



THE UNIVERSITY OF
CHICAGO

Department of Statistics

MASTER'S THESIS PRESENTATION

HAOYUAN ZOU

Department of Statistics
The University of Chicago

Symmetric Thermal Optimal Path Method for the Lead-Lag
Relationship in U.S. Stock Market

FRIDAY, February 9, 2018, at 9:00 AM
Jones 304, 5747 S. Ellis Avenue

ABSTRACT

We present a non-parametric methodology, the symmetric thermal optimal path (TOPS) method to determine the dynamical time evolution of the lead-lag relationship between two stochastic time series. The method includes constructing a distance matrix based on the matching of all sample pairs between two target time series, and searching lead-lag relationship by minimizing the total mismatch. The searching process as obtaining the optimal path in the distance matrix landscape alleviates some inconsistencies by imposing that the lead-lag structure should be invariant when considering a time reversal of the time series. This symmetric thermal optimal path containing the time reversal would be more efficient to detect the real-time lead-lag structure. We use simulation to demonstrate the efficiency of the TOPS method in detecting dynamic time evolution of lead-lag relationship with allowance of multi-stage lead-lag structure. Furthermore, the performance of lead-lag relationship is also checked by bring in real analysis on high frequency data of U.S. stock market from Wharton Research Data Services (WRDS).

For information about building access for persons with disabilities, please contact Laura Rigazzi at 773.702-0541 or send an email to lrigazzi@galton.uchicago.edu. If you wish to subscribe to our email list, please visit the following web site: <https://lists.uchicago.edu/web/arc/statseminars>.