

THREE-DIMENSIONAL ISOGEOMETRIC SURFACE ELEMENT ENRICHMENT

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A novel surface enrichment technique based on isogeometric analysis is presented. The technique uses isogeometric basis functions, e.g. NURBS or T-splines, on surfaces which require higher accuracy or higher continuity than provided by a standard Lagrangian basis [1]. The basis functions are used for approximation of both the field of unknowns and the geometry. Within the bulk domain, a standard Lagrangian basis is employed to maintain efficiency and simplicity. The approach does not only lead to higher accuracy and continuity on the surface, but can also simplify the meshing procedure. Meshing of three-dimensional bodies with NURBS or T-splines is currently a topic of ongoing research, while meshing the surface with Lagrange-based elements leads to geometric inaccuracies. With the presented approach, only well-understood NURBS or T-spline surfaces are required, while the volume can be meshed with readily available commercial tools.

Vairous numerical examples underlining the potential of the proposed method are presented, including frictional contact computations, peeling and debonding, and fluid-structure interaction. Together with the computational results, the advantages and drawbacks of the method are discussed.

REFERENCES

- [1] C.J. Corbett and R.A. Sauer. *NURBS-enriched contact finite elements*. submitted, 2013.