Special Issue

New Advances in Physics-Informed Machine Learning

Message from the Guest Editor

Dear colleagues, Artificial intelligence methods have recently evolved into a dominant approach for solving differential equations, finding widespread applications across various applied mathematics fields such as fluid mechanics, optics, and engineering, known as physics-informed machine learning (PIML) methods. While PIML has demonstrated significant advantages over traditional numerical methods—including the ability to solve unsteady solutions and inverse problems of partial differential equations and even directly derive differential equations from pure data—it still faces critical challenges that require urgent solutions, such as increased complexity and optimization difficulties of loss functions when dealing with large computational domains (with an increased number of residual points), as well as issues of low accuracy and slow computation in operator learning for batch PDE solutions. To address these bottlenecks, the journal *Mathematics* issues a Special Issue entitled "New Advances in Physics-Informed Machine Learning", which aims to publish the latest progress in PIML approaches for solving differential equations.

Guest Editor

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About the Journal

Message from the Editor-in-Chief

The journal *Mathematics* publishes high-quality, refereed papers that treat both pure and applied mathematics. The journal highlights articles devoted to the mathematical treatment of questions arising in physics, chemistry, biology, statistics, finance, computer science, engineering and sociology, particularly those that stress analytical/algebraic aspects and novel problems and their solutions. One of the missions of the journal is to serve mathematicians and scientists through the prompt publication of significant advances in any branch of science and technology, and to provide a forum for the discussion of new scientific developments.

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