



H_∞ CONTROLLER DESIGN OF MIXED EIGENSTRUCTURE ASSIGNMENT AND H_∞ FILTER FOR FLEXIBLE STRUCTURE VIBRATION CONTROL

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ABSTRACT—This paper presents a new H_∞ controller design approach of mixed eigenstructure assignment and H_∞ filter for flexible structure vibration control problem. The new approach not only realizes the desired system dynamic response in the time domain through the choice of a state feedback gain using eigenstructure assignment, it also guarantees the performance specifications in the frequency domain by constructing an H_∞ filter for the generalized plant to estimate the system state variables. The design approach is straightforward and more effective in tackling the spillover problem for vibration control of flexible structures. The performance of the new approach is further validated via numerical simulation of the vibration control of a cantilever beam bonded with piezoelectric actuator and sensor.

Key Words: H_∞ control, eigenstructure assignment, H_∞ filter, flexible structure, vibration control