

Abstract:

Structural Causal Models (SCMs), also known as (Non-Parametric) Structural Equation Models (NP-SEMs), are widely used for causal modelling purposes. One of their advantages over other representations such as causal Bayesian networks is that SCMs allow for cycles (causal feedback oops). The presence of cycles adds many complexities that are absent in the acyclic setting, especially for nonlinear models. In this talk, I will discuss recent advances in the theory of cyclic Structural Causal Models. I will discuss how they can be marginalized to describe a subsystem of interest, explain how SCMs can model the equilibrium states of ordinary differential equation models and how these equilibrium states change under perturbations, and I will present recent results on the Markov properties of cyclic SCMs that provides the corner stone for novel cyclic causal discovery algorithms.