CORS · SCRO

Canadian Operational Research Society
Société canadienne de recherche opérationnelle

Friday, February 21st, 2025

9:00 – 10:00 a.m. EST

CORS Micro-Event (online):

Enabling cellular network power infrastructure to support the stabilization of power grids

Presented by

Brigitte Jaumard, Professor, Concordia University, Montreal

Brigitte Jaumard is a professor in the Computer Science and Software Engineering (CSE) Department at Concordia University. Her research focuses on mathematical modeling and algorithm design (large-scale optimization and machine learning) for problems arising in communication networks, transportation and logistics networks.
Recent studies include the design of efficient optimization/machine learning algorithms for network design, dimensioning and provisioning, scheduling in edge-computing and clouds, and 5G networks. During her 2020-2021 sabbatical year, she was a senior advisor for the Montreal Ericsson GAIA (Global Artificial Intelligence Accelerator) research center and a research lead with Ciena. She was the chief scientist of CRIM during 2019-2021, and then the first scientific director of Confiance IA in 2024.
Brigitte Jaumard was ranked among the top 2% of scientists in her field of research according to a 2021 study based on research citations. She was awarded several research chairs (Canada Research Chair and Concordia Research Chair, both Tier I during the years 2000-2019). B. Jaumard has published over 400 papers in international journals in Optimization, Machine Learning and in Telecommunications.

Abstract

Power systems are increasingly challenged by the widespread adoption of renewable and volatile energy sources. In this context, the electrical infrastructure of cellular base stations (BSs), as well as their batteries to compensate for outages, have a significant potential to support the stabilization of the power grid by providing frequency regulation services during off-peak 5G traffic periods, but not only. This potential is further amplified by the proliferation of 5G BSs and future 6G networks, which require a higher density of base stations. We discuss exact algorithms and heuristics for the planning and coordination of cellular network systems that can provide frequency regulation. They rely on the integration of battery degradation models in large-scale mathematical models. Indeed, by exploiting the geographically distributed batteries of BSs and their reserve capacity, we demonstrate both the technical and economic feasibility of our models, as well as their efficiency with minimal impact on the protected traffic load. Validations were performed using a combination of real-world datasets, ensuring the robustness and applicability of the proposed models under various scenarios and balancing market conditions.
The conclusions are that cellular network batteries can not only contribute to the stability of the power grid by providing a valuable new balancing resource, but also improve revenue streams for Communication Service Providers (CSPs).

Register at: https://forms.gle/ZCMoqpmkbG9wciPm7

Questions? Email:president@cors.ca

Organized by: Anjali Awasthi, President CORS and CORS Montreal Local Section

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Friday, February 21st, 2025

10:00 – 11:00 a.m. EST

CORS Micro-Event (online):

Best-Worst Method: A Behaviorally-Inspired Approach to Decision-Making

Presented by

Jafar Rezaei, Delft University of Technology, Netherlands

Jafar Rezaei is Professor of Decision Science at the Faculty of Technology, Policy, and Management at Delft University of Technology (TU Delft) in the Netherlands. His research focuses on behavioral decision-making methodologies and their applications across various domains, including supply chain management and logistics. Jafar Rezaei is widely recognized for his contributions to the development of several decision-making methods, notably the Best-Worst Method (BWM), which has emerged as a mainstream approach in the field of multi-criteria decision-making. In addition to his research, he teaches courses on supply chain management, logistics, and multi-criteria decision analysis. Furthermore, He serves as the editor-in-chief for the Journal of Multi-Criteria Decision Analysis, a preeminent journal in the MCDA field.

Abstract

In this workshop, I give an overview of the Best-Worst Method (BWM), explaining how it effectively mitigates behavioral biases commonly found in multi-criteria decision-making (MCDM) problems. BWM is a multi-criteria decision-making method rooted in behavioral decision theories, designed to simplify and improve the consistency of preference elicitation. It addresses cognitive limitations by focusing on extremes: decision-makers identify the most important (best) and least important (worst) criteria, then compare all other criteria to these two anchors. This approach reduces the number of comparisons required, minimizes cognitive load, and ensures logical consistency through optimization techniques. By aligning with natural human tendencies, BWM provides a robust and reliable framework for deriving weights in decision-making. Its applications span diverse fields, including supply chain management, healthcare, and environmental planning, making it a versatile tool for addressing complex decisions.

Register at: https://forms.gle/ZCMoqpmkbG9wciPm7

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