# THE FINITE ELEMENT METHOD FOR A BOUNDARY VALUE PROBLEM WITH DOUBLE SINGULARITY

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We present a new approach for numerical solution of the boundary value problem with double singularity. The specificity of solving these problems is generated by discontinuous input data (the coefficients of the equations, the right hand sides of the equation and of the boundary conditions) in combination with the presence of salient points on the boundary of the domain.

The diffraction problem with discontinuity of coefficients on the domain with a slot and a boundary contained $2\pi$ angles has been considered. For this problem we introduce a definition of $R_\nu$-generalized solution and two weak matching conditions on the slot, construct the approximation using the singular mortar finite element method, and suggest the new method of numerical analysis on computer that permits to parallelize the process of computations.

We conducted a series of calculations of model boundary value problems with double singularity. We have made the comparison of errors for the found approximate generalized (weak) solution and approximate $R_\nu$-generalized solution in the norm of the space $C$ in the mesh points.