

Abstract Submitted
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Interpretable Conservation Law Estimation from Trained Deep Neural Networks YOH-ICHI MOTOTAKE, Physical Society of Japan — Several deep neural networks(DNN) model, has been developed to the estimation of the Hamiltonian from a time-series data of a dynamics. Although, these methods have a limitation of interpretability. We propose a new approach to extract the interpretable physical laws from DNN trained by time-series data. The approach is realized by developing two methods. One is an estimation method of transformations that makes the target system invariant. Another is an estimation method of conservation laws based on Noether's theorem. These methods are constructed by derivating the relationship between the manifold structure of time series data and the necessary conditions for Noether's theorem. The feasibility of the approach has been verified in some primitive cases whose conservation law is well known.

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