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QUADRILATERAL FINITE ELEMENTS FOR PLANAR LINEAR ELASTICITY PROBLEM WITH LARGE LAM$\{'E}$ CONSTANT

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摘要
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QUADRILATERAL FINITE ELEMENTS FOR PLANAR LINEAR ELASTICITY PROBLEM WITH LARGE LAM$\'{E}$ CONSTANT

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Abstract In this paper, we discuss the quadrilateral finite element approximation to the two-dimensional linear elasticity problem associated with a homogeneous isotropic elastic material. The optimal convergence of the finite element method is proved for both the L^2-norm and energy-norm, and in particular, the convergence is uniform with respect to the Lam\'{e} constant λ. Also the performance of the scheme does not deteriorate as the material becomes nearly incompressible. Numerical experiments are given which are consistent with our theory.

Key words Planar linear elasticity optimal error estimates large Lam\'{e} constant locking phenomenon

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