

THE BASIS PROPERTIES OF THE SYSTEM OF  
ROOT FUNCTIONS OF STURM-LIOUVILLE  
PROBLEM WITH SPECTRAL PARAMETER IN  
THE BOUNDARY CONDITION

Abstract

*We consider the Sturm-Liouville equation*

$$-y''(x) + q(x)y(x) = \lambda y(x), x \in (0, 1)$$

*subject to the boundary conditions*

$$b_0 y(0) = d_0 y'(0),$$

$$(a_1 \lambda + b_1) y(1) = (c_1 \lambda + d_1) y'(1),$$

*where  $\lambda$  is a spectral parameter,  $q$  is a continuous real valued function on  $[0, 1]$ ,  $b_0, d_0, a_1, b_1, c_1, d_1$  are real constants, such that  $|b_0| + |d_0| \neq 0$ ,  $\sigma_1 = a_1 d_1 - b_1 c_1 < 0$ .*

*Necessary and sufficient conditions are given for basicity in the space  $L_p(0, 1)$ ,  $p \in (1, \infty)$ , of the system of root functions of this problem.*