

## Learning Hamiltonian functions of ODEs and PDEs

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A lot of physical phenomena are modeled by Hamiltonian systems, which are entirely determined by a Hamiltonian function. In some cases, however, the Hamiltonian function may not be known and we may want to find it from data sampled over one or more trajectories. The method discussed here aims to do this by using Sparse Identification of Non-Linear Dynamics (SINDy) method, proposed by Brunton and al. in 2016, to find the target Hamiltonian in the space spanned by a finite number of functions that have been previously chosen. In our approach, we solve this optimization problem by considering target solutions over increasing time intervals. In doing so, we reduce the computation time of gradient descent while avoiding a large number of local minima. We will present this method applied to Hamiltonian PDEs.