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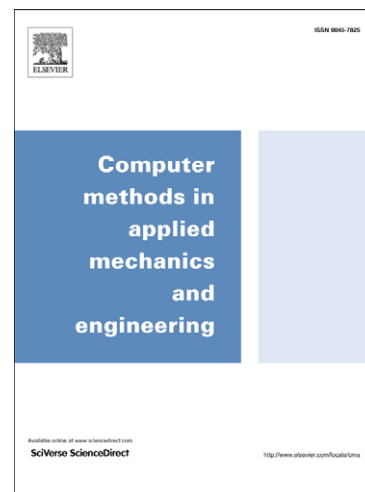
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Blended Isogeometric Shells

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Abstract

We propose a new isogeometric shell formulation that blends Kirchhoff-Love theory with Reissner-Mindlin theory. This enables us to reduce the size of equation systems by eliminating rotational degrees of freedom while simultaneously providing a general and effective treatment of kinematic constraints engendered by shell intersections, folds, boundary conditions, the merging of NURBS patches, etc. We illustrate the blended theory's performance on a series of test problems.

Key words: isogeometric analysis, NURBS, shells, rotation-free, nonlinear

1 Introduction

Reissner-Mindlin shell theory, also referred to as “thick shell theory,” which accommodates transverse shear deformations, has become the predominate theory used as a basis of finite element implementations. The main attribute of Reissner-Mindlin theory, as far as finite element technology goes, is that it is C^0 -conforming, that is, standard C^0 -continuous interpolation functions are appropriate for representing displacements and independent fiber rotations. Various “locking” phenomena are

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