

Mechanical Engineering Thesis Defense

Implementation and Comparison of Various Observers for Time Delay System

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abstract

In this thesis, various H_∞ observers for time-delay systems are implemented and their performances are compared. Equations that can be used to calculate observer gains are mentioned. Different methods used to implement observers for time-delay systems are clearly illustrated. Various stable and unstable systems are used, and H_∞ bounds are calculated using different observer designing methods. Delays are assumed to be known constants for all systems. H_∞ gains are calculated numerically using disturbance signals and performances of observers are compared.

Main purpose of this thesis is to implement the observer designed using SOS and compare its performance with existing H_∞ optimal observers. These observers are more general than the class of observers most commonly associated with time-delay systems in that they use corrections to both the estimate of present state as well as the history of the state. The result is that the observer is itself a PDE. Results shown in this thesis shows that this approach of designing observers out-performs existing approaches.

April 12, 2018; 1:30 PM; DISCVRY 123