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Multiview Symbolic Regression

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Symbolic Regression is a data-driven method that searches the space of mathematical equations with the goal of finding the best analytical representation of a given dataset. It is a very powerful tool, which enables the emergence of underlying behavior governing the data generation process. Furthermore, in the case of physical equations, obtaining an analytical form adds a layer of interpretability to the answer which might highlight interesting physical properties.
However equations built with traditional symbolic regression approaches are limited to describing one particular event at a time. That is, if a given parametric equation was at the origin of two datasets produced using two sets of parameters, the method would output two particular solutions, with specific parameter values for each event, instead of finding a common parametric equation. In fact there are many real world applications where we want to propose a formula for a family of events which may share the same functional shape, but with different numerical parameters
In this work we propose a simple adaptation of the Symbolic Regression method that is capable of recovering a common parametric equation hidden behind multiple examples generated using different parameter values. We call this approach Multiview Symbolic Regression. We demonstrate how we can reconstruct famous physical equations from the seminal Feynman Lectures on Physics (S.-M. Udrescu et al., 2020). Additionally we explore possible applications in the domain of astronomy for light curves modeling. Building equations to describe astrophysical object behaviors can lead to better flux prediction as well as new feature extraction for future machine learning applications.

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