On explicit error estimates for the elastic wave propagation in heterogeneous media

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ABSTRACT

This work deals with explicit *a posteriori* error estimates for elastic wave propagation in heterogeneous media. Based on some previous works on acoustic problems ([1]), the proposed explicit error estimator is derived in a non-natural L^{∞} norm.

Two main ideas are developed: the second-order elastodynamic equation is transformed firstly to a first-order hyperbolic system ([2], [3]); and the residual method of *a posteriori* error estimates is exploited with a series of field reconstructions in time and in space ([4], [5]). These reconstructions are performed with respect to different regularities required by corresponding ingredients of the estimator. The effectivity of the estimator on uniform meshes and adaptive meshes is studied numerically. The numerical results indicate that the error estimator gives a good estimation to the true error and that it is asymptotically exact as the computational effort grows. Improvements for the reconstruction in time and in space are proposed.

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