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A multiscale finite element method with embedded strong discontinuity model for the simulation of cohesive cracks in solids

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ABSTRACT:

A multiscale finite element method with the embedded strong discontinuity model is proposed to simulate the cohesive cracks in solids. In the proposed method, the kinematic descriptions of the strong discontinuity and space discretization are considered based on the fine-scale with the strong discontinuity approach. Then in order to correctly and conveniently deliver the discontinuous information between the coarse-scale and fine-scale, an enhanced coarse element strategy is proposed to construct the multiscale base functions that can well capture the discontinuous characteristics and preserve an adequate accuracy for the unit cells exhibiting a strong discontinuity. The main idea is that the coarse nodes of the enhanced coarse element can be dynamically added according to the identification of the intersection between

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