IGA/FEM on a blending type spline construction

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Basis functions are used for computations, in isogeometric analysis(IGA) and as finite element methods(FEM), but with regards to geometry, the basis-functions for IGA is chosen to exactly match the geometry. Non-Uniform Rational B-Splines(NURBS) is the most common used spline technique in today's computer aided design(CAD) tools, however they have non-local basis functions which inherently poses some problems for performing FEM analysis. Using NURBS as local geometry with blending splines, we achieve perfect interpolation, and basis-functions that are strictly local. We show, by numerical experiments, examples of FEM analysis on NURBS via a blending type spline construction. We formulate the computation of integrals, which appear in the Ritz-Galerkin approximation, in terms of the expo-rational basis functions. We explore properties of the approximated solution and compare it with the linear basis solution.

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