形狀記憶合金彈簧懸吊系統用於光碟機平台減振之研究

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摘 要

光碟機機台之減振技術對不斷要求提升轉速、讀寫速度之設 計而言，是一項持續改進之挑戰。目前以平衡鋼珠機構，做為光 碟機減振的設計，雖可有效的降低偏心量造成之偏擺問題，但其 缺點是只適用於平台自然頻率以上始為穩定有效，而無法應用於 小於共振頻率之模態。在讀取與燒寫係使用不同速度之光碟機而 言，在兩種轉速下皆要平衡鋼珠機構穩定進行減振控制，藉助額 外之半主動式減振系統有其需求性。本研究是利用記憶性材料在 不同麻田散體相與沃斯田體相之材料剛性等性質差異，設計記憶 型材料之平台懸吊墊圈彈簧。根據使用之狀況，控制彈簧墊圈之 溫度而改變懸吊系統之動態性質，以調控平台系統之自然頻率， 使光碟不論在讀或寫之操作模式下，都可維持在平衡鋼珠機構穩 定進行減振控制之狀態。本研究為了能夠了解光碟機支撐平台上 單一彈簧特性，利用ANSYS 分析單一自由度彈簧受力變形結 果，並推導出彈簧受力變形理論推導公式，將ANSYS 分析結果 與推導公式作一比較，可以對記憶合金彈簧更近一步了解，並且 推導出彈簧懸吊平台之動態方程式，以調整對光碟機平台減振效 果。而實驗結果顯示，利用形狀記憶合金彈簧，可有效抑制光碟 機平台振動20%左右，比一般傳統墊圈減振效果來的大。

關鍵詞 : 光碟機平台，半主動減振系統，記憶合金

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