

ISOGEOMETRIC COLLOCATION: INCOMPRESSIBLE ELASTICITY, LOCKING, AND POSSIBLE SOLUTIONS

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Key Words: *Isogeometric Analysis, Collocation, Locking, Incompressible Elasticity.*

Isogeometric Analysis (IGA) is a recent analysis framework (cf. [1,2]) aiming at the gap between Computational Mechanics and Computer Aided Design (CAD). It can be seen as an extension of standard isoparametric finite element methods, where the functions typically used by CAD systems (e.g. NURBS) are adopted to describe both geometry and field variables. In addition to clear advantages in terms of geometry representation capabilities, the use of such functions lead to superior results with respect to standard finite elements on a per degree-of-freedom basis, thanks to their high regularity properties. In the framework of NURBS-based IGA, collocation methods have been recently introduced as an efficient and promising alternative to standard isogeometric Galerkin approaches (cf. [3]), characterized by a high accuracy-to-computational-cost ratio (see [4]). In this work, we initiate the study of the approximation of incompressible elastic problems via isogeometric collocation. In particular, we introduce and discuss several mixed formulations and we present a number of numerical tests showing the behavior of the proposed methods.

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