

C^1 hierarchical spline constructions on planar multi-patch geometries for adaptive IGA

Cesare Bracco ^a, Carlotta Giannelli^a, Mario Kapl^b, Rafael Vázquez^{c,d}

^a Department of Mathematics and Computer Science, University of Florence (Italy)

^b Department of Engineering & IT, Carinthia University of Applied Sciences, Villach, Austria

^c Institute of Mathematics, École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland

^d Istituto di Matematica Applicata e Tecnologie Informatiche ‘E. Magenes’ del CNR, Pavia, Italy

cesare.bracco@unifi.it, carlotta.giannelli@unifi.it, M.Kapl@fh-kaernten.at,
rafael.vazquez@epfl.ch

We present an adaptive isogeometric method for the numerical approximation of partial differential equations defined on certain planar multi-patch geometries with C^1 hierarchical splines. We first discuss key properties of the considered hierarchical spline space and its associated basis, such as nestedness on refined meshes and, under a mild assumption on the mesh near the vertices, linear independence of the basis. We then present a refinement algorithm with linear complexity, which guarantees the construction of graded hierarchical meshes that fulfill the condition for linear independence. A selection of numerical examples will confirm the potential of the adaptive scheme on different multi-patch domains.