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ISOGEOMETRIC FINITE ELEMENT ANALYSIS USING POLYNOMIAL SPLINES OVER HIERARCHICAL T-MESHES FOR SOLID MECHANICS PROBLEMS

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Abstract

Isogeometric finite element analysis was recently proposed to handle exact geometries and to improve significantly the accuracy of the standard finite elements. One major drawback of NURBS based isogeometric finite elements is their inability of local refinement. In this study, we promote an alternative to NURBS based isogeometric finite elements that allow for local refinement. The idea is based on polynomial splines and exploits the flexibility of T-meshes for local refinement. The shape functions satisfy important properties such as nonnegativity, local support and partition of unity. Two numerical examples are illustrated to show the efficiency of the present method.

Key works: Isogeometric analysis, Finite elements, T-meshes, PHT-spline.

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