

Séminaire conjoint CIRRELT / Département OSD

EL MEHDI ER RAQABI, Chercheur postdoctoral
Georgia Institute of Technology



THE PRIMAL BENDERS DECOMPOSITION

Abstract: In real-life contexts, organizations face very large-scale problems for which they usually have good primal solutions. The goal is to use these solutions (primal information) to reach satisfactory solutions quickly. Among several decompositions, the Benders decomposition has been significantly applied to tackle very large-scale problems with complicating variables, which, when temporarily fixed, yield problems easy to solve. Still, in its standard form, the Benders decomposition does not profit from primal information and shows a zigzagging behavior, making convergence very slow, which is problematic in practice for large-scale problems. Driven by observations from practice, we propose the primal Benders decomposition (PBD) for sparse very large-scale problems, for which most complicating variables are equal to zero in the optimal solution. This method, a paradigm shift, uses the PBD master problem to select the complicating variables to insert in the PBD subproblem, which is a restriction of the original problem and provides the primal solution implemented in practice. We run experiments on a real-life, very large-scale problem that motivated this research and integrates production scheduling, inventory management, and vessel assignment. Beyond the OCP case, we report promising computational results on facility location instances.

Biography: El Mehdi Er Raqabi is currently a postdoctoral fellow at the Industrial and Systems Engineering (ISyE) Faculty of Georgia Institute of Technology. He obtained his PhD in operations research from Polytechnique Montreal in 2024. He was also a visiting scholar at KU Leuven in 2024 and Griffith University in 2023. Before that, he got an MBA from the International University of Japan in 2019 and an industrial engineering degree from the Mohammadia School of Engineers in 2016. He has won several scholarships and awards, including the EURO Excellence in Practice Award 2024 and the 2024 GERAD Best Thesis Competition.

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Meeting ID: 641 6049 2524 Passcode: 661236

JEUDI
8 MAI 2025
13h30

ZOOM

Ouvert à tous

Responsable :
Jacques Renaud