A DG-IGA scheme on multipatch unions with small overlapping regions

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ABSTRACT

In the Isogeometric Analysis (IGA) framework, the computational domain is very often represented as a multipatch union. In this talk, the construction of the patch union consists of two stages, [1]. The first stage includes a segmentation of the computational domain into simple subdomains, which are topological equivalent to a cube. The second stage includes the parametrization of each of the simple subdomains by volumetric B-Splines or NURBS. During the first stage errors can be occurred on the determination of the interface control points. This can result in the derivation of non-conforming interface parametrizations and overlapping regions can exist between the patches. We develop a Discontinuous Galerkin (DG)- IGA approach which can be applied on this type of multipatch unions. We present results for the discretization of a linear heterogeneous diffusion problem. We derive a priori error estimates by decomposing the whole error into two components: one coming from the incorrect parametrization of the interfaces of the patches and a second coming from the approximation properties of the IGA space. We verify the theoretical error estimates in a series of numerical examples. This talk is based on [2]. This work was supported by the Austrian Science Fund (FWF) under the grant NFN S117-03 and W1214-N15, project DK4.

REFERENCES

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