ALEX BIHLO, Memorial University of Newfoundland

A multi-model physics-informed neural network approach for solving the shallow-water equations on the sphere

Multi-model physics-informed neural networks are developed for solving the shallow-water equations on the sphere. Vanilla physics-informed neural networks are trained to satisfy differential equations along with the prescribed initial and boundary data, and thus can be seen as an alternative approach to solving differential equations compared to traditional numerical approaches such as finite difference, finite volume or spectral methods. I will discuss the training difficulties of vanilla physics-informed neural networks for the shallow-water equations on the sphere and propose a simple multi-model approach to tackle test cases of comparatively long time intervals. I will illustrate the abilities of the method by solving the most prominent test cases proposed by Williamson et al. [J. Comput. Phys. 102, 211-224, 1992]. This is joint work with Roman O. Popovych.