

عنوان مقاله:

Local and Global Approaches to Fracture Mechanics Using different Computational Geometry Technologies in Isogeometric Analysis Method

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خلاصه مقاله:

In the present research, implementations of different computational geometry technologies in isogeometric analysis framework for computational fracture mechanics are investigated. NURBS and T-splines are two different computational geometry technologies which are studied in this work. Among features of B-spline basis functions the possibility of enhancing a B-spline basis with discontinuities by means of knot insertion makes isogeometric analysis method a suitable candidate for modeling discrete cracks. In this contribution we use isogeometric analysis to discretize the cohesive zone formulation for failure in materials. In the case of a pre-defined interface, non-uniform rational Bsplines(NURBS) are used to obtain an efficient discretization. In the case that propagating cracks are considered, Tsplines are found to be more suitable, due to their ability to generate localized discontinuities. In other words, using intrinsic properties of NURBS or T-spline-based isogeometric analysis method in fracture mechanics obviate the implementation of partition of unity method in the isogeometric analysis framework. Also utilizing isogeometric analysis method can decrease computational effort much more than other numerical approaches. Various numerical simulations demonstrate the suitability of the isogeometric approach to cohesive zone modeling

کلمات کلیدی:

Fracture mechanics, Isogeometric analysis method, Knot insertion, NURBS, Partition of Unity method (PUM), T-spline

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