具濾波型順滑模態控制於精密定位平台上之應用

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摘 要

本論文所探討的是精密定位系統之設計問題，以兩組滾珠螺桿機械平台為主，研究微米級之超細微機械 定位動作。整個定位系統之規劃與設計，以PC個人電腦為主，因其開放之架構，非常具有彈性，適合各 種高等控制理論之發展。 摩擦力的影響是一般機械系統中主要的非線性因素來源，所以系統於低速度 運作時，首先要克服即是因不同物體接觸面所產生的摩擦。摩擦為複雜的非線性物理現象，包含靜摩擦 、庫倫摩擦和黏滯摩擦，其中靜摩擦與庫倫摩擦屬於非線性函數。 本文實驗分為兩階段，第一部份為精 密定位實驗，第二部份為尋圓軌跡追蹤問題。精密定位實驗，並沒有採用摩擦力前饋補償器，而是利用 干擾觀測器與順滑控制器等具有強健性的控制器達成控制目標，此為non-model-based的補償方式。 而尋圓軌跡追蹤問題，則是利用實驗所建立出來的摩擦力模型配合高增益觀測器進行前饋補償，並加入 干擾觀測器與具濾波型順滑控制器來抵抗摩擦力干擾現象。

關鍵詞 : 精密定位、摩擦力、干擾觀測器、順滑控制器、 高增益觀測器

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