The synthesis of the proportional-integral regulators for optimal control problem

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An optimal control problem for non-stationary linear systems with fixed ends of the trajectories taking into account external influences is considered. It is required to transfer the system from a given initial state to a desired final state for a fixed time interval. On the basis of optimal control problem solving by program control construction is maximum principle that reduces the solution to the corresponding two-point boundary-value problem. Solving of the same problem in the form of the synthesis of optimal feedback control is based on the dynamic programming method, where the problem is reduced to Bellman equation construction. Lagrange multipliers of a special form are used to solve the formulated problem in this work. The constructive proportional-integral regulator and corresponding algorithm of control based on feedback principle taking into account constraints on control values is developed. Minimized quadratic functional depends on the control, state vector and its integral.

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