



CIRRELT / CORS (Montréal Chapter) joint seminar

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John M. Thompson Chair in Engineering Leadership and Innovation

LEARNING FOR RLT-BASED RELAXATIONS FOR POLYNOMIAL OPTIMIZATION PROBLEMS

Abstract: The use of machine learning techniques to improve the performance of branch-and-bound optimization algorithms is a very active area in the context of mixed integer linear problems, but little has been done for non-linear optimization. To bridge this gap, we develop a learning framework for spatial branching and show its efficacy in the context of the Reformulation-Linearization Technique for polynomial optimization problems. The proposed learning is performed offline, based on instance-specific features and with no computational overhead when solving new instances. Novel graph-based features are introduced, which turn out to play an important role in the learning. Experiments on different benchmark instances from MINLPLib and QPLIB show that the learning-based branching selection and learning-based constraint generation significantly outperform the standard approaches.

Biography: Bissan Ghaddar is the John M. Thompson Chair in Engineering Leadership and Innovation and an Associate Professor of Management Science and Sustainability at the Ivey Business School working on problems at the intersection of machine learning and non-linear optimization. Before joining Ivey Business School, she worked on energy, water, and transportation network optimization at IBM Research and on inventory management problems at the Centre for Operational Research and Analysis, Department of National Defence Canada. Her work has been published in prestigious journals such as Mathematical Programming, INFORMS Journal on Computing, SIAM Journal on Optimization, among others. Her research has been supported by national and international grants including NSERC, OCE, Cisco, H2020, and Marie Curie International Incoming Fellowship. She serves as the Research Lead at the Ivey Energy Policy and Management Centre and is a fellow at the Balsillie School of International Affairs, engaged in the research cluster on AI, Global Governance, and International Public Policy. She is the Associate Editor for the EURO Journal on Computational Optimization.

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10:30

Université de Montréal
Pavillon André-Aisenstadt
Salle / Room: 5441

Ouvert à tous / Open to all

Responsable / Organizer :
Nadia Lahrichi