SHAONING HAN

340 Olin Hall
3650 McClintock Avenue
Los Angeles, CA 90089-0105

Email: shaoning@usc.edu
Phone: (412) 628-5788
Homepage: shaoninghan.github.io

RESEARCH INTERESTS

- **Methodologies:** mixed-integer programming, nonconvex and nonsmooth optimization, submodular optimization, variational inequality, (parametric) pivoting methods for LP/QP/LCP
- **Applications:** inference problems with combinatorial structures in statistics and machine learning, portfolio optimization and risk, signal denoising, revenue management

ACADEMIC EMPLOYMENT

Postdoctoral researcher, University of Southern California, 2023
- Advisor: Jong-Shi Pang

EDUCATION

Ph.D in Industrial and Systems Engineering, University of Southern California, 2022
- Advisor: Andrés Gómez

B.S. in Mathematics, University of Science and Technology of China, 2017

PUBLICATIONS

1. Han, S., Gómez, A., and Atamtürk, A. (2023a). 2×2-convexifications for convex quadratic optimization with indicator variables. *Mathematical Programming*

2. He, Z., Han, S., Gómez, A., Cui, Y., and Pang, J.-S. (2023). Comparing solution paths of sparse quadratic minimization with a Stieltjes matrix. *Mathematical Programming*

3. Pang, J.-S. and Han, S. (2023). Some strongly polynomially solvable convex quadratic programs with bounded variables. *SIAM Journal on Optimization*, 33(2):899–920

4. Han, S., Gómez, A., and Atamtürk, A. (2022a). The equivalence of optimal perspective formulation and Shor's SDP for quadratic programs with indicator variables. *Operations Research Letters*, 50(2):195–198

5. Han, S., Gómez, A., and Prokopyev, O. A. (2022c). Fractional 0-1 programming and submodularity. *Journal of Global Optimization*

6. Atamtürk, A., Gómez, A., and Han, S. (2021). Sparse and smooth signal estimation: Convexification of ℓ_0-formulations. *Journal of Machine Learning Research*, 22(52):1–43

PREPRINTS

1. Han, S. and Pang, J.-S. (2022). Continuous selections of solutions to parametric variational inequalities. *Minor Revision at SIAM Journal on Optimization*

2. Han, S. and Gómez, A. (2021a). Compact extended formulations for low-rank functions with indicator variables. *Major Revision at Mathematics of Operations Research*

3. Han, S., Zhang, X., and Pang, J.-S. (2023b). On the number of pivots of Dantzig's simplex methods for linear and convex quadratic programs. *Major Revision at Operations Research Letters*

4. Han, S., Gómez, A., and Pang, J.-S. (2022b). On polynomial-time solvability of combinatorial Markov random fields. *Submitted*

5. Han, S. and Gómez, A. (2021b). Single-neuron convexifications for binarized neural networks. *Technical Report*

TEACHING EXPERIENCE

- ISE 530 (MS) Optimization Methods for Analytics
  Instructor, University of Southern California, 2023 Fall

- ISE 599 (PhD) Mixed-Integer Programming
  TA, University of Southern California, 2021 Spring

- ISE 530 (MS) Optimization Methods for Analytics
  TA, University of Southern California, 2019 Fall

- ENGR 0020 (BS) Probability and Statistics for Engineers
  TA, University of Pittsburgh, 2018 Spring&Fall/2019 Spring

- IE 2086 (MS) Decision Models
  TA, University of Pittsburgh, 2017 Fall

INVITED TALKS

- *On the convex hull of mixed-integer nonlinear submodular minimization.* INFORMS Annual Meeting, Phoenix, AZ, October 2023

- *Mixed-binary convex quadratic optimization and its applications in inference with sparsity.* The Academy of Mathematics and Systems Science (AMSS) of the Chinese Academy of Sciences, March 2023

- *On polynomial-time solvability of combinatorial Markov random fields.* INFORMS Annual Meeting, Indianapolis, IN, October 2022

- *Convexification for low-rank functions with indicator variables.* International Conference on Continuous Optimization, Bethlehem, PA, July 2022

- *Strongly polynomial algorithm for box-constrained quadratic programs with H_0-matrix.* INFORMS Optimization Society Conference, Greenville, SC, March 2022

- *Fractional 0-1 programming and submodularity.* INFORMS Annual Meeting, Anaheim, CA, October 2021

- *On SDP formulations for quadratic optimization with indicator variables.* INFORMS Annual Meeting, virtual, November 2020

PROFESSIONAL ACTIVITIES

Journal/Conference Reviewer

- Mathematical Programming, SIAM Journal on Optimization, Mathematics of Operations Research, Journal of Global Optimization, Optimization Letters, IPCO 2023

Invited Session Chair

- Recent advances in nonsmooth optimization, 2023 INFORMS Annual Meeting, Phoenix, AZ, October 2023
- Recent advances in mixed-integer nonlinear programming, 2023 INFORMS Annual Meeting, Phoenix, AZ, October 2023
- Algorithms for discrete optimization problems, 2022 INFORMS Optimization Society Conference, Greenville, SC, March 2022

Member

- INFORMS   2018 - Present
- INFORMS Optimization Society   2018 - Present

VOLUNTEER EXPERIENCE

Virtual volunteer at INFORMS Annual Meeting, Anaheim, CA, October 2021. Responsible for five rooms during one shift day to ensure the smooth progress of meetings.

SKILLS

Python, Matlab, Julia, PyTorch, Gurobi, Mosek