



Contribution ID: 269

Type: Oral Presentation

Physics-Informed Neural Networks

Thursday, 7 July 2022 12:15 (15 minutes)

A Physics-Informed Neural Network (PINN) is a neural network that is constrained by laws of physics. The best-known type of PINN is a feedforward, fully connected neural network, or multi-layer perceptron, with a loss function that has a data term plus a term for the PDE that governs the physical system. Including physics knowledge that is additional to data reduces the solution space, which allows for finding a solution when limited data is available. A PINN is not necessarily a replacement for analytical or numerical methods; rather it is useful in cases where solutions are difficult to find with conventional methods. A PINN may also have a modified architecture of connections between neurons, but that is more difficult to do than informing the loss function. A PINN may be applied to finding a future state of a system given initial conditions, as is done in time-evolution simulations, and also for inverse problems in which the final state is known but the parameter values need to be determined. Examples will be presented.

Apply to be considered for a student ; award (Yes / No)?

No

Level for award;(Hons, MSc, PhD, N/A)?

N/A

Primary author: MATTHEWS, Alan (UKZN)**Presenter:** MATTHEWS, Alan (UKZN)**Session Classification:** Applied Physics**Track Classification:** Track F - Applied Physics