Robust software modules for modelling interfaces

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This is a joint work in blending the solver and graph libraries provided by HAZmath (a finite element, solver, and graph software library) and the well known framework for discretization and multi-physics framework (FEniCS). The focus will be on the resulting suite of software modules HAZniCS which shows promise in increasing the efficiency and robustness of the numerical algorithms and methods used in prototyping examples. Several challenges arising in the numerical modeling of complex interfaces will be reported. The focus will be on the design, analysis, and implementation of a pool of robust discretization and solver algorithms which tackle issues related to pairing poromechanics with Darcy/Stokes flows.