

## **Analysis of Boundary-Domain Integro-Differential Problems for some Elliptic BVPs with Variable Coefficients**

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The Dirichlet, Neumann and mixed boundary value problem for the "Laplace" differential equation with variable coefficient is considered. Such problems appear e.g. in electrostatics, stationary heat transfer and other diffusion problems for inhomogeneous media. Reducing the BVPs to some non-standard systems of boundary-domain integro-differential equations (BDIDEs) based on a specially constructed parametrix is discussed. The BDIDEs contain integral operators defined on the domain under consideration as well as potential-type operators defined on open sub-manifolds of the boundary and acting on the trace and/or co-normal derivative of the unknown solution. They may be supplemented by the original boundary conditions thus constituting boundary-domain integro-differential problems (BDIDPs). Solvability, solution uniqueness, and equivalence of the BDIDEs/BDIDPs to the corresponding original BVPs are investigated in appropriate Sobolev spaces.