

Multi-objective H₂/H-infinity-Optimal Control via Finite Dimensional Q-Parametrization and Linear Matrix Inequalities

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The problem of multi-objective H₂/H-infinity optimal controller design is reviewed. There is as yet no exact solution to this problem. We present a method based on that proposed by Scherer. The problem is formulated as a convex semidefinite program (SDP) using the LMI formulation of the H₂ and H-infinity norms. Suboptimal solutions are computed using finite dimensional Q-parametrization. The objective value of the suboptimal Q's converges to the true optimum as the dimension of Q is increased. State space representations are presented which are the analog of those given by Khargonekar and Rotea for the H₂ case. A simple example computed using FIR (Finite Impulse Response) Q's is presented.