車輛線傳電控轉向系統模擬測試之研究 = Simulation and test analysis study of vehicle steer By-Wire control system

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摘 要

本研究之主旨為使用物件導向動態模擬程式，建立車輛轉向 模擬系統動態模型，供車輛線傳電控轉向系統模擬測試與研究。 針對車輛之轉向穩定控制進行研究分析，依據不同輸入之方向盤 轉角與車速變化，進行車輛設計與控制參數對於車輛穩定性能之 影響模擬評估控制分析。 研究方法首先針對車輛線傳電控轉向系統之橫向運動進行模 擬並分析對應之線傳轉向馬達之動態響應，使轉向操控性能提 昇。藉由模擬設計及控制參數之改變，對於車輛轉向運動之影 響，可迅速加以模擬調整，以改變車輛轉向傳遞特性，提升車輛 之轉向性能，也可降低不當操控之意外的發生。所建立之車輛轉 向模擬程式並與商用車輛動態模擬軟體比較並驗證。 車輛縱向與橫向動態模型藉由線傳硬體迴路模擬技術，透過 電腦與控制介面卡，將車輛動態模型結合即時目標模擬器。發展 車輛橫向模擬與硬體整合方法，修正模擬車輛轉向運動之模式， 及相關動力與制動及傳動系統匹配控制策略。本研究建立之方法 可迅速模擬車輛轉向操控性提供設計者參考，以產生較佳之車體穩定控制系統性能，縮短車輛穩定控制系統研發時程，提升車輛 穩定控制系統性能，增進車輛主動安全迴避與預防控制技術，降 低車輛事故發生。

關鍵詞 : 車輛橫向穩定控制，車輛轉向動態模擬，線傳轉向系統硬體迴路

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