



復旦大學

数据科学与深度学习  
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# Energy Equidistribution Moving Sampling Physics-informed Neural Networks for Solving Energy Conservative Partial Differential Equations



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时间：2026年9月24日16:00-17:00

地点：光华楼东主楼1513

**Abstract:** This talk presents a novel energy equidistribution adaptive sampling framework for multi-dimensional conservative PDEs, introducing both location-based and velocity-based formulations of energy equidistribution moving mesh PDEs (EMMPDEs). The framework utilizes the energy density function as the monitor function, ensuring that mesh adaptation dynamically tracks energy evolution during temporal integration. These theoretical developments are integrated with deep neural networks to establish the energy equidistribution Moving Sampling Physics-Informed Neural Networks (EEMS-PINNs), which integrate physics-informed learning with energy-adaptive mesh optimization. Extensive numerical experiments demonstrate that EEMS-PINNs effectively maintain solution accuracy in long-time simulations while preserving conserved energy. The framework's robustness is further evidenced by its stable performance in non-conservative systems.

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