On convergences of the squareroot approximation scheme to the Fokker–Planck operator

Martin Heida, Weierstrass Institute for Applied Analysis and Stochastics, Berlin

Abstract: We study the qualitative convergence properties of a finite volume scheme that recently was proposed by Lie, Fackeldey and Weber 2013 in the context of conformation dynamics. The scheme was derived from physical principles and is called the squareroot approximation (SQRA) scheme. We show that SQRA has a natural gradient structure and that solutions to the SQRA equation converge to solutions of the Fokker-Planck equation using a discrete notion of G-convergence. Hence the squareroot approximation turns out to be a usefull approximation scheme to the Fokker-Planck equation in high dimensional spaces, but could also be used in lower dimensions. As an example, in the special case of stationary Voronoi tessellations we use stochastic two-scale convergence to prove that this setting satisfies the G-convergence property. In particular, the class of tessellations for which the G-convergence result holds is not trivial.

Institut für Mathematik, Humboldt-Universität zu Berlin
Rudower Chaussee 25, Berlin-Adlershof, Room 2.417,
29. Mai 2018, 14 s.t.