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A posteriori estimation of dimension reduction errors. (English) [Zbl 1056.65105](#)

Feistauer, M. (ed.) et al., Numerical mathematics and advanced applications. Proceedings of ENUMATH 2003, the 5th European conference on numerical mathematics and advanced applications, Prague, Czech Republic, August 18–22, 2003. Berlin: Springer (ISBN 3-540-21460-7/hbk). 716-725 (2004).

Summary: A new a posteriori error estimator is presented for the verification of the dimensionally reduced models stemming from the elliptic problems on thin domains. The original problem is considered in a general setting, without any specific assumptions on the domain geometry, coefficients and the right-hand sides. The estimator provides a guaranteed upper bound for the modelling error in the energy norm, exhibits the optimal convergence rate as the domain thickness tends to zero and accurately indicates the local error distribution.

For the entire collection see [\[Zbl 1046.65002\]](#).

MSC:

- 65N15** Error bounds for boundary value problems involving PDEs
- 65N30** Finite element, Rayleigh-Ritz and Galerkin methods for boundary value problems involving PDEs
- 65N12** Stability and convergence of numerical methods for boundary value problems involving PDEs
- 35J25** Boundary value problems for second-order elliptic equations
- 35J05** Laplace operator, Helmholtz equation (reduced wave equation), Poisson equation
- 74K20** Plates
- 74S05** Finite element methods applied to problems in solid mechanics

Keywords:

error bounds; Poisson equation; numerical example; finite elements; plates; dimension reduction; elliptic problems; convergence