Reliability and Efficiency of Functional-type A Posteriori Error Estimates for Solid Mechanics in 2D: a Comparison of Standard and Mixed Finite Elements

Maksim Frolov[1]

This presentation is devoted to reliability and efficiency issues for functional approach (for example, see [1-3]) to a posteriori error control in 2D. We justify theoretically and confirm numerically that the approach yields reliable error bounds, which are valid for all conforming solutions of problems regardless of methods for solving. Error estimation requires construction of a set of new additional variables. It is shown that conforming finite element approximations in the Hilbert space H(div) for the additional variables provides a better choice for efficient implementations of the error control than standard finite elements. This work is supported by the Grant of the President of the Russian Federation MD-1071.2017.1.

References:

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[3] M. Churilova, M. Frolov, S. Repin, A posteriori error estimates for approximate solutions and adaptive algorithms for plane problems of elasticity theory, APM-2017 Proceedings (XLV International Conference "Advanced Problems in Mechanics", June 22-27, 2017, St. Petersburg, Russia), 2017.

[1] Institute of Applied Mathematics and Mechanics, Department of Applied Mathematics, St. Petersburg, Russia, frolov_me@spbstu.ru