

C^2 -smooth isogeometric functions on planar multi-patch geometries

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ABSTRACT

The space of C^2 -smooth isogeometric functions on bilinear planar multi-patch domains, where the graph of each isogeometric function is a multi-patch spline surface of bidegree (d,d) , $d = 5,6$, is considered. This space is fully characterized by the equivalence of the C^2 -smoothness of an isogeometric function and the G^2 -smoothness of its graph surface (cf. [1,2]).

We investigate the dimension of the C^2 -smooth isogeometric space and present a construction of a basis. The potential of the space for applications in isogeometric analysis is demonstrated by solving the triharmonic equation, a 6th order partial differential equation, on different bilinear multi-patch domains. Moreover, we experimentally investigate the approximation power of the space by performing L^2 -approximation. The numerical results indicate optimal approximation order. Finally, we describe possible extensions of the construction of C^2 -smooth isogeometric functions to more general domains.

REFERENCES

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