



LEARNING TO BOUND USING DECISION DIAGRAMMS AND REINFORCEMENT LEARNING

ZOOM : [HTTPS://POLYMTL-CA.ZOOM.US/j/82989651514?pwd=TCYRYKO_HMT0-AQA3IK1kxAOFEHVXA.1#SUCCESS](https://POLYMTL-CA.ZOOM.US/j/82989651514?pwd=TCYRYKO_HMT0-AQA3IK1kxAOFEHVXA.1#SUCCESS)

Abstract: Finding tight bounds on the optimal solution is a critical element of practical solution methods for discrete optimization problems. In the last decade, decision diagrams have brought a new perspective on obtaining upper and lower bounds that can be significantly better than classical bounding mechanisms, such as linear relaxations. However, the quality of the bounds achieved through this flexible bounding method is highly reliant on the ordering of variables chosen for building the diagram, and finding an ordering that optimizes standard metrics is an NP-hard problem, which is also difficult to model. In this talk, I will present a generic approach based on deep reinforcement learning for obtaining an ordering for tightening the bounds obtained with approximate decision diagrams, and show that these bounds can be efficiently used to speed-up a branch-and-bound algorithm.

Bio: Quentin Cappart is an assistant professor in artificial intelligence at the Department of Computer and Software Engineering of Polytechnique Montréal. He obtained a Ph.D. in 2017 from *Université catholique de Louvain* (Belgium). After his Ph.D, he joined Polytechnique Montréal and CIRRELT as a postdoctoral fellow from 2018 to 2020. During these two years, he worked in the integration of machine learning and operations research. For instance, he showed that decision diagrams, thanks to their dynamic programming nature, can be a natural bridge between these two worlds.

JEUDI / THURSDAY

19 mai 2022, 10h30
May 19th, 2022, 10:30

Salle / Room 5441
Pavillon André-Aisenstadt
Université de Montréal
ou/or [Lien Zoom](#)

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Responsable / Organizer

Jean-Yves Potvin