

Global stability for McKean-Vlasov equations on large networks

Tobias Wöhner

This talk investigates the mean-field dynamics of stochastic McKean (or Kuramoto-type) differential equations with particle interaction patterns described by large network/graph structures. These dynamics are fundamental in wide range of natural processes such as synchronization phenomena, opinion formation and biological mechanisms. We formulate the limiting McKean-Vlasov equation with a Vlasov interaction term that incorporates the recently developed graph limit theory of graph operators (or graphops). This allows us to cover a wide range of graph structures including dense, sparse and various intermediately dense cases. In this rather general setting, we prove global stability of the homogeneous steady state via entropy methods and provide explicit graph-structure dependent stability conditions and decay rates.