Cong CHENG

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EDUCATION

School of Mathematical Science, University of Science and Technology of China（USTC） Aug. 2016 – July. 2020
Bachelor of Science in Mathematics and Applied Mathematics
Teaching Assistance: Multivariate Calculus (2019 Spring)

RESEARCH EXPERIENCE

Change Point Detection | USTC | Research Assistant July 2020 - Aug. 2021
Advisor: *Prof. Xiao Han, Associate Professor at School of Management, USTC*
• Before we do the detection of change point, we first do the dimension reduction.
• Find the limit distribution of $\max D_j$ in some condition.

Imputation for Blockwise and Elementwise Missing Data | UNC | Research Assistant July 2019 - Sept. 2019
Advisor: *Prof. Quefeng Li, Assistance Professor at the Department of Biostatistics, UNC*
• Proposed a factor-based imputation method by directly modeling the distribution of missing variable X_{mis} conditional on observable variables X_{obs}
• Simulated on blockwise and elementwise missing data via R; our method outperforms SoftALS (2015) in factor models
• Proved the convergence rate of estimation of $\mathrm{E}(X_{mis}|X_{obs})$ in first iteration and attempted to prove normal condition

Degrees of freedom in low rank matrix estimation | USTC | Research Assistant Oct. 2018 - Jan. 2019
Advisor: *Prof. Xiao Guo, Associate Professor at School of Management, USTC*
• Reviewed the existing literature about calculating the degree of freedom in low-rank matrix estimation, such as Yuan (2016)
• Proposed an alternative method by first adding penalty (e.g. L2) to estimate the matrix and then calculating the degree of freedom

Determining the Number of Factors in Approximate Factor Model | USTC| Research Assistant Sept. 2018 - Nov. 2018
Advisor: *Prof. Xiao Guo, Associate Professor at School of Management, USTC*
• Implemented and compared existing methods via MATLAB, such as Bai and Ng(2002), ER and GR(2013) and Onatski (2006)
• Extensive simulation under assumed model indicates that ER and GR estimators generally outperform other competing estimators, especially when the idiosyncratic components of the response variables are both cross-sectionally and serially correlated.

Extreme Value Problem on Spectral Graph Theory | USTC | Research Assistant June 2018 - present
Advisor: *Prof. Xinmin Hou, Associate Professor at School of Mathematical Science, USTC*
• Our goal was to solve the conjecture of Nikiforov (2010) that every graph G of order n with $\mu(\mathrm{G}) \geq \mu(S_{n,k}^{+})$ contains all trees of orders 2k+3 unless $\mathrm{G} = S_{n,k}^{+}$.
• Solved the case $d_G(u) < p$ under the assumption that the diam(T) is lower than 4 and still attempted other cases.

AWARDS

Silver Prize for Outstanding Student Scholarship, USTC (20/154) 2018
The Leadership Scholarship of Chen Guilin (1/154) 2017
First prize in National High School Mathematics Contest, Hubei Division 2015