An hybrid physics-ML framework to model exoplanetary light curves

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Abstract

Several machine-learning approaches have started to emerge on astrophysical time series data, suggesting innovative automated solutions to the challenging problems of namely: light curve correction and classification, object and outlier detection... However the complexity of some processes and the absence of ground truth labels hinders the direct use of supervised methods and encourages to develop hybrid solutions to embed physical and probabilistic models inside deep learning frameworks, thus opening new doors for both performance and interpretability. In the context of exoplanetary transit light curves, we propose to decompose the problem by using machine learning to model time-correlated noise while keeping traditional physics models to infer the planetary parameters.
Slides: in PDF
Video: https://youtu.be/S2JGyDG5Pww

Keywords: Exoplanets, light curves, hybrid methods, physics based deep learning

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