



THE UNIVERSITY OF
CHICAGO

Department of Statistics

MASTER'S THESIS PRESENTATION

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Simultaneous Confidence Bands in Nonparametric
Time Series Regression

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Jones 304, 5747 S. Ellis Avenue

ABSTRACT

We consider the simultaneous nonparametric inference of time series regression model $Y_i = \mu(X_i) + \sigma(X_i)\eta_i$, where (X_i, Y_i) is a stationary process and η_i are unobserved independent and identically distributed errors with zero mean and unit variance. We first introduce theories of Liu and Wu (2010) showing that the maximum deviations of kernel density and regression estimates are asymptotically Gumbel. Then we apply the results to construction of simultaneous confidence bands (SCB) for estimates in nonparametric regression. As an application, we construct SCBs for drift and volatility functions in short-term interest rate model for the yield rates data of U.S. Treasury bills with 1-month, 3-month and 6-month maturities to study their patterns.