A problem of optimal control with free initial state

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We study an optimal control problem with free initial condition. The initial state of the optimized system is not known exactly, a priori information on the initial state is exhausted by inclusions $x_0 \in X_0$. Accessible controls for optimization of continuous dynamic system are discrete controls defined on quantized axes. The method presented is based on the concepts and operations of the adaptive method [3] of linear programming. Numerical algorithm for solving the problem [4,5] , the iteration consists in three procedures: change of control, change of a support, at the end, final procedure. The results are illustrated by a fourth order problem, estimates of efficiency of proposed methods are given.

$$c'x(t^*) \rightarrow max \tag{1}$$

$$\dot{x} = Ax + bu, x(0) = z \in X_0 = \{z \in \mathbb{R}^n, \quad Gz = \gamma, \quad d_* \leq z \leq d^*\}, \tag{2}$$

$$Hx(t^*) = g, \tag{3}$$

$$f_* \leq u(t) \leq f^*, \quad t \in T = [0, t^*]. \tag{4}$$

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