PINN-PAD: Physics Informed Neural Networks in PADova
22–23 February 2024, Padova, Italy

Predicting coronal mass ejections' travel times by using physics-informed loss functions

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The problem of predicting the arrival of coronal mass ejections (CMEs) to Earth represents an important topic in the context of space weather, which has been addressed by many empirical, physics-based and machine learning strategies.

In this talk, we propose a physics-driven deep learning method, in which we include the widely-used drag-based physical model in the definition of the loss functions to minimize during the training process of a cascade of two neural networks. We show that including physical information in the architecture improves the predictive capabilities and robustness of the scheme with respect to the purely-data driven approach.