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# Modelling fracture propagation in poro-elastic media combining phase-field and discrete fracture models

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The understanding of the dynamics of flow in fracturing porous media is of large interest in many subsurface engineering applications. However, the numerical modelling of these processes is challenging as it requires treatment of thin geometrical features, dynamically changing topologies, and highly non-linearly coupled physical effects. This contribution investigates numerical modelling of fracture propagation in poro-elastic media. We propose a thermodynamically consistent phase-field model and present the corresponding discontinuous Galerkin discretisation. In order to reduce computational effort, we combine a global discrete fracture model with phase-field computations at the tips to compute displacement and pressure around the fractures more efficiently [1]. For this mixed-dimensional discrete fracture model we propose a mixed-dimensional discontinuous Galerkin discretisation with fully conforming grids [2]. The propagation of fractures can be tracked according to the locally computed phase-field indicator by adding facets to the fracture network [3]. In numerical examples we show that the discrete fracture model can be considered as sharp interface limit of the phase-field model, and we apply our method to complex fracture network propagation scenarios.

## REFERENCES

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