Numerical solutions for high dimensional Kolmogorov equations via Gaussian analysis

Dejun Luo (AMSS)

2020/06/03

Abstract

For Kolmogorov equations associated to finite dimensional stochastic differential equations (SDEs) in high dimension, a numerical method alternative to Monte Carlo simulations is proposed. The structure of the SDE is inspired by stochastic Partial Differential Equations (SPDE) and thus contains an underlying Gaussian process which is the key of the algorithm. A series development of the solution in terms of iterated integrals of the Gaussian process is given, it is proved to converge - also in the infinite dimensional limit - and it is numerically tested in a number of examples. This talk is based on joint work with Franco Flandoli and Cristiano Ricci.