Abstract

A posteriori error estimation is an inseparable component of any reliable numerical method for solving partial differential equations. The aim of the goal-oriented a posteriori error estimates is to control the computational error directly with respect to some quantity of interest, which makes the method very convenient for many engineering applications. The resulting error estimates may be employed for mesh adaptation which enables to find a numerical approximation of the quantity of interest under some given tolerance in a very efficient manner. In this thesis, the goal-oriented error estimates are derived for discontinuous Galerkin discretizations of the linear scalar model problems, as well as of the Euler equations describing inviscid compressible flows. It focuses on several aspects of the goal-oriented error estimation method, in particular, higher order reconstructions, adjoint consistency of the discretizations, control of the algebraic errors arising from iterative solutions of both algebraic systems, and linking the estimates with the *hp*-anisotropic mesh adaptation. The computational performance is demonstrated by numerical experiments.