

Model identification and Smart structural vibration Control using H^∞ controller

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Abstract- A smart structure plays a vital role in aerospace applications and robotics and other applications. It presents many challenging control problems due to their non-linear dynamic behavior. The Objective of this work is to design a controller that minimizes the structural vibration using H^∞ controller. Vibration as a measured parameter has been used to evaluate model of a non-linear process (piezoelectric actuator and sensor) at different modes .The model was generated using an ARMAX technique. By selecting appropriate weighting functions H^∞ controller were designed based on mixed sensitivity approach using singular loop shaping method. The performance of H^∞ controller was compared with LQG controller based on vibration reduction. From the results it is observed that the H^∞ controller is the best suited for smart structural process.

Index terms: H^∞ controller, ARMAX, smart structure, LQG, weighting function, loop shaping, weighting function,