Parameter-free weak coupling of trimmed patches in Isogeometric Analysis

*S. Kollmannsberger[1], A. Özcan[1], J. Baiges[2], M. Ruess[3], A. Reali[4] and E. Rank[1]

[1]Chair for Computation in Engineering, Technische Universität München, Arcisstraße 21, 80333 Munich, Germany
[2]International Center for Numerical Methods in Engineering, Universitat Politécnica de Catalunya, Spain
[3]Aeorospace Structures and Computational Mechanics, Delft University of Technology, Delft, The Netherlands
[4]Department of Civil Engineering and Architecture, University of Pavia, Italy

*Corresponding author: Kollmannsberger_AT_bv.tum.de

Weak Dirichlet-type boundary conditions are especially important in embedded domain methods such as the Finite Cell Method [1]. Well suited are Nitsche-type methods which have been extended to problems of linear elasticity [2] or fluid dynamics. These methods contain two types of terms: a) those stemming from an identified Lagrange multiplier and b) stabilization terms which contain problem dependent parameters.

Recently, in [3] an attractive alternative was presented in the context of low order methods. It replaces the stabilization terms using the condition that the multiplier is the normal trace of the flux of the unknown in a least squares sense. It, thereby, circumvents an estimation of problem dependent parameters.

We have utilized this method to derive a new formulation for parameter-free coupling of trimmed NURBS. We will show results for coupled problems in one and two dimensions and address issues of conditioning, convergence and coercivity.

Keywords: Isogeometric Analysis, embedded domain method, weak boundary conditions, weak coupling, trimmed patches

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