

新型並聯式複合電動重型機車之一體式馬達/發電機驅動器與控制器研製

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摘要

近年來隨著環保意識抬頭與全球暖化的危機浮現，如何減緩對環境的汙染已成為當前迫切的議題。在大眾運輸方面，傳統內燃機雖然排氣汙染較嚴重，但結合內燃機之優點與電動馬達的特性之複合電動車(Hybrid Electric Vehicle, HEV)是目前省能且低污染具環保概念車輛的主流。基於複合電動車輛的重要，本論文發展一種新型並聯式複合電動型機車之一體式馬達/發電機驅動器與控制器研製，在電控系統中，使用數位訊號處理器(DSP)作為各元件訊號溝通與處理整個系統的完整運作。本論文的理論分析是藉由線性矩陣不等式(LMI)方法應用在非匹配不確定輸出回授可變結構系統(VSS)，經由此理論推導之控制器，能有效減少非匹配不確定成份的不良影響，確保系統穩定而且性能良好。本論文根據實際系統建構車輛在各種路面及負載狀況下運轉特性，並藉由實驗平台的系統零組件配置及行車模式的測試操控，實際驗證此種新型並聯式複合電動型機車之單一動力輸出與雙動力整合之功能與成效。本論文也實際建構一台原型車，此原型車並也於今年四月的台北國際車用電子展中展示。

關鍵詞：複合電動車；一體式馬達/發電機；數位訊號處理器；線性矩陣不等式；可變結構系統

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