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17. Control Theory and Optimization

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Synthesis of optimal dynamical systems

The problem of constructing optimal state and output feedbacks is under consideration (D. W. Bushaw, 1953). A new approach to the problem based on introducing defining elements and defining (algebraic) equations is justified. A method of real-time solving the defining equations is suggested. The approach is applied to real-time construction of output feedback for control systems under uncertainty $I(u) = h_0' x(t^*) \to \max, \dot{x} = Ax + Bu + w(t)$, with a priori information $x(0) \in X_0, w(t) \in W, x(t^*) \in X^*$ and a sensor $y(t) = Cx(t) + \xi(t), \xi_* \leq \xi(t) \leq \xi^*, t \in [0, t^*]$.
Results are used to investigate the stabilization problem.

Reference: R. Gabasov, F. M. Kirillova, and S. V. Prischepova, *Optimal Feedback Control*, Lecture Notes in Control and Information Sciences, **207**, Springer-Verlag, 1995.