On separability of a differential operator of non-classical type in an unbounded domain

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Abstract: Review of literature on the equations of nonclassical type can be found in [1–3]. Properties of the semi periodic Dirichlet problem for degenerate equations were studied in [4–6].

In these studies we investigated the solvability and smoothness of solutions of boundary value problems for nonclassical equations without degeneration

$$Lu = -\frac{\partial^2 u}{\partial y^2} - \sum_{k=0}^{s} R_k(y)\frac{\partial^{2k+1}u}{\partial x^{2k+1}} + \sum_{k=0}^{m}(-1)^k C_k(y)\frac{\partial^{2k}u}{\partial x^{2k}}$$

defined on a set $C_o^\infty(\Omega)$, where $\Omega = \{(x,y) : -\infty < x < +\infty, 0 < y < 1\}$, $C_o^\infty(\Omega)$ is the set of infinitely differentiable functions satisfying the condition:

$$u(x,0) = u(x,1) = 0,$$

and compactly supported with respect to x.

The conditions existence of a solution and the separability of the operator were found during the study.

Keywords: non-classical type operator, resolvent, separability, an unbounded domain

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