

MENGLONG LI

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EDUCATION

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|---|-------------------|
| University of Illinois at Urbana-Champaign. Champaign, IL.
Department of Industrial and Enterprise Systems Engineering
<i>Ph.D. in Operations Research</i> | 08/2016 - Present |
| University of Pierre and Marie Curie. Paris, France.
Department of Mathematics
<i>M.S. in Mathematics</i> | 09/2014 - 06/2015 |
| Tsinghua University. Beijing, China.
Department of Mathematical Sciences
<i>B.S. in Mathematics</i> | 09/2010 - 07/2014 |

RESEARCH INTEREST

Inventory management, revenue management, discrete convex analysis, approximation algorithms, data-driven decision making, game theory

PUBLICATIONS

- **M^{\natural} -Convexity and Its Applications in Operations**, with Xin Chen.
Operations Research, accepted
 - Provide a tool using M^{\natural} -convexity to derive nonincreasing optimal solutions and preservation properties in parametric maximization problems with submodular objective functions, together with some new fundamental properties of M^{\natural} -convexity. Its usefulness is demonstrated by two important inventory models in the literature.
- **Discrete Convexity and Its Applications in Operations: A Survey**, with Xin Chen.
Production and Operations Management, accepted
 - Review of applications of L^{\natural} -convexity and M^{\natural} -convexity in inventory management, revenue management, sharing economy, healthcare and economics.
- **S-Convexity and Gross Substitutability**, with Xin Chen
Under review of *Operations Research*
 - Introduce a generalization of M^{\natural} -convexity referred to as S-convexity, and establish its properties, characterizations, nonincreasing optimal solutions result, and relationship with gross substitutability. Employ S-convexity to derive monotone comparative statics results for two classical inventory models.

WORKING PAPERS

- **Assortment Optimization Under a Multi-Category-Bundle Logit Model**, with Xin Chen and Tiancheng Zhao.
 - Study an assortment optimization problem of a discrete choice model where each customer chooses a bundle consisting of products from multiple categories, and develop its approximation algorithms.

- **Asymptotic Optimality of Open-Loop Policies in Markov Decision Processes With a Large Lead Time**, with Xin Chen, Alexander Stolyar, Xingyu Bai.

- Provide conditions and examples under which open-loop policies is asymptotically optimal in a Markov decision process with an action delayed by a large lead time.

RELEVANT EXPERIENCE

University of Illinois at Urbana-Champaign. Champaign, IL.

08/2016 - Present

Research Assistant. Supervisor: Xin Chen

- Established properties of M^h -convex functions, and employed them to simplify the complicated analysis of prevalent operations models in the literature including a multi-product dynamic stochastic inventory model, a discrete choice model, an assemble-to-order inventory model and a portfolio contract model.
- Proposed a generalization of M^h -convexity referred to as S-convexity, and established properties of S-convex functions on continuous spaces. Utilized S-convexity to derive monotone comparative statics results for two classical inventory models.
- Proposed an 0.5-approximation algorithm for an assortment optimization problem under a two-category bundle logit model when one category has two products.
- Established the asymptotic optimality of a bracket policy for a lost-sales inventory model with integral random demand and discrete replenishment.

Shanghai University of Finance and Economics. Shanghai, China.

07/2015 - 06/2016

Visiting Student. Supervisor: Simai He

- Simulated three online advertisement allocation algorithms in MATLAB and achieved a 10% revenue increase over a greedy algorithm.

INDUSTRIAL PROJECTS

Inventory Management of Unattended Vending Shelves Operated by Shunfeng. Champaign, IL.

10/2018 - 03/2019

Supervisor: Xin Chen

- Helped Shunfeng to predict the demand of each product on their unmanned shelves in several cities of China. Raised R^2 scores of weekly and monthly predictions to 0.868 and 0.877, respectively.
- Proposed a new data-driven inventory replenishment policy which outperforms Shunfeng's current policy in multiple criterion including inventory level, inventory turnover, number of replenishment and out-of-stock rate.

TALKS

- **Substitutability, M^h -Convexity and Their Applications**
MSOM Conference 2018
- **M^h -Convexity and Its Applications in Operations**
UIUC Gies College of Business Brown Bag Seminar 2019
Informs Annual Meeting 2019
POMS Conference 2019
Informs Annual Meeting 2018

PROFESSIONAL SERVICES

- Reviewer for Production and Operations Management
- Session Chair for 2018 MSOM Conference

AWARD RECOGNITION

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|---|-------------|
| • William A. Chittenden II Award | 2020 |
| • YinzOR Poster Competition Third Place | 2019 |
| • UIUC ISE Department Travel Poster Presentation First Place | 2019 |
| • Alibaba Global Mathematics Competition Excellence Award | 2018 |
| • Fondation Sciences Mathématiques de Paris Program scholarship | 2014 - 2015 |
| • China National Grants | 2013 |
| • China National Grants | 2011 |
| • China Mathematical Olympiad Silver Award | 2010 |
| • National High School Mathematics League First Prize | 2009 |

TECHNICAL SKILLS

Python, R, MATLAB, C++, Latex, Mathematica