

Tractable optimal experimental design using transport maps

Tuesday, August 13, 2024 4:30 PM (30 minutes)

We present an approach for optimal experimental design (OED) for Bayesian inverse problems characterized by non-Gaussian, intractable posteriors. Our transport-map-based approach is versatile, accommodating various optimality criteria, design types, and prior distributions. In this talk, we highlight the key aspects of our method with a focus on the Bayesian D-optimality criterion, which aims to maximize the expected information gain from prior to posterior. A crucial tool for our approach is the Knothe-Rosenblatt rearrangement, which facilitates efficient sampling from conditional distributions that appear in many optimality criteria. We construct this map via a tensor train surrogate to the intractable target density. We also discuss extensions of our approach to sequential design problems and supplement our discussion with numerical examples.

Primary authors: KOVAL, Karina (Heidelberg University); Prof. SCHEICHL, Robert (Heidelberg University); Prof. HERZOG, Roland (Heidelberg University)

Presenter: KOVAL, Karina (Heidelberg University)

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