Peng, Xuan; Lian, Haojie; Ma, Zhenwu; Zheng, Chao
Intrinsic extended isogeometric analysis with emphasis on capturing high gradients or singularities. (English) Zbl 07440010

Summary: Formulations of an extra-degree-of-freedom (DOF) free extended isogeometric analysis (IGA) are presented in this study. The idea is achieved by reconstruction of the coefficients through a mesh-free-based local approximation, based on the framework of a generalized finite-element method. The enrichment functions are embedded in the mesh-free basis implicitly, resulting in an identical number of DOFs. Moreover, the system condition number is of the same level between the enriched IGA and non-enriched version. The approach to handling the blending issues is discussed. Numerical examples with a solution containing sharp features/singularities are designed and studied in terms of accuracy and convergence.

MSC:
65-XX Numerical analysis
76-XX Fluid mechanics

Keywords:
isogeometric analysis; extended finite-element method; partition of unity; sharp gradient; singularity

Full Text: DOI

References:

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