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Trimming Simulation of Forming Metal Sheets Isogeometric Models by Using NURBS Surfaces

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Abstract. Some metal sheets forming processes need trimming in a final stage for achieving the net-shape specification and for removing micro-cracks and irregularities. In numerical simulation, since the exact final edge location is a priori unknown in the original metal blanket, the trimming needs to be done once the forming is finished. During the forming internal stresses are generated inside the sheet. When trimming those stresses configuration is changed to achieve equilibrium as a consequence of the material removal. In this paper a novel method for simulating the trimming is presented. The part to trim is modelled using isogeometric analysis (IGA). The new surface generated is modelled with non-uniform rational B-splines (NURBS). Due to the IGA characteristics a total geometrical accuracy and an efficient residual stresses recalculation are accomplished.

Keywords. Trimming, IGA, NURBS, Metal sheet forming.

