

WGFINNs: Weak-form Generic formalism informed neural networks

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Numerous data-driven modeling studies have shown that employing a weak formulation of model equations with carefully selected test functions enhances robustness against noise. In this paper, we introduce the weak-form GENERIC formalism informed neural networks (WGFINNs) to improve the performance of the GENERIC formalism informed neural networks (GFINNs) for discovering underlying dynamics from noisy measurement data. Numerical examples demonstrate that, by leveraging the weak form, WGFINNs provide greater resilience to noise compared to GFINNs, enhancing the accuracy of the data-driven discovery of dynamics.