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压电作动器用于振动主动控制技术的研究

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STUDIES ON THE TECHNOLOGY OF ACTIVE VIBRATION CONTROL BY USING PIEZOELECTRIC ACTUATORS

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摘要 从理论和实验两方面分析了利用压电作动器进行柔性结构振动主动控制的机理，从能量的角度对施加控制时悬臂梁自由衰减振动的阻尼比进行了理论计算，得出了主动阻尼比与反馈增益之间的关系。建立相应的实验系统，对上述关系式进行了实验验证

关键词： 压电陶瓷 作动器 阻尼 振动 主动控制

Abstract： Theoretical and experimental analyses are given on the mechanism of utilizing piezoelectric actuators in controlling vibration of a flexible structure. Based on the law of conservation of energy, the relationship between feedback gain and damping ratio of the beam actuators system is obtained. An experiment system is established to verify the relationship described above, which shows that the damping of the beam can be effectively increased by means of choosing a suitable piezoelectric material and suitable locations of sensors and actuators.

Keywords： piezoelectric ceramic actuators damping vibration active control

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