# Adaptive IgA Based on the Functional-type Error Control

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We are concerned with adaptive IgA schemes applied to solve elliptic boundary value problems and initial boundary value problems of parabolic type. To provide guaranteed error control, we use functional error estimates (majorant and minorants) that are reliable, include only global constants (independent of the mesh characteristic h), and are valid for any approximation from the admissible functional space (see Repin, 1997 and Repin, 2002).

For both static and evolutionary cases, we generate quantitatively efficient a posteriori error estimates and indicators by means of optimisation of the corresponding functionals. The efficient-in-time minimization (maximisation) of majorant (minorant) is achieved by performing it over higher smoothness approximation spaces defined on coarser grids. We confirm the reliability and efficiency of considered error estimates by performing uniform and adaptive refinement algorithms on a wide set of problems. The analysis of their performance is based on the results obtained from the extensive numerical testing.

References:

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