Optimal output feedback control for linear system with unknown input unit parameter and disturbances

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Abstract

A problem of synthesis of optimal controls of feedback type for optimization of a linear dynamical system with unknown disturbances and input unit parameter is under consideration. An algorithm of operating an optimal controller which is able to calculate values of optimal feedback during each particular control process in real time is described. In 80th last century a technique for solving in real time control problems, that are mainly not extremal by their nature (as problems of stabilization) appeared. This technique is referred to as Model Predictive Control (MPC) . The conception of MPC is that at each current moment the control sequence is calculated by solving on-line optimal control problem, but only the first control in this sequence is implemented, the rest of the control sequence is discarded. This difference from traditional control (where control low is computed up to the beginning of the control process) allows to control multivariable systems and to cope with hard constrains on controls and states(when off-line computation of control low is difficult or impossible). Since 90s in Belarus the technique close to MPC has been developing for solving in real time optimal control problems [1]. This one is based on dual methods which allow to take into account dynamical nature of problems. Thus at every current moment instead of solving a new problem it is sufficient to correct the previous solution, that gives an opportunity to control sufficiently fast processes. The technique mentioned above is applied for constructing the algorithm of operating the optimal controller.

References

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