



[Econometric Reviews](#) >  
Volume 31, 2012 - Issue 3

2,250 Views | 152 CrossRef citations to date | 6 Altmetric

Original Articles

# A Survey of Sequential Monte Carlo Methods for Economics and Finance

Drew Creal

Pages 245-296 | Accepted author version posted online: 04 Oct 2011, Published online: 28 Nov 2011

Download citation <https://doi.org/10.1080/07474938.2011.607333>

Sample our  
Mathematics & Statistics  
Journals  
>> [Sign in here](#) to start your access  
to the latest two volumes for 14 days

Full Article Figures & data References Citations Metrics

Reprints & Permissions

[Get access](#)

## Abstract

This article serves as an introduction and survey for economists to the field of sequential Monte Carlo methods which are also known as particle filters. Sequential Monte Carlo methods are simulation-based algorithms used to compute the high-dimensional and/or complex integrals that arise regularly in applied work. These methods are becoming increasingly popular in economics and finance; from dynamic stochastic general equilibrium models in macro-economics to option pricing. The objective of this article is to explain the basics of the methodology, provide references to the literature, and cover some of the theoretical results that justify the methods in practice.

Keywords: [Kalman filter](#) [Markov chain Monte Carlo](#) [Particle filter](#) [Sequential Monte Carlo](#)  
[State space models](#)

JEL Classification: [C11](#) [C15](#) [C32](#)

## ACKNOWLEDGMENTS

I would like to thank Charles Bos, Siem Jan Koopman, Michael Massmann, Herman van Dijk, Eric Zivot, participants at the Emerging Methods in Bayesian Econometrics Workshop at Erasmus Universiteit Rotterdam, and two anonymous referees for constructive comments. I would also like to acknowledge financial support from the Grover and Creta Ensley Fellowship, which funded part of this research while I was a graduate student at the University of Washington. All the computations reported in this article were carried out using the OxMetrix 6.0 programming environment of Doornik (2009). Ox and some Matlab code are available upon request from the author.



## Related research

People also read

Recommended articles

Cited by  
152

[Particle Learning of Gaussian Process Models for Sequential Design and Optimization >](#)

Robert B. Gramacy et al.  
Journal of Computational and Graphical Statistics  
Published online: 1 Jan 2012

[A Dynamic Multivariate Heavy-Tailed Model for Time-Varying Volatilities and Correlations >](#)

Drew Creal et al.  
Journal of Business & Economic Statistics  
Published online: 24 Jan 2012

[Partial Factor Modeling: Predictor-Dependent Shrinkage for Linear Regression >](#)

P. Richard Hahn et al.  
Journal of the American Statistical Association  
Published online: 27 Sep 2013

[View more](#)

## Information for

[Authors](#)  
[R&D professionals](#)  
[Editors](#)  
[Librarians](#)  
[Societies](#)

## Opportunities

[Reprints and e-prints](#)  
[Advertising solutions](#)  
[Accelerated publication](#)  
[Corporate access solutions](#)

## Keep up to date

Register to receive personalised research and resources by email

 [Sign me up](#)



## Open access

[Overview](#)  
[Open journals](#)  
[Open Select](#)  
[Dove Medical Press](#)  
[F1000Research](#)

## Help and information

[Help and contact](#)  
[Newsroom](#)  
[All journals](#)  
[Books](#)