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Timo Heister* (heister@clemsn.edu), **Mary F Wheeler** and **Thomas Wick**. *A parallel solution approach for crack propagation using adaptive mesh refinement.*

We present an algorithm based on the active set strategy to simulate crack propagation using a quasi-static fracture model. The crack is discretized using a phase-field approach, which allows merging and joining of cracks. The non-linear system is discretized using the Finite Element method and solved in a monolithic fashion. We include a new strategy for adaptive mesh refinement. The whole scheme is parallelized and scales to a large number of cores. (Received February 01, 2015)