



The University of Chicago  
Department of Statistics

Ph.D. Seminar

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## Nonparametric Inference for Stochastic Diffusion Models

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**110 Eckhart Hall, 5734 S. University Avenue**

### ABSTRACT

Nonparametric model validation under dependence has been a difficult problem. Fan and Yao (Nonlinear Time Series: Nonparametric and Parametric Methods, 2003) pointed out that there have been virtually no theoretical development on nonparametric model validations under dependence, despite the importance of the latter problem since dependence is an intrinsic characteristic in time series. In this talk, we consider nonparametric estimation and inference of mean regression and volatility functions in nonlinear stochastic regression models. Simultaneous confidence bands are constructed and the coverage probabilities are shown to be asymptotically correct. The imposed dependence structure allows applications in many nonlinear autoregressive processes and linear processes, including both short-range dependent and long-range dependent processes. The results are applied to the S&P 500 Index data. Interestingly, the constructed simultaneous confidence bands suggest that we can accept the two null hypotheses that the regression function is linear and the volatility function is quadratic.