

EXPERIMENTAL STUDY ON VIBRATION CONTROL OF SHAPE MEMORY ALLOY ACTUATED FLEXIBLE BEAM

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Abstract- This paper describes the development of an experimental platform which analyzes and controls the vibration of a Shape Memory Alloy (SMA) actuated and piezo sensed flexible beam. The vibration is controlled using the interactive force of a pair of almost identical SMA wires connected in an antagonistic manner, arranged in parallel to and on both sides of the cantilever beam structure. Data acquisition and control are implemented using a PCI data acquisition card and LabVIEW. Standard P, PI, ON-OFF controllers have been used to control the first mode of vibration of the flexible beam. Experimental results are used to demonstrate the effectiveness of the controllers designed and usefulness of the proposed test platform by exciting the structure at resonance.

Index terms: Smart structure, Shape Memory Alloy, Vibration Control, LabVIEW, P, PI and ON-OFF controller.