

TOWARDS OPERATOR LEARNING FOR IONIC MODELS IN BIOMATHEMATICS

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Ionic models are among the most extensively studied dynamical systems in biomathematics, as they play a crucial role in modelling electrophysiology at the cellular scale. In particular, they are a crucial component in cardiac modelling since they account for the excitability of the cellular membrane and they are responsible for the action potential. Since they may significantly contribute to the computational complexity of the problem, it is important to develop alternative techniques that minimize their impact on the global solution time. In this talk, we will introduce a strategy for exploiting Operator Learning techniques, such as DeepONet, Fourier Neural Operator (FNO) and Wavelet Neural Operator (WNO), to solve these systems more efficiently. Specifically, we will compare the accuracy of the trained models with the ones solved numerically and discuss the capabilities of these architectures in reconstructing the desired dynamics.