FEM-BEM coupling for the exterior Stokes problem with conforming and non-conforming finite elements

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Galerkin finite element - boundary integral equation formulations are presented for the coupling of a finite element modelled interior region to a boundary integral supported exterior region for the two-dimensional steady state exterior Stokes problem.

The solutions in the exterior are represented using both single- and double-layer hydrodynamic potentials which allows a well conditioned symmetric structure for the entire system-matrix when using (stabilized linear) conforming finite elements, for which results will be presented.

Similar formulations and results will also be indicated for **preliminary work** extending the FEM-BEM coupling to use non-conforming Crouzeix-Raviart finite elements for the velocity, where stabilization is not required but overall system-matrix symmetry is lost.

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