Development of high power 20kw brushless DC motor driver and application of novel parallel hybrid electric vehicles = 高

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摘 要

近年來全球暖化的危機浮現及油價飆漲情況下使得環保議題受到矚目，目前全球主要仰賴於石化能源，然而，根據世界能源會(WEC)的估計，世界的石油將於 40-50年內用盡，因此搭載兩種動力源的複合式動力車，無疑成為近年來車壇的當紅話題。傳統內燃機雖然排氣污染較嚴重，但結合內燃機之優點與電動馬達的特性之複合式動力車輛(HEV)是目前省能且低污染具環保概念車輛的主流。 基於複合動力車輛的重要性並考量較大輸出扭力的需求，所以需要萬瓦級以上之大功率直流無刷馬達及大功率馬達驅動器，作為複合動力車輛之電能動力來源。雖然低功率馬達驅動器已經具備完整的研究，但是對於萬瓦級以上之高功率馬達驅動器的研究與設計仍然極少，高功率馬達驅動器比一般驅動器的設計、製作與工作穩定度更為複雜困難。因此，本論文根據此需求，研製2萬瓦特大功率永磁式直流無刷馬達驅動器，並應用於新型複合動力車輛平台，以滿足複合式動力車輛之大功率需求與驅動系統的可靠度。 本論文不但研究高功率直流無刷馬達驅動器設計且建構新型複合動力系統平台，來進行功能驗證及測試2萬瓦特直流無刷馬達在各種負載狀況下運轉之穩定性，並藉由實驗平台系統測試高功率2萬瓦特直流無刷馬達與內燃機之複合雙動力整合的功效並使系統能達到節能的效果。

關鍵詞 : 複合動力車;2萬瓦特直流無刷馬達驅動器;新型複合式動力車輛

目錄

INSIDE FRONT COVER SIGNATURE PAGE AUTHORIZATION COPYRIGHT STATEMENT iii ENGLISH ABSTRACT iv CHINESE ABSTRACT v ACKNOWLEDGMENT vi TABLE OF CONTENTS vii LIST OF FIGURES ix ABBREVIATIONS AND SYMBOLS xiii Chapter I. INTRODUCTION 1.1 Motivation 1 1.2 Organization 2 Chapter II. FRAMEWORK OF THE NOVEL PARALLEL-TYPE HYBRID ELECTRIC SYSTEM 2.1 Series Hybrid System 3 2.2 Parallel Hybrid System 4 2.3 Series-Parallel Hybrid System 5 2.4 Novel Parallel-type Hybrid Electric System 6 2.5 Introduction to the experimental platform 8 2.6 Power Output of Electric Motor Only 12 2.7 Power Output of Internal Combustion Engine Only 12 2.8 Dual Powers Output By Electric Motor and Internal Combustion Engine 13 2.9 Vehicles Travel Environment Model 14 Chapter III. MATHEMATICAL MODEL AND PARAMETER OF BRUSHLESS DC MOTOR 3.1 The Electric Motor Model 16 3.2 High Power of Brushless DC Motor 20 3.3 The characteristic curve of electric motor 22 3.4 The characteristic of generator 25 Chapter IV. THE PROTECTION OF IGBT POWER MODULE 4.1 The power switch 28 4.2 Basic structure of IGBT 28 4.3 The noise of switches 31 4.4 RCD snubber and clamp circuit 34 Chapter V. MOTOR DRIVER DESIGN OF ELECTRIC CONTROL SYSTEM 5.1 Electronic Control System 40 5.2 The TMS320LF2407 family 40 5.3 Pulse-Width Modulation (PWM) 43 5.4 The philosophy of BLDC motor driver 47 5.4.1 Six step commutation 48 5.4.2 BLDC motor 180 ° driver theory 52 5.4.3 BLDC motor 120 ° driver theory 55 5.5 Torque controller 58 5.6 The interface of DSP 62 5.7 The BLDC motor driver system 63 Chapter VI. EXPERIMENT RESULTS 6.1 Introduction of experiment results 65 6.2 The experiment of different load 65 6.3 Test the high power of motor output 71 6.4 Hybrid power output 72 Chapter VII. CONCLUSIONS 76 APPENDICES 77 REFERENCE 79

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