

Approximation Properties of B-Splines and their Application to Isogeometric Analysis

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Abstract

Isogeometric Analysis (IGA) is a numerical method, which uses the B-spline or NURBS based representation of CAD models to discretize pde problems. To analyze the methods one has to study the approximation and stability properties of piecewise polynomial function spaces.

Here, we restrict ourselves to B-spline spaces of maximum smoothness and arbitrary degree over a uniform mesh. For this configuration we present approximation error bounds and inverse estimates of optimal order, independent of the polynomial degree. We develop all results in Sobolev spaces.

To conclude, we discuss the application of the obtained results in the context of IGA for partial differential equations and present possible extensions.