

# FRICTIONAL CONTACT WITH NITSCHKE METHOD

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**ABSTRACT.** We consider frictional contact problems in small strain elasticity discretized with finite elements and the Nitsche method [3]. Both bilateral and unilateral contact problems are taken into account, as well as both Tresca and Coulomb friction models [2, 5, 6]. We derive residual posteriori error estimates for each friction model following [4]. For the incomplete variant of Nitsche, we prove an upper bound for the dual norm of the residual, for Tresca and Coulomb friction, without any extra regularity and without a saturation assumption. We also prove local lower bounds. Numerical experiments in FEniCS allow to assess the accuracy of the estimates and their interest for adaptive meshing in different situations [1].

**Keywords:** frictional contact; finite elements; Nitsche method; stabilized methods; bilateral contact; unilateral contact; Tresca friction; Coulomb friction; a posteriori error estimates; adaptive meshing.

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