使用電流變液控制之噴墨單元間動態特性研究

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摘 要

近年來由於資訊科技產業蓬勃發展，電腦及其周邊產品已成為各廠家研發的重點，其中尤以印表機的需求日益增加，因此一快速列印、品質優良、價格低廉的印表機將是未來之趨勢。為達上述之目的，本文是利用電流變液在外加電場作用下具有可調變黏彈行為的特性，設計一同心圓式電流變液閥之陣列式噴墨印表頭控制機構，首先以理論方式推導此流變閥在靜態下之性能，並藉此以確定設計時，影響此流變閥特性的主要設計參數。接著以實驗方式藉由控制外加在同心圓式電極的電場強度，以改變流經流變閥之ER流體之阻尼剛性，藉此來達到控制陣列式噴墨單元噴墨與否的目的。研究之結果發現兩噴墨單元間之交互影響並不明顯，因此可分別單獨來控制單元間之作動。最後以系統在脈衝型式之控制電壓下，探求輸出側壓力室之暫態響應，並藉著改變控制電場作用之導通時間及調整電場作用時間起始的相位，以找出控制系統最佳之型式是當主動側在振幅0.3mm，頻率10Hz正弦激振下，我們要使系統有最小的輸出，可選擇在電場強度為533V/mm，電場作用導通時間為0.06秒，且相位在零度時是最有效率的控制方式。

關鍵詞 : 電流變液 ; 流變閥 ; 噴墨印表頭

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