

Hongyu Chen

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EDUCATION

PEKING UNIVERSITY

Sep. 2018 - Jul. 2022 (expected)

Bachelor of Science in Mathematics (concentration in statistics), Double Major in Economics

- **Academics:** Overall GPA: 3.86/4.00, Ranking 3/57
- **Selected Coursework:** Mathematical Analysis I (95), Linear Algebra II (96), Real Analysis (97), Abstract Algebra (99), Probability Theory (100), Mathematical Statistics (95), Applied Stochastic Process (96), Data Structure and Algorithms (97.5), Measure Theory (95), Stochastic Analysis and Application (99)
- **Graduate Courses:** Convex Optimization (92), Statistical Learning (88), Asymptotic Statistics (96), Bayesian Theory and Algorithms (93.3), High-Dimensional Probability (on-going), Algorithms for Combinatorial Optimization (on-going)
- **Honors and Awards:** Gold Medal in the 33th China Mathematics Olympics Final (2017), Merit student of Peking University (2019, 2020)

PUBLICATION

- Minghan Yang, Dong Xu, **Hongyu Chen**, Zaiwen Wen, Mengyun Chen, "Enhance Curvature Information by Structured Stochastic Quasi-Newton Methods", accepted by the 34th Computer Vision and Pattern Recognition. (CVPR 2021)
- (Author list TBD), "Price Competition and Assortment Display in Online Marketplace", in manuscript.

RESEARCH EXPERIENCE

Price Competition and Assortment Display in Online Marketplace

May. 2021 - Present

Advisor: Prof. David Simchi-Levi, Institute for Data, Systems and Society, MIT

- In this research we studied the price competition and assortment policy in online marketplace such as Airbnb where the pricing process involves a multi-agent game for the sellers.
- Analyzed the optimal policy in the limiting case with large demand level; proved that when the sellers have finite inventory, the platform should display everything to every customer.
- Proposed a mixed-integer programming formulation to obtain the assortment policy when the for moderate demand level.

Optimal Control for Parallel Queues with a Single Batch Server

Jan. 2021 - Present

Advisor: Prof. Zizhuo Wang, Institute of Data and Decision Analytics, CUHK, Shenzhen

- In this research, we analyzed the optimal control policy for parallel queues with a single batch server.
- Discovered and proved the structure of the optimal control policy for the MDP problem.
- Proposed a heuristic policy based on the simplified fluid model and conducted related numerical experiments to demonstrate its near-optimal performance.

Structured Quasi-Newton Method for Large-Scale Optimization

Jul. 2020 – Mar.2021

Advisor: Prof. Zaiwen Wen, Beijing International Center for Mathematical Research, Peking University

- In this research, we proposed a framework to enhance curvature information of the quasi-Newton matrix in the setting of large-scale machine learning.
- Applied the proposed framework to the KFAC approximation of the Hessian matrix in deep neural networks and developed the related block-BFGS and sketching techniques.
- Implemented our proposed method the optimization problem in CNN and compared its efficiency with traditional optimization methods including SGD, Adam and KFAC; proved that our method can achieve more accuracy with the same computational cost.
- Established the theoretical guarantee for global convergence of our proposed method under mild assumptions.

TECHNICAL SKILLS

- **Programming:** Python, C/C++, Matlab, LaTeX
- **Convex Optimization Algorithms:** GD, SGD, Proximal Gradient Descent, BFGS, L-BFGS etc.
- **Machine Learning Algorithms:** PCA, SVM, LASSO, Decision Tree, Boosting etc.

LANGUAGE SKILLS

- **TOEFL iBT:** 109/120 (Reading 30, Listening 28, Speaking 24, Writing 27)
- **GRE General:** 329/340+4.0/6.0 (Verbal 159, Quantitative 170, Analytical Writing 4.0)