Physics-Informed Neural Networks

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Introduction

- The real world is governed by physical laws
- Most of them are described by complex Differential Equations (DEs)
  - Navier-Stokes
  - Diffusion
  - Poisson–Boltzmann
- Solving DEs is a challenging task and it is often impossible to find an analytical solution

Introduction

- Runge-Kutta methods
  - High computational cost
  - Mainly used for behavioural simulations
- Popularity growth of Deep Neural Networks (DNNs) to solve DEs [1]
  - Computational cost is moved to the training phase
  - Possibility to

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Background

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Bibliography

[1] Tamirat Temesgen Dufera. "Deep neural network for system of ordinary differential equations: Vectorized algorithm and simulation". In: *Machine Learning with Applications* 5 (2021), p. 100058. ISSN: 2666-8270. DOI: https://doi.org/10.1016/j.mlwa.2021.100058. URL: https://www.sciencedirect.com/science/article/pii/S2666827021000293.