

蜂巢三明治複材平板的主動式振動與噪音控制

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摘要

本論文主要的目的是對於一個蜂巢三明治複材平板的結構做振動及噪音控制；如何使用最少數量的感測器和致動器來控制寬頻域的振動及噪音；如何決定最佳的感測器和致動器的位置；如何使用最少的能量達到最大效果的振動抑制；如何選擇控制方法和控制方法的穩定性、自我調整能力和對外界影響的調適性、強健性等。以上問題皆為從事消除或抑制結構的振動與噪音的學者的重要研究領域。針對於此本論文的目的是發展出一個簡單而有效的主動式技術來抑制PZT蜂巢三明治平板結構的振動，並評估使用中山科學研究院於主計畫(關鍵元件材料的開發與應用)中開發完成的d31型式的壓電致動器的主動控制效率。本論文研究的課題包括(1)建立PZT蜂巢三明治平板的 flexural vibration 的動態數學模型或有限元素模型，並輔以實驗驗證；(2)發展能以最少數量的感測器和致動器來控制寬頻域的振動技術；(3)建立決定最佳的感測器和致動器的位置技術，以控制寬頻域的振動(4)建立和實驗驗證一個能有效、可靠和需能量少的主動控制技術，用來抑制蜂巢三明治平板的結構振動，達到抑制振動的目標。

關鍵詞：壓電纖維複材致動器，結構減振控制，顫振抑制

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