

New Algorithm for H_2 Guaranteed Cost Control of Singularly Perturbed Uncertain Systems and Its Application to the Manufacturing Assembly Process

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In this paper, the H_2 guaranteed cost control problem for a singularly perturbed norm-bounded uncertain system is addressed by using the improved recursive algorithm. First we derive sufficient conditions such that full-order algebraic Riccati equation has positive definite solution. After defining the generalized algebraic Riccati equation, we propose a new recursive algorithm based on the Kleinman algorithm with the very special kind of the initial condition. The proposed algorithm is very efficient from the numerical point of view since the new recursive algorithm has property of quadratic convergence. Furthermore, we apply the new algorithm to the manufacturing assembly process and show the validity of the full-order controller proposed in this paper.