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## A nonlinear interface formulation for soil–structure interaction systems

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### ABSTRACT

Finite element simulations of soil–structure interaction systems require the use of nonconfirming meshes (NCM) to increase accuracy in capturing the behavior in each material and along the interface. The use of NCM meshes, however, presents a number of challenges in modeling the soil–structure contact interface. The main issue in modeling contact with NCMs is how to ensure geometric compatibility and a complete transfer of surface tractions through the interface in the presence of large material and geometric nonlinearities. In this study, the enriched discontinuous Galerkin formulation approach (EDGA) developed in Ref. [1] for the coupling of the NCM is extended to model the soil–structure interface in a large deformation contact problem. A constitutive model capable of describing the nonlinearity and plastic behavior of the soil is considered. This study is intended to verify the applicability and effectiveness of the EDGA for soil–structure interaction problems in the presence of large deformations, materials nonlinearities, and soil plasticity.

### REFERENCE

- [1] Haikal, G., Hjelmstad, K.D. An enriched discontinuous Galerkin formulation for the coupling of non-conforming meshes. *Finite Elements in Analysis and Design*. 2010, 46(6), 496–503.