智慧型車輛動力系統之動態模擬與分析

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摘 要

本論文主旨在建立智慧型車輛動力系統控制之相關技術與方法。智慧型車輛動力系統之設計，可以將電子點火、噴油系統及自動變速箱傳動系統加以整合。其中車輛動力系統性能，由相關控制軟體構建合適之車輛動力系統及傳動系統模型，進行輸出性能之模擬分析。 模擬軟體之建構以量測實驗引擎於動力計上之實測數據為基礎，配合相關控制系統原理，加以修正其動態響應性能，以期能建立良好之對應關係。本論文配合一部四行程汽油引擎車輛之動力系統量測，研究引擎在車輛各種操作狀態如加減速時，引擎空燃比、扭力、轉速及進氣壓力等動態特性與有相關影響之操作變數間之工程相關性。 引擎、變速箱、傳動軸、差速器、驅動軸傳遞至輪胎之扭力及轉速藉由傳動系統之整合動態模式完成相關數學模式與參數設定方法，可以提供設計智慧型車輛動力系統並評估比較參數對性能之影響。 藉由不同加減負荷、轉速量測之數據，分析引擎燃燒之動態響應特性，瞭解各計算控制模式及參數對車輛性能之影響及其感度。並修正模擬動力系統動態模式及相關引擎與傳動系統匹配控制策略，以產生較佳智慧型車輛動力系統評估計算分析所須之性能，同時協助工程師改善設計、縮短研發試誤及時辰。

關鍵詞 : 智慧型車輛動力系統 ; 引擎動態分析 ; 傳動系統模擬

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