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论文与报告

线性离散奇异系统的不定二次最优控制问题: Krein空间方法

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摘要
The finite time horizon indefinite linear quadratic(LQ) optimal control problem for singular linear discrete time-varying systems is discussed. Indefinite LQ optimal control problem for singular systems can be transformed to that for standard state-space systems under a reasonable assumption. It is shown that the indefinite LQ optimal control problem is dual to that of projection for backward stochastic systems. Thus, the optimal LQ controller can be obtained by computing the gain matrices of Kalman filter. Necessary and sufficient conditions guaranteeing a unique solution for the indefinite LQ problem are given. An explicit solution for the problem is obtained in terms of the solution of Riccati difference equations.

关键词 Singular linear discrete-time system LQ optimal control finite time horizon Riccati difference equation Kalman filter

分类号

Indefinite Linear Quadratic Optimal Control Problem for Singular Linear Discrete-time System: Krein Space Method

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Abstract
The finite time horizon indefinite linear quadratic(LQ) optimal control problem for singular linear discrete time-varying systems is discussed. Indefinite LQ optimal control problem for singular systems can be transformed to that for standard state-space systems under a reasonable assumption. It is shown that the indefinite LQ optimal control problem is dual to that of projection for backward stochastic systems. Thus, the optimal LQ controller can be obtained by computing the gain matrices of Kalman filter. Necessary and sufficient conditions guaranteeing a unique solution for the indefinite LQ problem are given. An explicit solution for the problem is obtained in terms of the solution of Riccati difference equations.

Key words Singular linear discrete-time system LQ optimal control finite time horizon Riccati difference equation Kalman filter

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