Numerical Solution of PDE's Using Deep Learning and Applications in Finance

Lucas Farias[1], **Yuri Saporito**[1]

[1] FGV | EMAp - School of Applied Mathematics

This work presents a method for the solution of PDE's using deep learning, a neural network with many hidden layers. The main idea behind the method, based on [1], is using a norm of the PDE itself as the loss function, while each iteration considers a different batch of points in the domain, together with the boundary conditions. We present some applications to well-known PDE's, including examples from finance.

References

[1] Justin Sirignano and Konstantinos Spiliopoulos, *A deep learning algorithm for solving partial differential equations*, Journal of Computational Physics 375, 1339-1364