

AN A POSTERIORI ERROR ESTIMATOR FOR LINEAR ELASTICITY PROBLEM WITH
NONHOMOGENEOUS DIRICHLET BOUNDARY CONDITION

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We develop a locking-free numerical analysis for the linear elasticity problem with non homogeneous Dirichlet boundary condition, approximated by an unusual conforming finite element scheme. The starting point is the performing of a homogenization procedure that lets us to analyse a similar elasticity problem with homogeneous boundary condition. Next, we add some kind of least square terms to the variational formulation, allowing to consider any pair of finite-dimensional subspaces of the continuous ones. The resulting augmented scheme is different from others available in literature, but coincide when we deal with homogeneous Dirichlet condition. We prove the well posedness of our scheme, as well as the optimal rate of convergence for the a priori error analysis, which turn out to be valid for both 2D and 3D. The a posteriori error analysis is based on the Ritz projection of the error, and we present an indicator that consists of just two residual terms, which is reliable and local efficient. We provide numerical experiments that illustrate the performance of the corresponding adaptive algorithm and support its use in practice.

Trabajo en conjunto con Edwin Behrens (Universidad Católica de la Santísima Concepción, Chile) y Rommel Bustinza (Universidad de Concepción, Chile).

Referencias

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