CONTROL OPTIMAL VIBRATION OF STRUCTURE
BUILDING AGAINST EARTHQUAKES

Name : BAGUS SETYO UGI WIDODO
NRP : 1205 100 046
Department : Matematika FMIPA-ITS
Supervisor : 1. Dr. Erna Apriliani, M.Si
2. Drs. Kamiran, M.Si

Abstract

Controlling vibration of building structures against earthquake effects become very important topic of present days. For controlling vibration of building structure which it is systems have multi degree of freedom, optimal control algorithm especially Linear Quadratic Regulator (LQR) is used that lead in getting active system plan that is feedback system control. This multi degree of freedom within the system of building structure depends on how many stories the building has. In the structure of building it is used instrument called Active Tune Mass Damper (ATMD) as a mechanism control for reducing vibration against earthquakes. Where ATMD placed on the top of building. Actuator in ATMD is used as vibration controller.

In this Final Project, system with five degree of freedom is simulated using optimum control carries on getting parameter for ATMD which used for reducing vibration. At the end of study, time of the floor displacements, velocity of the floor displacement, and ratio of the floor displacements are discussed and after controlled is shown hance can observed that optimal control using LQR can be used for reducing the vibration of the structures.

Keyword: building vibration, optimal control, Linear Quadratic Regulator (LQR)