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Physics-Informed Neural Networks

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Message from the Guest Editors

Physics-informed neural networks (PINNs) have recently emerged as a novel deep learning method that is applicable to both forward and inverse problems governed by systems of ordinary or partial differential equations. Designed to approximate solutions to these differential equations, in their standard formulation, PINN training aims to simultaneously ensure that the learned function agrees with the provided training data and satisfies the differential equations. The multi-objective nature of PINN training was shown to lead to optimization scenarios that appear novel and that often cannot be successfully addressed by existing approaches in the field of deep learning.

The aim of this Special Issue is to deepen our understanding of the peculiarities of PINN training and to draw connections with recent trends in machine learning theory, such as generalization bounds, spectral bias theory, and the appropriateness of certain optimization approaches.

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Message from the Editor-in-Chief

The concept of entropy is traditionally a quantity in physics that has to do with temperature. However, it is now clear that entropy is deeply related to information theory and the process of inference. As such, entropic techniques have found broad application in the sciences.

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