JOHANNES KEPLER UNIVERSITY LINZ

Johannes Kepler Universität Linz
Institut für Numerische Mathematik

o.Univ.-Prof. Dr. Ulrich Langer

Talk announcement

Dr. Clemens Hofreither
(Institute of Computational Mathematics)

Tuesday, June 7, 2016
13:45, S2 059

Robust Multigrid for Isogeometric Analysis based on Subspace Correction

We present a robust and efficient multigrid method for isogeometric discretizations using tensor product B-splines of maximum smoothness. Our method is based on a stable splitting of the spline space into a large subspace of "interior" splines which satisfy a robust inverse inequality, as well as one or several smaller subspaces which capture the boundary effects responsible for the spectral outliers known to occur in Isogeometric Analysis. We then construct a multigrid smoother based on a subspace correction approach, applying a different smoother to each of the subspaces. For the interior splines, we use a mass smoother, whereas the remaining components are treated with suitably chosen Kronecker product smoothers or direct solvers.

The resulting multigrid method exhibits iteration numbers which are robust with respect to the spline degree and the mesh size. Furthermore, it can be efficiently realized for discretizations of problems in arbitrarily high geometric dimension. Some numerical examples illustrate the theoretical results and show that the iteration numbers also scale relatively mildly with the problem dimension.