

SOLVABILITY OF A BOUNDARY VALUE  
PROBLEM FOR A SECOND ORDER  
ELLIPTIC-DIFFERENTIAL OPERATOR EQUATION  
WITH SPECTRAL PARAMETER IN THE  
EQUATION AND BOUNDARY CONDITIONS

Abstract

*In the paper, in a separable Hilbert  $H$  we study the following boundary value problem*

$$\lambda u(x) - u''(x) + Au(x) = f(x), \quad x \in [0, 1], \quad (1)$$

$$\alpha u'(0) + \lambda u(1) = f_1,$$

$$u(0) = f_2, \quad (2)$$

*where  $\lambda$  is a spectral parameter;  $A$  is a linear closed operator with everywhere dense in  $H$  domain of definition and a resolvent, decreasing as  $|\lambda|^{-1}$  under large  $|\lambda|$  at some angles containing a positive semi-axis;  $\alpha \neq 0$  is any fixed complex number. Sufficient conditions for the solvability of problems (1) – (2) in  $L_p((0, 1); H)$  ( $p > 1$ ) are found.*