

# Understanding Dynamical Laws with Tensor Analysis

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Dynamical systems are ubiquitous in nature and have been modeled by differential equations for ages. It is, however, an open problem to find a generic method for the recovery of such governing equations from observations of a system. Although neural networks have universal approximation properties, their expressivity is not understood, if we restrict to finite architectures, which prevents them to be used for the recovery of dynamical laws in a controlled manner. We discuss the similarity of this problem to tensor network decompositions and make this change of perspective precise with the kernel trick. Finally, we review the MANDy method to recover dynamical laws using tensorial data and discuss the expressivity of Convolutional Arithmetic Circuits.