JISUN LEE

Email: jisun_lee@berkeley.edu | Webpage: https://jsl0713.github.io/

EDUCATION

Ph.D. **University of California, Berkeley**, USA
- Industrial Engineering & Operations Research, August 2020 - present (expected May 2025)
- Advisor: Alper Atamtürk [link]

M.S. **Seoul National University (SNU)**, Republic of Korea
- Industrial Engineering, August 2019
- Advisor: Kyungsik Lee [link]
- Thesis: An Approximation Scheme for the Probability Maximizing Combinatorial Optimization Problem [link]

B.S. **Seoul National University (SNU)**, Republic of Korea
- Industrial Engineering, August 2017
- Thesis: A Study on the Corporate Credit Rating Prediction Model using Convolution Neural Network with Time Series Data

PAPERS

Convex hull of mixed-integer quadratic optimization problems with separable cost matrices

Jisun Lee, Andrés Goméz, and Alper Atamtürk. (Working paper, presented at MIP Workshop 2024)

- Unique properties of (block) separable matrices are studied, a polynomial-time DP algorithm and a tight SOCP reformulation are proposed.

Efficient sampling from ϵ-optimality solution set

Jisun Lee, Alper Atamtürk, and Ignacio Aravena Solís. (Working paper)

- A parallelizable sampling technique that efficiently generates well-distributed points within an ϵ-optimal solution set is proposed.

Cut generation for hybrid model predictive control by linking consecutive periods

Jisun Lee and Alper Atamtürk. (Working paper)

- Novel tightening cuts and techniques for MIQPs, leveraging matrix decomposition and second-order cone constraints, are developed.

Strong formulations for hybrid model predictive control [pdf]

Jisun Lee, Hyungki Im, and Alper Atamtürk.

(Preprint, presented at MIP Workshop 2023, INFORMS 2023, SIAM Optimization Conference 2023)

- Proposed strong formulations for MIQPs arising in hybrid model predictive control, utilizing cuts derived by disjunctive programming and perspective reformulation.
- Application to the energy management of power-split hybrid electrical vehicle is demonstrated.

A fully polynomial time approximation scheme for the probability maximizing shortest path problem [pdf]

Jisun Lee, Seulgi Joung, and Kyungsik Lee. European Journal of Operational Research, 2022.

- An FPTAS that iteratively solves deterministic shortest path problems to find an approximate solution with guaranteed bound on a directed graph with Gaussian random arc lengths is proposed.

PRESENTATION

2024 Mixed Integer Programming Workshop, Kentucky, USA. [poster]
- Strong formulation of hybrid control problem with tridiagonal inverse matrix.

2019 European Conference on Operational Research, Dublin, Ireland. [slides]
- An approximation scheme of the probability maximizing combinatorial optimization problem.

2019 Fall Conference of Korean Institute of Industrial Engineers, Seoul, Republic of Korea.
- A fully polynomial time approximation scheme for the probability maximizing shortest path problem.

2019 Spring Conference of Korean Institute of Industrial Engineers, Seoul, Republic of Korea.
- An approximation scheme of the probability maximizing combinatorial optimization problem.

TEACHING ASSISTANT

IEOR 262A **Mathematical Programming I**	UC Berkeley, Fall 2024
IEOR 165 **Engineering Statistics, Quality Control, and Forecasting**	UC Berkeley, Spring 2024
IEOR 142 **Introduction to Machine Learning and Data Analytics**	UC Berkeley, Spring 2023

RESEARCH INTEREST

- Integer Programming, Combinatorial Optimization, Convex Optimization
- Applications: Statistical Learning, Control Optimization
- Optimization Under Uncertainty: Stochastic Optimization, Robust Optimization

SKILLS

Programming Language: Python, Java, C++

Modeling & Analysis Tool: Gurobi, Mosek, Xpress, CPLEX, Drake, MPI, MATLAB, R, Arena

HONORS & AWARDS

UC Berkeley IEOR Departmental Fellowship, 2020.
Exellence Prize (3rd Prize) in KIIE Master's Thesis Competition, 2019.
Brain Korea 21 Plus Scholarship, 2018.
National Scholarship for Science & Engineering, Korea Student Aid Foundation, 2016.
SNU Scholarship for Academic Achievement, 2015.
Uisan Engineering Scholarship, 2014.
4th Prize in SNU Big Data Institute 2nd Datathon, 2014.