

Abstract

Partial Differential Equations (PDEs) occur in all branches of Applied Mathematics and Engineering. They are used to model various real world phenomena. Dynamic meteorology and numerical weather prediction is based solely on solving PDEs. Deep learning approaches have begun to achieve their full potential in the last 2 decades. Physics Informed Neural Networks (PINNs) provide an alternative numerical way to approximate the solution to PDEs.

In this work, variational form of PDE has been augmented with the loss function of PINNs. With this framework we can achieve the benefit of h and p refinement used in Finite Element Method. The framework developed has been utilized to solve various kinds of PDEs, i.e., Poisson Equation and Convection-Diffusion Equation. These classes of PDEs are immensely useful to model various transport phenomena.