DSP based 20kW generator/lithium battery management system and application of parallel hybrid electric vehicles = DSP為

戴睿宏、蔡耀文

E-mail: 9706911@mail.dyu.edu.tw

摘 要

發電機及電池管理系統，在很多機電設備都佔有舉足輕重的角色，尤其是在複合動力車輛日漸重要的今天，發電機及鋰電池管理系統，更是其重要的控制單元，對於系統節能與減碳有著決定性的影響力。 本文發展一個適應型電池充電系統，配合複合動力車輛所需的控制策略，成為系統節能與減碳的核心單元，此適應型充電系統可依據電源電量的多寡即時控管鋰電池做最佳化充電。本法設計多種自動化充電模式，使得系統不會因為電量太低而無法對鋰電池充電，達成提高儲存效率和減少能量損失的功能，此外還能同時對電池做電量平衡充電，以延長電池壽命。 本文將此適應型充電系統應用在複合動力車輛上，由於發電機及鋰電池功率可達到萬瓦以上，因此在電路設計及穩定性操作上有一定的困難，考慮發電機的功率調變和鋰電池充放電反應及安規條件等，完成一個基於複合動力車輛的適應型電池充電系統。另外，此研究中也順利完成原型車的建構，對於本系統做實際的應用及測試。經實測之結果證明理論的正確性，並驗證此發電機與鋰電池管理系統的可行性。 本系統並不限定於特定的電池應用，也不限定於車輛系統上，也可以應用在各種電源電量經常變動的發電系統，例如太陽能發電與風力發電系統等。

關鍵詞 : 一體式馬達發電機;鋰電池;電池充電系統;充電平衡;複合動力車輛

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