

Analysis suitable T-Splines in three space dimensions – Abstract

Isogeometric analysis is a method for solving partial differential equations with higher degree polynomial basis functions, developed in recent years. Usually, NURBS are used for modelling. However, since adaptive refinement yield unstructured meshes, the concept of T-Splines was introduced. In this setting we can only use special meshes for numerical analysis and implementation, called analysis suitable meshes. In 2D, a practical definition of analysis suitability was made and approximation properties were proven, see [1]. This definition uses the indices of the knot vectors used for T-Splines. For arbitrary space dimension d , another definition based on the support of T-Splines was introduced, see [2]. Implementation requires additional memory, but approximation theory still holds. We will extend the definition from [1] to 3D in a first step and show then the equivalence of the existing definitions under the assumptions of no knot repetitions.

References

- [1] L. Beirão da Veiga et al. (2014), “Mathematical analysis of variational isogeometric methods”. *In: Acta Numerica 23*, pp. 157 – 287.
- [2] P. Morgenstern (2016), “Globally Structured Three-Dimensional Analysis-Suitable T-Splines: Definition, Linear Independence and m-graded local refinement”. *In: SIAM Journal on Numerical Analysis 54.4*, pp. 2163–2186.