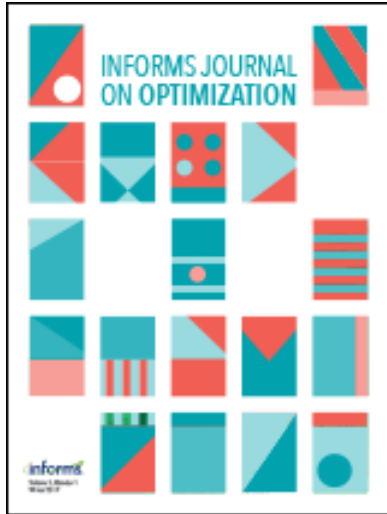




INFORMS Journal on Optimization

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From the Editor

Dimitris Bertsimas

To cite this article:

Dimitris Bertsimas (2019) From the Editor. INFORMS Journal on Optimization 1(1):1-1. <https://doi.org/10.1287/ijoo.2019.0011>

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From the Editor

Dimitris Bertsimas^a

^a Sloan School of Management and Operations Research Center, Massachusetts Institute of Technology, Cambridge, Massachusetts 02139

Contact: dbertsim@mit.edu (DB)

<https://doi.org/10.1287/ijoo.2019.0011>

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I am excited to present the first issue of *INFORMS Journal on Optimization*. The first issue consists of four papers. The first paper, “Robust Classification” by Dimitris Bertsimas, Jack Dunn, Colin Pawlowski, and Daisy Zhuo, is part of a decade-long investigation of developing algorithms for machine learning (ML) using insights and algorithms from modern optimization initiated by the first author. Given that all real-world data are subject to uncertainty, the authors investigate whether it is possible to develop a principled, optimization-based framework for the central problem of classification in ML. Using tools from robust optimization, the authors address three of the most commonly used models for classification: logistic regression, support vector machines, and decision trees. Following the same methodology in each case and considering uncertainty in the both the features and labels, they derive robust counterparts that are computationally tractable for each model and each uncertainty set. The final result is a unified framework for robust classification, along with computational results comparing all three methods and revealing method-independent trends of robust classifiers.

The second paper, “Pricing Wind: A Revenue Adequate, Cost Recovering Uniform Price Auction for Electricity Markets with Intermittent Generation,” by Golbon Zakeri, Geoffrey Pritchard, Mette Bjørndal, and Endre Bjørndal, explores the uncertainty faced in electricity markets motivated by the increased penetration of renewable generation. The authors propose a new stochastic-programming, market-clearing mechanism to optimize predispach quantities, given the probability distribution of the uncertainties and the costs of real-time deviation. This model differs from similar mechanisms proposed previously in that predispach quantities are not subject to any network or other physical constraints; nor do they have a dedicated financial settlement. They establish revenue adequacy in each scenario (as opposed to “in expectation”), welfare enhancement and expected cost recovery, for this market clearing mechanism. Last, they establish that this market clearing mechanism is social welfare optimizing.

The third paper, “Constraint Generation for Two-Stage Robust Network Flow Problem,” by David Simchi-Levi, He Wang, and Yehua Wei, is a part of a broader investigation in developing exact methods for solving adaptive robust optimization that can be useful for real-world applications. The paper develops easy-to-implement, practical methods for robust optimization models used in practice. This collaboration was motivated by work that the first and the third authors completed for Ford Motor Company in the area of supply chain risk management.

The fourth paper, “Separable Convex Optimization with Nested Lower and Upper Constraints,” by Thibaut Vidal, Daniel Gribel, and Patrick Jaillet, originated as a spin-off from a joint routing and speed optimization application in maritime transportation. The current speed optimization algorithms were insufficient to repeatedly solve numerous speed optimization subproblems and account for variable sea conditions, ship payloads, and fuel consumptions around the globe. The authors designed a new efficient decomposition algorithm. Their model is linked with numerous other applications in production planning, statistics, machine learning, portfolio management, and telecommunication. The algorithm achieves the best known complexity for the problem and is built on very different principles than existing scaling or network flow algorithms.