Tchebycheffian spline spaces over T-meshes

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ABSTRACT

Tensor-product structures allow us to construct multivariate splines in a very simple and elegant way from univariate splines, and they have been applied in different contexts. However, such a multivariate structure lacks adequate local refinement.

Tchebycheff spaces, or more precisely extended Tchebycheff spaces, are natural generalizations of algebraic polynomial spaces. Univariate Tchebycheffian splines are smooth piecewise functions with sections in extended Tchebycheff spaces. They have several advantages over classical (algebraic) polynomial splines, mainly due to the wide variety that extended Tcheby-cheff spaces offer. They are a popular tool in several contexts, including approximation theory and Computer Aided Geomentric Design . Despite this flexibility, many results of the polynomial framework extend in a natural way to the larger Tchebycheffian spline framework. Multivariate extensions of Tchebycheffian splines can be easily obtained via the tensor-product approach. Tensor-products of so-called generalized splines (which are a special class of Tchebycheffian splines) have been used in isogeometric analysis.

In this talk we consider Tchebycheffian spline spaces over T-meshes, [1]. As in the polynomial case, a complete understanding of these spline spaces requires the knowledge of the dimension of the spline space defined on a prescribed T-mesh for a given smoothness.

REFERENCES

[1] C. Bracco, T. Lyche, C. Manni, F. Roman, and H. Speleers "On the dimension of Tchebycheffian spline spaces over planar T-meshes", *CAGD*, Vol. **45**, pp. 151–173, 2016.