1011-65-119   **Weimin Han*** (`whan@math.uiowa.edu`), Department of Mathematics, University of Iowa, Iowa City, IA 52242. *A Posteriori Error Analysis For Mathematical Idealizations And Numerical Approximations.*

We provide a posteriori error analysis for mathematical idealizations in modeling boundary value problems and for numerical approximations. A posteriori error estimation is central to measuring, controlling and minimizing errors in modeling and numerical approximations. With the tool from the duality theory, we develop systematically a posteriori error estimates for mathematical idealizations in boundary value problems, linearization of nonlinear problems, and numerical approximations such as the regularization technique, the Kacanov method and the finite element method. Many numerical examples are presented to show the usefulness of the error estimates. (Received August 20, 2005)