Nonlinear algorithms for state estimation of Hamiltonian systems

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This talk is devoted to the problem of recovering an unknown function u from a Hilbert space from finitely many measurements possibly affected by noise. In recent years, inversion methods based on linear and piece-wise linear approximation spaces with certified recovery bounds have been developed. It is however known that such spaces become ineffective for approximating simple and relevant families of functions, such as piecewise smooth functions that typically occur in physical problems with important advection effects. In this talk, we present a nonlinear inversion method to address this obstruction in the framework of Hamiltonian problems. The method relies on dynamical low rank approximations, and a dynamical optimal sensor placement.

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