

О контроле ошибки смешанных методов для решения эллиптических уравнений 4-го порядка с точным представлением границы области

Корнеев В.Г., СПбГУ, Санкт-Петербург vad.korneev2011@yandex.ru

Аннотация

A reliable and computable a posteriori error bound is derived for the mixed Ciarlet–Raviart method for the equation $\Delta\Delta u + \kappa u = f(x)$, $x \in \Omega \subset R^2$, with the first boundary condition and a piecewise constant $\kappa \geq 0$. Several authors derived residual type a posteriori error bounds at the assumptions that $\kappa \equiv 0$ and the domain is polygonal, none of which is used in this work. In case of a piecewise smooth boundary, we consider the mixed method with the triangular Lagrange finite elements of the 3d order, which, in general, are curvilinear along the boundary. The curvilinear finite elements provide an approximation to the boundary, matching the finite elements in accuracy. Our bounds belong to the class of a posteriori functional majorants and are evaluated with help of functions from the testing C^1 space. By the reasons of accuracy and simplicity, this space is generated by the finite elements with the domains, coinciding with the domains of the Lagrange elements, and singular rational coordinate functions.