磷酸鋰鐵電池為主體之複合動力車輛電控系統研發

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摘 要

近年來，由於環保概念及國際石油價格的上漲，嚴重影響許多國家的經濟發展與人民的生命財產安全。基於這個原因，全球在電動車(EVs)和複合電動車(HEVs)上的技術發展快速。由於電動車輛的電池充電設備不足和效能不佳，造成電動車發展上的限制。因此，可以避開此問題的複合動力車成為目前汽車業發展的主流之一。 本論文主要設計和發展複合動力的新式耦合機構與其系統控制器，利用不同動力整合輸出的連結變動，達到電子無段變速(E-CVT)功能的目的，耦合機構驅動方式使用軟起動控制，依據不同動力源的速度作耦合調變來保護動力輸出機構。在電控系統方面，使用數位信號處理器(DSP)作為各元件間訊號溝通與處理的控制核心。在馬達控制方面，應用空間向量脈寬調變 (SVPWM)之控制技術到無刷馬達，以磷酸鋰鐵電池 (LiFePO4)作為儲存與提供電力的媒介，來提供高效率的複合動力車，並設計一個平衡充電電路來延長電池壽命。 最後，根據架設的實驗平台，該系統經由整合和測試後，驗證電控耦合機構的功能，實驗結果說明本論文的目的達成。

關鍵詞 : 電動車、複合電動車、電子無段變速、數位訊號處理器、磷酸鋰鐵電池

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