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Maximizing the Value of Decay Rate for a Vibrated Beam

Abtract-*This paper presents design controllers by using control strategies and (LMI) in order to attenuate the vibrations of a beam. An Aluminum beam with fixed-fixed configuration was chosen as an application example of (AVC) of structure. Six conditions had been taken for (AVC) of the beam. In each condition the beam was the same, the changes was in the actuator and in the disturbance according to the location and the kind of the force applied. The attenuation in vibrations of this beam is in maximizing the decay rate (increasing the damping) and limiting the amplitude of the Beam. In this study Pzt actuator had be used, this Pzt have some constraints in the maximum voltage that can be applied, so the input signal must be bounded and limited to some value. In the result there are four requirements for (AVC), stability, input peak bound, output peak bound, and maximizing the decay rate. These requirements had been formulated in the form of (LMI). These (LMI) can be solved by using The Method of Centers For Minimizing The Eigen values. Once the problem solved, the response of the system in the time domain and in frequency domain had been plotted with controller and without controller. The percentage of reduction in the settling time for condition one was (75.9%), while for condition four was (94.6%) and for condition five was (88.32%). The settling time for conditions two and three had increased which means these two conditions are not useful for active vibration control*

Keywords*- LMI, Active Vibration Control, smart structures,Pzt.*

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