

Contribution ID: 2

Type: **not specified**

Renormalization Group Approach for Machine Learning Hamiltonian

Wednesday, 28 June 2023 11:30 (25 minutes)

Reconstructing, or generating, Hamiltonian associated with high dimensional probability distributions starting from data is a central problem in machine learning and data sciences. We will present a method —The Wavelet Conditional Renormalization Group —that combines ideas from physics (renormalization group theory) and computer science (wavelets, Monte-Carlo sampling, etc.). The Wavelet Conditional Renormalization Group allows reconstructing in a very efficient way classes of Hamiltonians and associated high dimensional distributions hierarchically from large to small length scales. We will present the method and then show its applications to data from statistical physics and cosmology.

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