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具有指定闭环极点的最优控制系统鲁棒稳定摄动界

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ROBUST STABLE PERTURBATION BOUNDS OF OPTIMAL CONTROL SYSTEMS WITH DESIRED CLOSED LOOP POLES

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摘要

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摘要 对线性二次最优控制系统,给出了选择适当加权矩阵从而保证系统具有希望闭环极点的方法。加权矩阵可以通过与期望极点有关的变换阵来调节,使得系统具有希望的动态品质。针对这种闭环系统存在不确定扰动时,得出了保证系统稳定的不确定摄动界

关键词: 最优控制 闭环极点 摄动界

Abstract: For the linear quadratic(LQ) optimal control system, a method is proposed to choose the suitable weighting matrices which make the system have desired closed loop poles. The weighting matrices can be regulated by transformation matrices which are related to the desired system poles. So the LQ system acquires the desired dynamic quality. These designs are based on the system normal model. When perturbations occur, the stability and desired performance of the system are affected severely. So it is very important to obtain the allowable stable perturbation bounds for analysis and design of the system. In this paper, a robustness measure bound is introduced for the state feedback system, and the stable bounds of the closed loop system in the presence of perturbations are derived. The stable bounds are obtained for allowable nonlinear time varying perturbation. In particular, for linear perturbations the stable bounds are also derived. A numerical example is finally included to demonstrate the proposed procedure.

Keywords: optima l contr ol closed loop poles pertur bat ion bounds

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