Koopman operator theory: fundamentals and data-driven approximation

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The linear, but infinite-dimensional Koopman operator enables analysis, prediction, and control of nonlinear dynamical systems through the lens of observable functions [4, 5]. Extended Dynamic Mode Decomposition (EDMD) and kernel EDMD are widely applied and computationally attractive methods to approximate the Koopman operator. The goal of this talk is threefold: First, we provide a concise introduction into Koopman operator theory [4]. Second, we give insight into the error analysis to derive uniform error bounds [3]. Hereby, we briefly touch upon Koopman invariance and its function-space dependent characterization [1]. Third, we leverage parabolic regularity to derive comparable results for stochastic dynamics under weaker regularity conditions [2].

# Literatur

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