壓電振動平板的能量收集與轉換

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摘 要

能量汲取即是將週遭的能量取得並將其轉換成可用的電 能。壓電材料為一機電偶合材料，可對其施加機械應變能量使其轉換成電能，反之對其施加電位能可使其轉換成機械應變能。而 利用壓電材料將週遭系統的振動能量轉換成電能即為壓電能量汲 取系統。 本論文的目的是希望建立一壓電平板的數學模型，期望能以 數值模擬的方式預測壓電材料的電能輸出。基於上述的目標，將 研究的課題區分為以下部分：1. 壓電平板的數學模型建立、2.壓 電電能特性及特性預測、3. 壓電能量汲取系統結構設計以及實驗 量測的方法。透過以上步驟，觀察及探討當壓電能量汲取系統的 參數(1) 施力強度、(2)壓電元件黏貼位置以及(3)施力位置(單一頻 率簡諧力與隨機頻率力)改變時，對其特性(轉換電壓、功率)的影 響。

關鍵詞 : 能量汲取，壓電材料，壓電平板。

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