Refinement Indicators and Adaptive Schemes for Goal-oriented Error Estimation

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ABSTRACT

Goal-oriented error estimation was developed in the nineties [1, 2, 3], if not earlier [4], in order to control errors with respect to quantities of interest. The methodology is based on the representation of the error in quantity of interest in terms of the residual functional of the primal problem and the solution of a dual problem. Approximation of the adjoint solution, obtained on a mesh finer than that used to compute the primal solution, usually provides acceptable estimates of the error. Decomposition of these estimates into local contributions allows one to define local refinement indicators and to adapt meshes accordingly. However, the decomposition is not unique and several choices are available. The main objective of the presentation will be to give an account of the results of a comparative study of some refinement indicators. The performance of the resulting adaptive schemes is tested and compared on classical model problems.

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