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Flux Regression Performances of Deep Learning in Discrete Fracture Networks

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The need of flow and transport characterization in underground fractured media is critical in many engineering applications, like fossil fuel extraction and water resources analysis. However, there is a lack of full knowledge (geometrical and hydrogeological) of these fracture systems and, therefore, statistical representations of the fractured media are given. In this context, we perform flow simulations in underground fractures with Discrete Fracture Network (DFN) models.

The stochastic representation of the fracture systems requires thousands of DFN generations and simulations to characterize the flow in a real fractured medium. For this reason, it is desirable to consider the application of Deep Learning models and use them as alternative model reduction methods to speed up the flow characterization process.

In this work we show the application of a set of Deep Learning models for flux regression in Discrete Fracture Networks, analyzing the regression quality and revealing suitable enhancements of the already existing encouraging results [1].

Time Block Preference

Time Block A (09:00-12:00 CET)

References

[1] S. Berrone, F. Della Santa, S. Pieraccini, F. Vaccarino, "Machine Learning for Flux Regression in Discrete Fracture Networks", PORTO@iris (2019), http://hdl.handle.net/11583/2724492

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