

SOME TWO-POINT PROBLEMS FOR SECOND ORDER INTEGRO-DIFFERENTIAL EQUATIONS WITH ARGUMENT DEVIATIONS

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ABSTRACT. In the paper we describe the classes of unique solvability of the Dirichlet and mixed two point boundary value problems for the second order linear integro-differential equation

$$u''(t) = p_0(t)u(t) + p_1(t)u(\tau_1(t)) + \int_a^b p(t, s)u(\tau(s)) ds + q(t).$$

On the basis of the obtained and, in some sense, optimal results for the linear problems, by the a priori boundedness principle we prove the theorems of solvability and unique solvability for the second order nonlinear functional differential equations under the mentioned boundary conditions.

1. Statement of the main results

1.1. Introduction. In this paper we will consider the second order linear integro-differential equation

$$(1.1) \quad u''(t) = p_0(t)u(t) + p_1(t)u(\tau_1(t)) + \int_a^b p(t, s)u(\tau(s)) ds + q(t)$$

2010 *Mathematics Subject Classification.* Primary: 34K06, 34K10; Secondary: 34B15.

Key words and phrases. Integro-differential equations; Dirichlet and mixed problems; unique solvability; a priori boundedness principle.

The final version of this paper will be submitted for publication elsewhere.

For S. Mukhigulashvili the research was supported by institutional grant RVO: 67985840.

For V. Novotná research was supported by the Czech Science Foundation: GA16-03796S.