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An overview of operator learning

Abstract: Operator learning is an emerging field at the intersection of machine learning, physics, and mathematics, that aims to discover properties of unknown physical systems from experimental data. Popular techniques exploit the approximation power of deep learning to learn solution operators, which map source terms to solutions of the underlying PDE. Solution operators can then produce surrogate data for data-intensive machine learning approaches such as learning reduced order models for design optimization in engineering and PDE recovery. In this talk, we will provide a brief overview of the growing field of operator learning and see how numerical linear algebra algorithms, such as the randomized singular value decomposition, can be exploited to gain theoretical and mechanistic understanding of operator learning architectures.