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Oktay Günlük

Gary C. Butler Family Professor
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Education

Columbia University, School of Engineering and Applied Science, New York, NY.
Ph. D. (1995) and M. Phil. (1993) in Operations Research.

Boğaziçi University, School of Engineering and Applied Science, Istanbul, Turkey.
M.S. (1989) and B.S. (1987) in Industrial Engineering.

Research Interests

Oktay Günlük's main research interests are related to theoretical and computational aspects of discrete optimization problems, mainly in the area of integer programming. In particular, his main body of work is in the area of cutting planes for mixed-integer sets. Some of his recent work focuses on developing integer programming based approaches to classification and clustering problems in machine learning.

Teaching Interests

Oktay Günlük's teaching interests are related to theoretical and computational aspects of optimization problems, mainly in the area of integer programming. He has taught undergraduate level optimization classes including linear, integer, and combinatorial optimization.

Patents

1. "Automatic multilabel classification using machine learning", US Pat. No: 11379758
2. "Free-form integration of machine learning model primitives", US Pat. No: 11599829
3. "Method and Apparatus for Assigning Candidate Processing Nodes to Work in a Stream-Oriented Computer System", US Pat. No: 7738129; 8018614; 8437029.
4. "Method for Routing Optical Signals with Diversity Requirements", US Pat. No: 7023806; 8000250.
5. "Method for Designing Demand-sensitive Rings", USPO Pub. No: 20030009598

Recent Journal Publications

1. "Parallel Token Swapping for Qubit Routing", with Ishan Bansal and Richard Shapley, *Discrete Applied Math, 377: 480-497 (2025).*
2. *"Robust-to-Dynamics Optimization", with A. Ahmadi,* Math of OR*, 50(2), 965-992.*

3. *"Recovering Dantzig-Wolfe Bounds by Cutting Planes", with Rui Chen and Andrea Lodi,* Operations Research*, 73(2): 1128–1142 (2025).*
4. *"Convexifying multilinear sets with cardinality constraints: Structural properties, nested case and extensions", with Rui Chen and Dash,* Discrete Optimization*, 50: 100804 (2023)*
5. *"Binary matrix factorisation and completion via integer programming", with Hauser and Kovacs,* Math. of OR*, 49(2): 1278–1302 (2024).*
6. *"Interpretable and Fair Boolean Rule Sets via Column Generation", with Lawless, Dash, and Wei, Journal of Machine Learning Research, 24,1-50 (2023).*
7. *"Multilinear Sets with Two Monomials and Cardinality Constraints" with Rui Chen and Dash,* Discrete Applied Mathematics*, 324, 67–79 (2023).*
8. *"Optimal qubit assignment and routing via integer programming" (with Nannicini, Bishop and Jurcevic),* ACM Transactions on Quantum Computing*, 4(1), 1–31 (2023)*
9. *"On a generalization of the Chvatal-Gomory closure" (with Dash and Dabeen Lee),* Math. Programming*, 192 (1), 149–175 (2022).*
10. *"Optimal decision trees for categorical data via integer programming" (with Kalagnanam, Li, Menickelly, and Scheinberg),* Journal of Global Optimization*, 81, 233-260 (2021).*
11. *"Demonstration of quantum volume 64 on a superconducting quantum computing system", (with Jurcevic, Javadi-Abhari, Bishop, Lauer, et. al.),* Quantum Science and Technology*, 6 (2), 025020 (2021).*
12. *"Generalized Chvatal-Gomory closures for integer programs" with S. Dash and D. Lee,* Math. Programming*, 190 (1), 393–425 (2021).*
13. *"Lattice closures of polyhedra" (with S. Dash and D. Moran),* Math. Programming*, 182(1), 119–147 (2020).*