MICHIGAN STATE UNIVERSITY
Department of Statistics and Probability

COLLOQUIUM

Archil Gulisashvili
Ohio University

Implied volatility skew in rough stochastic volatility models. Moderate deviation regime

Tuesday, September 26, 2017
10:20 a.m. - 11:10 am
Refreshments 10:00 am
C405 Wells Hall

Abstract

The talk presents a joint work with C. Bayer, P. K. Friz, B. Horvath, and B. Stemper. We study correlated rough stochastic volatility models, in which the volatility is described by a function of a Volterra type Gaussian process. An important special case of such a volatility process is the exponential of fractional Brownian motion. In our work, we obtain small-time asymptotic formulas in a moderate deviation regime for the call pricing function and the implied volatility in certain rough volatility models. M. Forde and S. Zhang established a large deviation principle for fractional stochastic volatility models, and also found a semi-explicit formula for the rate (energy) function. One of the main results of our work is a sharp asymptotic formula for the Forde-Zhang energy function. This formula generalizes to a non-Markovian setting the known energy expansion due to Y. Osajima. Another main result of our work is a small-time asymptotic formula in the moderate deviation regime for the implied volatility and the implied volatility skew. The skew formula is a generalization of known formulas obtained by E. Alos, J. Leon, and J. Vives, and by M. Fukasawa.