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Coupling surface and subsurface flows with curved interfaces PU SONG, IVAN YOTOV, Department of Mathematics, University of Pittsburgh, 301 Thackeray, Pittsburgh, Pennsylvania 15260, USA — A mortar multiscale method is developed for the coupled Stokes andDarcy flows with the Beavers–Joseph–Saffman interface condition in irregular domains. Conforming Stokes elements and multipoint flux mixed finite elements in Darcy are used to discretize the subdomains on the fine scale. A coarse scale mortar finite element space is used to approximate interface stresses and pressures and impose weakly continuity of velocities and fluxes. Matching conditions on curved interfaces are imposed by mapping the physical grids to reference grids with flat interfaces.

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