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一类受扰不确定系统的渐近镇定控制

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ASYMPTOTIC STABILIZING CONTROL OF A CLASS OF DISTURBED UNCERTAIN SYSTEMS

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摘要

实际工程中的许多被控系统（如航天器,机器人,飞机等）几乎都处在一种变化的环境中,用精确的数学模型描述这类系统是不现实的。因此,研究考虑了这种不确定性的系统控制问题,在理论和应用中都有重要意义。 考虑用下述状态方程描述的不确定系统 （?）=（A_0+△A（r,s））X+（B_0+△B（r,s）u） （1）其中,X∈R^n,系统状态,n为系统阶数,u∈R^m,控制信号,A_0,B_0是适当维数的常值阵,r,s分别为p维和q维未知参数矢量,△A（r,s）,△B（r,s）分别是与A_0,B_0同维的不确定矩阵。

关键词： 扰动 不确定性 模边界 渐近镇定

Abstract:

The stabilization problem of a linear dynamical system in face of uncertainty and disturbance is studied. A new control strategy based on Lyapunov direct method is developed which exhibits the following properties: 1)unlike the existing work where the possible norm bounds of the uncertainty and disturbance are to be given a priori or estimated, the control does not rely on such information, 2)the control is a continuous type, which therefore obviates the undesirable phenomenon known as chattering in VSC systems, 3) the control guarantees the system asymptotically stable, rather than ultimate boundness. Moreover, the procedure for designing the controller is very simple, which is shown through two numerical examples.

Keywords: disturbance uncertainty norm bound stable