Masoumeh Mohammadi

Lehrstuhl für Wissenschaftliches Rechnen, Universität Würzburg

Analysis of discretization schemes for Fokker-Planck equations and related optimality systems

For Fokker-Planck (FP) equations two different discretization schemes are investigated; considering two cases of bounded and unbounded domains. These FP equations of parabolic type govern the time evolution of the probability density function (PDF) of stochastic processes, and of hyperbolic type govern the time evolution of the PDF of piecewise deterministic processes. For the bounded domain, the discretization schemes combine the Chang-Cooper method for spatial discretization with backward first- and second- order finite differencing in time to obtain stable and accurate solutions that satisfy conservation and positivity properties of the PDF. For the case of unbounded domains, the Hermite spectral discretization method is applied and analyzed as well. Next, two optimal control formulations based on the FP equations are discussed in order to control the corresponding PDFs. To approximate the solutions, the Hermite spectral discretization method is applied. It is proved that the solution of the corresponding discretized optimality systems are spectrally accurate and the numerical schemes preserve the required positivity and conservativity properties of the forward solutions.

Ort: Raum 30.02.003 (2. Stock) (Mathegeb. 30 West)   Zeit: Dienstag, 24.06.2014, 11.00 Uhr

Zu diesem Vortrag laden wir Sie herzlich ein.

gez. Prof. Dr. Alfio Borzi