# 反覆式學習控制於史都華平台之應用


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**摘 要**

反覆式學習控制(Iterative Learning Control, ILC)，即是經由反 覆的操作過程中學習系統未知的資訊，以作為下次控制修正的經 驗，因此ILC 控制器能在有限的學習次數中，將系統跟隨誤差收 斂至一微小的範圍內。本文將討論史都華平台（並聯式六軸平台） 系統之位置軌跡跟隨控制的實驗。在控制此系統之前，必須先推 導史都華平台的運動學，求得上平台中心座標與六軸油壓缸伸長 量的關係，即將上平台中心座標的跟隨軌跡轉換成六軸油壓缸伸 長量，進而控制六軸油壓缸伸長量來達成上平台中心座標的軌跡 跟隨的目的，研究中採用反覆式學習控制法則，透過反覆的學習 改善實驗中伸長量的誤差。我們運用PD 型態的學習控制法則， 並加入延遲參數，控制史都華平台作反覆軌跡追隨，達到收斂誤 差之效果。另一方面，我們也對史都華平台進行模擬控制，在進 行模擬控制前，我們必須得到平台的轉移函數，所以我們對於平 台進行系統識別，進而得到模擬數據來驗證實驗所作出來的數 據。從本文中可以觀看實驗與模擬的不同路徑的跟隨效果，基本上誤差都在可接受範圍以內，而從數據可知，振幅越大，其誤差 收斂速度會較慢。



關鍵詞 : 史都華平台，油壓缸，反覆學習控制


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