

ON THE DISCRETE SPECTRUM OF EXTERIOR
ELLIPTIC PROBLEMS

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Preprint no. 2019-03

Abstract

In this dissertation, we present three new results in the exterior elliptic problems with the variable coefficients that describe the process in inhomogeneous media in the presence of obstacles. These results concern perturbations of the operator $H_0 = -\operatorname{div}((a(x)\nabla))$ in an exterior domain with a Dirichlet, Neumann, or FKW boundary condition. We study the critical value β_{cr} of the coupling constant (the coefficient at the potential) that separates operators with a discrete spectrum and those without it. Our main technical tool of the study is the resolvent operator $(H_0 - \lambda)^{-1} : L^2 \rightarrow \dot{H}^2$ near point $\lambda = 0$. The dependence of β_{cr} on the boundary condition and on the distance between the boundary and the support of the potential is described. The discrete spectrum of a non-symmetric operator with the FKW boundary condition (that appears in diffusion processes with traps) is also investigated.