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A nonconforming discrete fracture model of single-phase Darcy flow

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The talk is concerned with a novel discrete fracture model for single-phase flow in aquifers with highly permeable fractures, which are assumed to be filled with a porous medium different from the porous medium in the surrounding matrix rock. The fractures are treated as a $(n - 1)$ -dimensional interface in a n -dimensional domain. The finite element method couples the flow in the fracture and surrounding matrix locally by introducing a Lagrange multiplier which represents the jump of the pressure derivative normal to the fracture. By this means it is particularly possible to consider non-conforming and non-matching fracture-matrix meshes. Several possible discretization schemes of the Lagrange multiplier method will be discussed and evaluated based on various test cases of different complexity validating the overall approach. Moreover stability issues, including a consistent stability, term and convergence properties are addressed.

References

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