Doucet & Johansen (2009)

Mar 13, 2025

Impact

- Cited 2800 times

- Updates Doucet, de Freitas & Gordon, eds. (2001) "Sequential Monte Carlo methods in practice" (10400 cites)

- A practical introduction is: Arulampalam, Maskell, Gordon, & Clapp (2002) "A tutorial on particle filters for online nonlinear/non-Gaussian Bayesian tracking" (16300 cites)

Plug-and-play property

- a.k.a. simulation based, likelihood-free, equation free

- The basic particle filter (sec. 4.1, with q=f) is p&p

- engineering applications may emphasize speed over model fidelity

Particle depletion and the curse of dimensionality

- Why does the sample size needed for importance sampling increase exponentially with the dimension?

Relationship between this review and the pomp package

- pomp has *de facto* focused on plug-and-play

- Rao-Blackwellization can make things much quicker, e.g., for a self-driving car, for which filtering failures can lead to tragic consequences