Simplex-Splines on the Clough-Tocher Element.

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We propose a simplex spline basis for a space of C^1 -cubics on the Clough-Tocher split on a triangle. The 12 elements of the basis give a nonnegative partition of unity. Then, we derive two Marsden-like identities, three quasi-interpolants with optimal approximation order and prove L_{∞} stability of the basis. The conditions for C^1 -junction to neighboring triangles are simple and similar to the C^1 conditions for the cubic Bernstein polynomials on a triangulation. The simplex spline basis can also be linked to the Hermite basis to solve the classical interpolation problem on the Clough-Tocher split. a basis

Then we generalize to any smoothness on the Clough–Tocher split of a triangle, considering a family of bases of simplex splines of degree 3r and smoothness r.

Joint work with: Tom Lyche, University of Oslo, Tomas Sauer, Universität Passau

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