ABSTRACT

Thesis: 92 p., 6 tbl., 16 fig., 2 addn., 12 references.

OPTIMAL CONTROL, REINFORCEMENT LEARNING, MACHINE LEARNING, DYNAMIC PROGRAMMING, VALUE ITERATION ALGORITHM, POLICY UPDATE ALGORITHM.

The purpose of this thesis is to develop and create mathematical and software tools for solving optimal control tasks in real time without knowledge of the internal dynamics of the control object.

The paper considers and implements methods of reinforcement learning for solving the problem of optimal control. Two algorithms were created in programming language Python : the value iteration algorithm and the policy iteration algorithm. The beeter results was demonstrated by policy iteration algorithm, since it came up with less iterations and obtained more precise solution.

In this paper we present a mathematical approches on which the considered algorithms are based. Based on the simulation of the linear quadratic regulator model, we demonstrate and analyz the results of the algorithms.