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Practice Job Presentation

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Confidence Bands in Nonparametric Time Series Regression

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ABSTRACT

Nonparametric model validation under dependence has been a difficult problem. Fan and Yao (2003, page 406) pointed out that there has 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 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 IBM stock data. Interestingly, the constructed simultaneous confidence bands suggest that we can accept the two null hypotheses that the regression function is linear and the squared volatility function is quadratic.