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Simulation of fractured porous media using partitioned black-box methods

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The simulation of coupled fracture flow and deforming porous medium is a challenging problem in reservoir engineering. Common examples are hydraulic simulations or hydro-fracking. Some of the challenges arise due to the difference in properties of the mathematical models used in each of the subdomains. Solving the problem using a monolithic approach leads to an ill-conditioned system of equations implying the necessity of using a direct solver for the resulting linear system of equations.

We investigate a partitioned black-box coupling approach based on the idea of domain decomposition techniques. The individual problems are solved separately in an iterative manner such that we can use standard iterative solvers for the linear systems. Our approach is based on the open-source library preCICE (www.precice.org) allowing us to reuse existing solver software and simplifying the setup of new solvers that are immediately prepared for high-performance parallel computations.

Time Block Preference

Time Block B (14:00-17:00 CET)

References

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