

電動機車電能控制與管理之研發與實作

The Development and Implementation on the Electric Energy Control and management of Electric Power Motorcycle

鍾翼能; 陳志鏗

摘要

本計畫為混合式動力電動機車之實作與發展研究，針對馬達系統之驅動控制及電子控制單元（ECU），做實務上的研究與探討。在混合動力中，馬達所提供之動力輸出為驅動機車之主要動力來源，本計畫之中所完成的工作包括第一為馬達之驅動系統之配置，在有效地應用電池電力之前提下驅動馬達，控制馬達的輸出扭力與轉速，以達到機車行駛中之額定之規格要求。第二為混合式動力機車之電控單元（ECU）之實作，我們將採用單晶數位控制器做為核心，搭配自行設計週邊界面電路，以偵測各種車上的信號狀態，並根據引擎性能圖、殘電量感測、車速及輸出扭力等回授資訊，建立控制法則，以決定引擎之啟動發電時間，並自動選擇切換檔位，以控制馬達達到所要求之車速，使整車操作達到最佳化的目標。第三為高效率充電器之實作，充電器的技術有相當的困難度存在，如功因改善、效率提高、高容量的穩流，其中包括智慧判定電池的好壞及能量殘留等重要特性的結合，將在各相關研發實驗之下完成。

Abstract

In the metropolitan area, the emission of motorcycles is one of the major sources of the air pollution. To resolve the air pollution problem, the electric motorcycle is one of the solutions; however the short cruise range, inconvenient and long-time recharge of the battery make the popularization of the electric motorcycle very difficult. Hybrid-power motorcycle is an alternative and can solve the above mentioned problems of the pure electric motorcycle. In this project, we will study the implementation of the motor control system and the Electrical Control Unit (ECU). In the hybrid power system, motor is the main source for driving the motorcycle. Thus, the first subject of this project is to implement the motor and driver system. We will design the controller to drive the motor efficiently. The second topic of the project is the ECU implementation. We will use the single-chip digital controller as the computation core and design the interface circuits to communicate with other subsystems. By computation core and design the interface circuits to communicate with other subsystems. By the feedback of subsystems, we can control the motorcycle system to operate in the optimal status.