On The Weak Solvability of Schrödinger Type Equations with Boundary Conditions

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This work is concerned with the weak solutions of the boundary value problems for Schrödinger type (in particular, the metaharmonic) equations. For a weak Stokes domain D lying in a semi-Riemann domain, the weak solvability of the Dirichlet, respectively, Neumann problem for such equations with a real spectral parameter is proved by making use of an elliptic Schrödinger product on the Sobolev space $H^1(D)$. Also, a Greens operator (in a weak sense) is introduced in the case where the spectral parameter is complex-valued but not belonging to $\mathbb{R}_-$. In consequence the existence of a weak solution to the Dirichlet-Neumann problem for a generalized Schrödinger equation with non-negative potential and $\mathcal{L}^2$-density is proved under suitable boundary value conditions.