

A new analysis of simple mixed finite element for elasticity with weakly symmetric stress

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ABSTRACT

We consider mixed finite elements for linear elasticity with weakly symmetric stress. There are three known approaches for stability analysis of mixed finite elements: the analysis using elasticity complex with weak symmetry by Arnold, Falk, Winther, the analysis using elements for the Stokes problems by Boffi, Brezzi, Fortin, and the mesh dependent norm analysis by Stenberg. In this talk we show that a new mesh dependent norm can be used to analyze low order elements for the problem, and the analysis leads to necessary conditions of stress space for stability. By constructing stress space fulfilling the conditions, we obtain a new rectangular mixed finite element for the problem in three dimensions.

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