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A NEW STABILIZED SCHEME APPLIED TO INCOMPRESSIBLE ELASTICITY: A-PRIORI AND A-POSTERIORI ANALYSIS

Tomás P. Barrios[a], Edwin M. Behrens[b] and Rommel Bustinza[c]

[a]*Departamento de Matemática y Física Aplicadas, Universidad Católica de la Santísima Concepción, Alonso de Ribera 2850, Concepción, Chile, tomas@ucsc.cl.*

[b]*Departamento de Ingeniería Civil, Universidad Católica de la Santísima Concepción, Alonso de Ribera 2850, Concepción, Chile, ebehrens@ucsc.cl.*

[c] *Centro de Investigación en Ingeniería Matemática (CI^2MA) & Departamento de Ingeniería Matemática, Universidad de Concepción, Avenida Esteban Iturra s/n, Concepción, Chile, rbustinz@ing-mat.udec.cl.*

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Abstract. We develop an a-priori and an a-posteriori error analysis for a stabilised mixed finite element method applied to incompressible elasticity. The stabilised formulation is obtained by adding to the standard dual-mixed approach suitable least-squares terms arising from the constitutive and equilibrium equations. It is shown that the resulting variational formulation is strongly coercive, which allows to use any pair of finite element subspaces for the corresponding discrete scheme. In particular, Raviart-Thomas spaces of lowest order for the stress tensor and piecewise linear elements for the displacement, can be used. Additionally, we derive a simple a-posteriori error estimator and prove that it is reliable and locally efficient. Finally, we include several numerical experiments that confirm the theoretical results.