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Self Adjoint Extensions for the Neumann Laplacian and Applications

S. A. NAZAROV, J. SOKOLOWSKI

Institute Elie Cartan, Laboratoire de Mathematiques, Universite Henri Poincare Nancy I, B. P. 239, 54506 Vandoeuvre les Nancy Cedex, France and Systems Research Institute of the Polish Academy of

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摘要

关键词 shape optimization asymptotic expansions self-adjoint extension weighted spaces with detached asymptotic topological derivatives

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Institute Elie Cartan, Laboratoire de Mathematiques, Universite Henri Poincare Nancy I, B. P. 239, 54506 Vandoeuvre les Nancy Cedex, France and Systems Research Institute of the Polish Academy of

Abstract A new technique is proposed for the analysis of shape optimization problems. The technique uses the asymptotic analysis of boundary value problems in singularly perturbed geometrical domains. The asymptotics of solutions are derived in the framework of compound and matched asymptotics expansions. The analysis involves the so-called interior topology variations. The asymptotic expansions are derived for a model problem, however the technique applies to general elliptic boundary value problems. The self-adjoint extensions of elliptic operators and the weighted spaces with detached asymptotics are exploited for the modelling of problems with small defects in geometrical domains. The error estimates for proposed approximations of shape functionals are provided.

Key words shape optimization asymptotic expansions self-adjoint extension weighted spaces with detached asymptotics topological derivatives

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通讯作者 J. SOKOLOWSKI sokolows@iecn.u-nancy.fr