Reconstruction-based a-posteriori error estimation in stress-based FEM for frictional contact problems

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The use of stress-based finite element methods for the treatment of contact problems admits locking free performance in the incompressible limit as well as direct access to the surface forces at the contact zone. Consequently we are studying the application of the stress-based FEM described in [1] featuring next-to-lowest order Raviart-Thomas-Elements to the Signorini contact problem with Coloumb friction using a dual variational formulation similar to the one studied in [2].
Since frictional contact problems tend to feature singularities, adaptive refinement strategies are to be considered and reliable a-posteriori error estimation is needed. We therefore extend the a-posteriori error estimator in [5] to frictional contact and reconstruct a H^1-conforming displacement following the ideas in [3] and [4]. We prove reliability of our error estimator under similar assumptions as those made in [6] for uniqueness and test its efficiency by numerical experiments in two and three dimensions.

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