

# Controllability of process described by system of linear integro-differential equations with restrictions

Serikbai Aisagaliev <sup>1</sup>, Ilya Sevryugin <sup>2</sup>

<sup>1</sup> *Al-Farabi Kazakh National University, Almaty, Kazakhstan*  
*E-mail: Serikbai.Aisagaliev@kaznu.kz*

<sup>2</sup> *Al-Farabi Kazakh National University, Almaty, Kazakhstan*  
*E-mail: Ilya.Sevryugin@gmail.com*

**Abstract:** Studied control process described by linear integro-differential equation  $\dot{x} = A(t)x + B(t)u(t) + C(t) \int_a^b K(t, \tau)w(\tau)d\tau + \mu(t)$ ,  $t \in I = [t_0, t_1]$  with boundary, phase, integral restrictions and restrictions on the control value.

For this problem offered method of solution based on passing from solving of initial problem to solving of some class of Fredholm integral equation of the first kind. For initial problem obtained necessary and sufficient conditions of it's solvability. Offered numerical method for solving control problem by constructing minimizing sequences.

This work is a continuation of researches conducted in the works [1, 2]

**Keywords:** optimal control, linear integro-differential equations

**2010 Mathematics Subject Classification:** 49N05

## REFERENCES

- [1] Aisagaliev S.A., Sevryugin I.V. "Upravljaemost' i bystrodejstvie processa, opisivaemogo linejnoj sistemoj obyknovennyh differencial'nyh uravnenij", *Matematicheskij zhurnal*, Vol. 13, pp.5–30, 2013.
- [2] Aisagaliev S.A., "Konstruktivnaja teorija kraevyh zadach obyknovennyh differencial'nyh uravnenij", -*Kazak universiteti*, Almaty, 2015.