Mini-Symposium: Modeling and computing complex reactive microscale flows

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SUMMARY

Keywords: Porous media, Reactive flows, CO_2 storage, biological flows, microscale fluids, upscaling, reservoir simulation, direct numerical simulation, inverse problems, uncertainty quantitication, physics-informed neural networks.

AMS Classification: 76D07, 74A60, 74A65, 65M22, 92C10, 86A22

This symposium is related to new results and emerging questions in numerical methods for reactive flows, from the microscale and its upscaling. It concerns state-of-the-art methods in biological flows at the scale of the cell, and geosciences involving challenges in CO_2 sequestration from the pore-scale to the reservoir scale. This mini-symposium is co-funded by the ANR project MucoReaDy 20-CE45-022 and the Laboratory of Mathematics and their Applications (LMAP, UMR CNRS 5142). The five talks will be the following:

References

[1] E. Ahusborde, S. Tabrizinejadas, Sequential coupling for reactive transport modeling using PHREEQC.

[2] D. Garcia-Navarro, J. Zhang-Zhou, J-M. Garcia-Aznar, Confined cell migration by an agent-based model.

[3] S. Perez, J-M. Etancelin, P. Poncet, From Direct Numerical Simulation to Uncertainty Quantification in reactive microscale flows for CO_2 mineral storage applications.

[4] J. Racot, J-M. Etancelin, P. Poncet, Numerical solution of a linear elasticity equation in a saturated porous media in presence of fluid flow.

[5] J. Stark, R. K. Harish, I. F. Sbalzarini, M. Brand, Porous-media characteristics of embryo tissue regulate morphogen gradient formation.

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