Contribution ID: **63** Type: **Poster**

Deep learning based model reduction approaches in flow models

Thursday, 30 July 2020 13:00 (1 hour)

In this paper, we intend to use a deep-learning based approach for the construction of locally conservative flux fields with heterogeneous and high-contrast media in the context of flow models. In previous work, the problem is solved through a variation of the Generalized Multiscale Finite Element Method(GMsFEM), which is computationally expensive. The key ingredients of GMsFEM include multiscale basis functions and coarse-scale parameters, which are obtained by solving local problems in each coarse neighborhood. In case of the time-dependent media, we have to recompute key ingredients in different time steps. The objective of our work is to make use of deep learning techniques to mimic the nonlinear relation between the permeability field and the GMsFEM discretizations, and use neural networks to perform fast computation of GMsFEM ingredients repeatedly for a class of media. The flux values are obtained through the use of a Ritz formulation in which we argument the resulting linear system of the continuous Garlerkin(CG) formulation in the higher-order GMsFEM approximation space. Furthermore, we postprocess the velocity field with some postprocessing approachesto obtain the local conservation property.

Primary author: WANG, Yiran (The Chinese University of Hong Kong)

Presenter: WANG, Yiran (The Chinese University of Hong Kong)

Session Classification: Posters 3