CIRRELT / CORS (Montréal Chapter) joint seminar

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Blackbox optimization: Algorithms and applications

Abstract: A blackbox optimization problem is such that its objective(s) and constraints are provided by a computer code or an experiment, a simulation seen as a blackbox. This blackbox may fail to evaluate, be time-consuming, be contaminated by noise, etc. Most importantly, analytical expressions of the problem, including derivatives, are unavailable. In such a context, optimization methods that do not rely on derivatives are needed. These derivative-free optimization algorithms exist since the 50's, but have rapidly evolved over the last 25 years. This presentation introduces several examples of applications, including hyperparameter tuning and the design of a solar power plant, and gives an overview of the different families of methods, with a focus on algorithms that are not heuristics since they possess mathematical guarantees of convergence. Several features will be highlighted, such as constraints handling, multiobjective optimization, discrete variables as well as the use of models and surrogates.

Biography: Sébastien Le Digabel is a Professor of Mathematics at Polytechnique Montreal and a regular member of the GERAD research center. Before that, he obtained a PhD in applied mathematics from Polytechnique in 2008, and worked as a postdoctoral fellow at the IBM Watson Research Center and the University of Chicago in 2010 and 2011.

His research interests include the analysis and development of algorithms for blackbox optimization, and the design of related software. Blackbox optimization occurs when the functions to optimize are given by numerical simulations for which derivative information is not available. In this context, derivative-free optimization may be considered, and in particular the Mesh Adaptive Direct Search (MADS) method of Audet and Dennis, for which Le Digabel's thesis brought some extensions and upgrades. All of his work on MADS is included in the NOMAD software, a free package for blackbox optimization available at www.gerad.ca/nomad.

Vendredi / Friday
28 mars 2025 / March 28th, 2025

11:00

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

Ouvert à tous / Open to all

Responsable / Organizer :
Nadia Lahrichi