

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進一步了解，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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