

János Karátson, Sergey Korotov: *Sharp upper global a posteriori error estimates for nonlinear elliptic variational problems*; Helsinki University of Technology, Institute of Mathematics, Research Reports A527 (2007).

Abstract: *The paper is devoted to the problem of verification of accuracy of approximate solutions obtained in computer simulations. This problem is strongly related to a posteriori error estimates, giving computable bounds for computational errors and detecting zones in the solution domain where such errors are too large and certain mesh refinements should be performed. A mathematical model embracing nonlinear elliptic variational problems is considered in this work. Based on functional type estimates developed in an abstract level, we present a general technology for constructing computable sharp upper bounds for the global error for various particular classes of elliptic problems. Here the global error is understood as a suitable energy type difference between the true and computed solutions. The estimates obtained are completely independent of the numerical technique used to obtain approximate solutions, and are sharp in the sense that they can be, in principle, made as close to the true error as resources of the used computer allow. The latter can be achieved by suitably tuning the auxiliary parameter functions, involved in the proposed upper error bounds, in course of the calculations.*

AMS subject classifications: 65J05, 65J15, 65M60, 65N15, 65N30, 65N50

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