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HIGH ORDER MORTAR FINITE ELEMENT APPLIED TO ANALYSIS OF COMPUTATIONAL CONTACT MECHANICS

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The contact between structures including frictional effects is a quite common nonlinear problem. Boundary value problems involving this phenomenon are of great importance, for instance, in mechanical and civil engineering, as well as in environmental and biomedical applications. Virtually all movement that can be seen on our planet involves contact between structures, and the consideration frictional effects further complicates this problem in means of mathematical modeling and numerical computational techniques. The determination of the pressure distribution at the contact interface in a structural component is essential in the design phase, and exerts a direct and crucial role in determining the wear and component life. In the present work, a high-order mortar finite element method for frictional contact problems is presented. The aim of this work is to increase the accuracy of the solution in the contact region with the application of p-FEM high-order method, under the consideration of finite deformations without thermomechanics effects. The development of techniques related to solving this kind of problems has applications in classical design contact of mechanical components such as bearings and shafts profiles of gears, as well as more recent applications of biomechanical prostheses and implants.

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