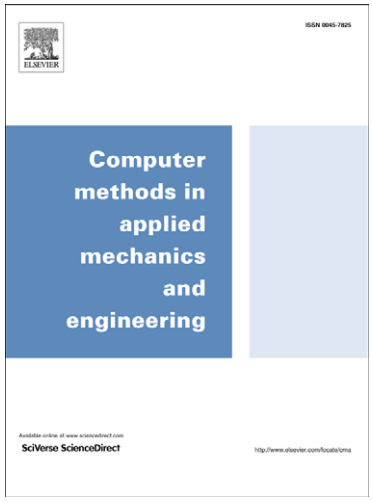

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PII: S0045-7825(12)00369-6
DOI: http://dx.doi.org/10.1016/j.cma.2012.11.020
Reference: CMA 9868

To appear in: *Comput. Methods Appl. Mech. Engrg.*

Received Date: 17 August 2012
Revised Date: 27 November 2012
Accepted Date: 30 November 2012

Please cite this article as: D.J. Benson, S. Hartmann, Y. Bazilevs, M.-C. Hsu, T.J.R. Hughes, Blended Isogeometric Shells, *Comput. Methods Appl. Mech. Engrg.* (2012), doi: http://dx.doi.org/10.1016/j.cma.2012.11.020

Blended Isogeometric Shells

D.J. Benson [a,1], S. Hartmann [b,2], Y. Bazilevs [a,3], M.-C. Hsu [c,4], and T.J.R. Hughes [c,5]

[a] *Department of Structural Engineering, University of California, San Diego 9500 Gilman Drive, La Jolla, CA 92093, USA*

[b] *DYNAmore GmbH, Industriestr. 2, 70565 Stuttgart-Vaihingen, Germany*

[c] *Institute for Computational Engineering and Sciences, The University of Texas at Austin, 201 East 24th Street, 1 University Station C0200, Austin, TX 78712, USA*

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

[1] Professor and corresponding author. Phone: 858-534-5928. E-mail: dbenson@ucsd.edu
[2] Research Engineer
[3] Associate Professor
[4] Postdoctoral Fellow
[5] Professor of Aerospace Engineering and Engineering Mechanics, Computational and Applied Mathematics Chair III