**Isogeometric Analysis of Shells in LS-DYNA**

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**Abstract**

- Simple benchmark tests to analyze different locking-phenomena (transverse shear locking and membrane locking) in shells.
- Analyze the influence of various model and discretization parameters like geometry, slenderness, shell theory type and mesh density.
- Compare results of FEM and IGA for an industrial problem.

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**Solution**

- Hierarchic formulations from IBB completely alleviate transverse shear locking.
- Reduced integrations schemes in LS-Dyna help alleviate locking.
- Membrane locking effects can be completely alleviated by using a hierarchic DSG formulation with a modification in the membrane part.
- Higher polynomial orders also reduce locking tendencies in IGA using LS-Dyna.

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**Hierarchic Parameterization:**

\[ a_3 = A_3 + \Phi \times A_3 + w^{\text{hier.}} \]

where

- \( w = w^1 A_1 + w^2 A_2 \)
- \( \Phi = \varphi_1 A_1 + \varphi_2 A_2 \)

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**More Results**

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**Literatur:**


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