車輛線傳橫向穩定控制系統之整合硬體迴路分析研究

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摘 要

本研究主旨為車輛橫向穩定控制之研究，建立車輛縱向與橫向動態模擬系統。針對橫向穩定控制進行研究分析，依據方向盤轉角與車速變化，進行車輛橫向穩定模擬控制。 研究方法建構車輛縱向與橫向動態模型，包括縱向驅動力、牽引力控制、轉向操控穩定控制、輪胎動態模型、橫擺模型等。研究以物件導向模擬軟體建立分析車輛運動變化，運用儀器擷取實車引擎轉速及車速相關行車資料，進行車輛動力傳動與橫向操控性能，比較驗證及分析動態模擬系統。整合之車輛橫向動態操控分析包括建立自行車穩態模型與暫態響應模型，進行車輛操控穩定研究，可計算車輛穩定性能輸出如側向加速度與橫擺之動態響應。研究建立之複合式牽引力控制，以車身橫擺率及驅動輪轉速差，利用模糊邏輯控制限滑差速器鎖定機構，降低車輪打滑及橫擺產生。車輛操控穩定控制模擬，以橫擺率及側向加速度變化，控制四輪獨立煞車壓力，分析控制參數對橫擺與側向速度影響。 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，縮短車輛穩定控制系統研發過程。提升車輛穩定控制系統研發時間，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，複合式牽引力控制，線傳硬體迴路

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