches have a strong potential for signal and image processing applications. A problem of great practical significance in this field, which remains largely unsolved as of today, is the estimation of fixed model parameters based on the output of sequential simulations. In this contribution, we investigate maximum likelihood estimation approaches based either on gradient or EM (Expectation−Maximization) techniques and show that several recently proposed methods share the common feature of requiring the approximation of the expectation of a sum functional of the hidden states, conditionally on all the available observations. Considering this general task, we discuss empirical results concerning the influence of the number of particles and sample size. We also propose a robustification of the basic particle estimator which is based on forgetting ideas.

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