



THE UNIVERSITY OF  
**CHICAGO**

Department of Statistics

**MASTER'S THESIS PRESENTATION**

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**Simultaneous Nonparametric Inference of Stationary  
Time Series**

**FRIDAY, February 10, 2017, at 9:00 AM**

Jones 226, 5747 S. Ellis Avenue

**ABSTRACT**

We consider the nonparametric estimate of the regression function and the conditional variance function of model  $Y_i = \mu(X_i) + \sigma(X_i)\eta_i$ , where  $(X_i, Y_i)$  is a stationary process and  $\eta_i$  are unobserved independent and identically distributed random variables. We first introduce the theories showing that the maximum deviances of both the regression estimate and the conditional variance estimate are asymptotically Gumbel. Then we apply the theory to construct simultaneous confidence bands (SCB) for the nonparametric estimate. We introduce a simulation based way to generate the SCB as well and compare the performance of the two ways on finite sample dataset using a simulation study. Finally as an application, we construct SCBs for the drift and diffusion functions for the U.S. Treasury yield curve rates data using the later way.

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