

OBSERVER BASE LINEAR QUADRATIC REGULATION WITH ESTIMATED STATE FEEDBACK CONTROL

黃啟光, 黃崑書, 林國斌, 李柏坤

Electrical Engineering

Engineering

simon@chu.edu.tw

Abstract

For the continuous infinite horizon time-invariant linear quadratic regulator problem (LQR), in the paper, the optimal state feedback controller based on the estimated state of the observer can be decoupled by the proposed approach which resulting one continuous time algebraic Riccati equation (CARE) for the controller design and one matrix equality equation (MEE) for the observer design. A coupling term related the CARE of the controller is found to be existed in the MEE of the observer. Unlike the separate principle to design the controller and observer separately without any coupling term, the design of the observer should consider the coupling term related to the CARE of the controller. The coupling problem between the controller and the observer usually exists in the linear matrix inequality (LMI) approach, and it is the main problem to be solved. The two-stage scheme is popular in the LMI approach, and the proposed method is similar to it, but adopting equality instead of inequality.

Keyword : Observer base; LQR; ARE; Two-Stage