The Hong Kong University of Science & Technology

Department of Mathematics

PhD Student Seminar

The Stochastic Local Volatility Model

By

Mr. Haoyun TANG

Abstract

We tackle the calibration of the Heston-like Stochastic Local Volatility (SLV) model, which combines the local and stochastic volatility features. To start with, market implied volatility surface should be well represented. And we proposed to use kernel splines instead of quadratic spline or other traditional forms to describe it, which is smooth and would prevent oscillations and make wings limit finite. Furthermore, it could generate smooth enough local volatility surface with respect to strike and maturity. About the stochastic volatility component, i.e. the pricewise constant Heston parameters are well calibrated by Elices algorithm with CHJ loss function. Finishing the local and stochastic volatility component, the remaining undetermined part in SLV model is the leverage function. Two methods could be used. One is solving the Kolmogorov forward PDE of transition density by semi implicit upwind FVM scheme, which is unconditional positive and stable. Besides, we will talk about the FVM scheme convergence proof by estimating the coefficient matrix L1 norm. Another method is more Intuitively, which is the direct fitting through an optimization procedure where the targets are the market vanilla option values. This method naturally makes sure market vanilla options are repriced.

Date: *Tuesday, 8 May 2018*

Time: *2:00 p.m.- 3:00 p.m.*

Venue: *Room 2406 (near lift 17, 18)*

All are welcome!