Isogeometric analysis with C^2-smooth functions on planar multi-patch geometries

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Isogeometric analysis allows the design of smooth spline spaces over complex multi-patch geometries and to use the spaces for solving high order partial differential equations on these domains. In this talk, we demonstrate the potential of the space of globally C^2-smooth functions [1, 2] for applications in isogeometric analysis on the basis of several examples. Amongst others, we present a framework for solving the triharmonic equation, a sixth order partial differential equation, over planar multi-patch geometries. This problem requires the use of a C^2-smooth space as discretization space for the corresponding partial differential equation. Moreover, we numerically show by means of L^2-approximation that the considered space of globally C^2-smooth isogeometric functions possesses optimal approximation properties.

Joint work with: Vito Vitrih.

References

[1] M. Kapl, Vito Vitrih. Space of C^2-smooth geometrically continuous isogeometrc functions on planar multi-patch geometries: Dimension and numerical experiments. *Computers & Mathematics with Applications.* 73(10):2319–2338, 2017.

[2] M. Kapl, Vito Vitrih. Dimension and basis construction for C^2-smooth isogeometric spline spaces over bilinear-like G^2 two-patch parameterizations. *Journal of Computational and Applied Mathematics.* 335:289–311, 2018.