NITheCS

National Institute for
Theoretical and Computational Sciences

NITheCS COLLOQUIUM:

Approximating PDEs with wide neural networks

Prof Sam Cohen (University of Oxford, UK)

Friday, 21 July 2023 | 16h00 – 17h00 SAST

Venue: in person* and online

** Neelsie Cinema, Stellenbosch University*

--- Cheese and wine will be served at the venue ---

ABSTRACT

Neural networks are a rich family of function approximators, which perform particularly well in high dimension. In this talk, we will consider training Neural Networks as approximators of the solutions of PDEs, using the `deep Galerkin' and `Q-PDE' algorithms. We will show conditions under which, in the limiting regime where the neural network becomes infinitely wide, the approximator can be proven to converge to the true Sobolev solution of the PDE, along with nurmerical examples.

BIOGRAPHY

Sam Cohen is Associate Professor in the Mathematical Institute in Oxford, and Fellow and Theme lead for Machine Learning in Finance at the Alan Turing Institute. He has worked on a wide range of problems associated with financial mathematics and probability, including decision making under uncertainty, modelling of high frequency data, the theory of optimal filtering and fundamentals of machine learning. His PhD was from the University of Adelaide in 2010, under the supervision of Robert Elliott and Charles Pearce.

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