Enabling IGA in LS-DYNA for industrial sheet-metal forming applications

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ABSTRACT

Lots of scientific research has been done in the area of Isogeometric Analysis (IGA) since its first publication in 2005 [1]. While investigating various types of analysis suitable basis functions, the majority of the works has been concentrating on using non-uniform rational B-splines (NURBS), which represent the most widely used geometry representation in Computer-Aided-Design (CAD). As it was shown, that finite-element analysis based on NURBS may lead to more accurate results compared with the standard finite element technology based on Lagrange polynomials, IGA with NURBS is being implemented into the commercial simulation software package LS-DYNA [2].

Initially this paper will give an overview about the current capabilities of IGA with NURBS in LS-DYNA. Thereafter, the focus will be on the challenges in using IGA for industrial sheet-metal forming applications. Recent advances in this area, like multi-stage analysis, allowing for stress, strain and thickness initialization or mapping will be presented. A discussion about missing features and future planned activities will conclude this work.

REFERENCES

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