THE UNIVERSITY OF HONG KONG

Institute of Mathematical Research
Department of Mathematics

Optimization and Machine Learning Seminar

Optimizer's Information Criterion: A Diagnostics Framework in Data-Driven Optimization

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Abstract

Data-driven optimization aims to integrate observed samples and machine learning predictions into downstream decision-making objectives. Different methods -- varying in model classes and algorithmic design -- can outperform one another across problem instances. This variability underscores a fundamental yet challenging question: how can we evaluate and compare the out-of-sample objective performance of data-driven optimization methods accurately and efficiently? In this talk, I will introduce Optimizer's Information Criterion (OIC), a general, decision-focused diagnostics framework that extends existing information criteria such as Akaike's Information Criterion from model selection to decision selection. OIC analytically approximates and removes the bias arising from the interaction between model fitting and downstream optimization. It covers a wide range of optimization formulations and provides reliable performance estimates without repeatedly re-solving optimization problems as in cross-validation. This perspective highlights how analyzing the structure of data-driven optimization algorithms offers a systematic and theoretically grounded approach to evaluating their performance.

Date:	November 19, 2025 (Wednesday)
Time:	11:00 am – 12:00 noon
Venue:	Room 210, Run Run Shaw Building HKU

All are welcome