Advanced spline discretizations in structural applications

Pulama Bhattacharya[†], Zhihui Zou[†], Kyle Richardson[†], Derek C. Thomas[*], Michael J. Borden[*], Florian Maurin[*], and Michael A. Scott[*†]

[*]Coreform LLC
Orem, Utah 84097, USA
e-mail: derek@coreform.com, web page: http://www.coreform.com

[†] Brigham Young University
Department of Civil and Environmental Engineering
Provo, Utah 84604, USA

ABSTRACT

Work at Coreform on the development of a commercial platform for isogeometric analysis has identified the advancement of several key analysis technologies as critical to the long-term success of isogeometric methods in industrial structural applications. These technologies include single-surface contact algorithms, locking-free shell formulations, and techniques to improve the critical time step size for highly unstructured spline discretizations in explicit dynamic applications. We will present several new results in each of these areas, their application to demanding problems, and demonstrate how U-splines, a new unstructured spline technology, are an important enabling technology in each case.