Construction of trace-preserving Fortin operators

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In the theory of mixed finite element spaces for incompressible fluid flows a so-called Fortin operator ensures that the inf-sup stability holds. It is a bounded (linear) operator that preserves the discrete divergence in the dual of the pressure space. Additional properties can be obtained by constructive means, for example locality or trace preservation properties. Those are key in the numerical analysis of non-Newtonian fluid flow and quasi-optimal error estimate for inhomogeneous Dirichlet boundary conditions. Also, when approximating curved domains they yield uniform inf-sup constants. We present a strategy to construct such Fortin operators for several H^1 conforming finite elements. This is joint work with Tabea Tscherpel.

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