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Evolution Boundary-Domain Integral Equations Equivalent to the Initial-Dirichlet Boundary Value Problem for a Non-stationary Variable-Coefficient Heat Equation

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Abstract

The initial-Dirichlet problem for a nonstationary heat (diffusion) equation with variable coefficient in a space–time cylinder having smooth spatial boundary is considered in the presentation. Constructing a space-time parametrix (Levi function), the problem is reduced to two systems of space–time boundary-domain integral equations. Mapping properties of the associated space-time parametrix-based potentials, including the initial, Newtonian, single- and double-layer potentials are analyzed. The equivalence between original problem and the derived integral systems is established, and the invertibility of corresponding operators is proved.