Optimal Transport for Inverse Problems in Dynamical Systems

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Abstract

Recovering underlying dynamics or essential parameters in a dynamical system is a fundamental problem in mathematical modeling. Often, first principles are not sufficient for estimating dynamics and parameters, and data-driven approaches are necessary. This talk will discuss an optimal transport-based method for recovering parameters in chaotic dynamical systems. Two key ideas are switching from trajectories to state-space distributions and considering optimal transportation costs as fidelity functions. As a byproduct, we analyze the pointwise differentiability of transportation-based loss functions and provide a sufficient condition in terms of the structure of optimal transport plans.

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