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BOLU

On the Basis Property of the Root Functions of the Periodic and the Antiperiodic Boundary Value Problems

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It is well known that the system of root functions of an ordinary differential operator of arbitrary order with strongly regular boundary conditions forms a Riesz basis in L_2 [?]-[?].

In this work we consider the differential operator

$$ly = y'' + q(x)y \tag{1}$$

neither with the periodic boundary conditions

$$y(1) = y(0), \quad y'(1) = y'(0) \tag{2}$$

or with the antiperiodic boundary conditions

$$y(1) = -y(0), \quad y'(1) = -y'(0). \tag{3}$$

which are non strong regular.

We prove the following main theorem.

Theorem. Let $q(x)$ be a complex-valued function of class $C^{(1)}[0,1]$, $q(1) = q(0)$ and $q'(1) \neq q'(0)$. Then the root functions of the boundary value problem (1), (2), as well as of the boundary value problem (1), (3), form a Riesz basis in $L_2[0,1]$.

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