The finite element method for Dirichlet problem with degeneration of solution on the boundary

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The first-boundary-value problem for the second-order elliptic equation with degeneracy of input data whose solution has weak singularity on the curvilinear boundary of a two-dimensional convex domain is considered. There exists a unique generalized solution of this problem in the Sobolev weighted space. We construct and investigate the finite element method for this problem. We created an algorithm and program for automated triangular elements to the boundary. It was established that the approximation to the exact generalized solution has first-order convergence in the norm of the Sobolev weighted space and second-order convergence in the norm of the Lebesgue space.

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