

智慧型車輛防側滾系統模糊控制之硬體迴路研究

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摘要

本研究旨在建立智慧型車輛防側滾系統模糊控制之硬體迴路研究，建立智慧型車輛防側滾系統模糊控制模擬系統。針對不同道路行駛狀況，分析車輛防翻覆性能及車身重心隨車速變化時之側滾率加以評估比較。為要達成智慧型車輛防側滾穩定性之車體穩態控制目的，本研究亦將不同之控制系統與模糊控制系統結果加以比較驗證。本論文以物件導向模擬軟體，致力分析車輛操控運動變化，建構出智慧型車輛防側滾系統模擬和模糊控制模組，包括轉向操控穩定控制、側滾模型與模糊控制模型等。進行智慧型車輛防側滾系統模糊控制並隨車速改變控制參數與控制策略規劃，分析比較及驗證動態響應。研究智慧型車輛防側滾重心高度改變與承載系統作動力與車體穩定控制動態之關係。利用建立之車輛動態系統模型，觀察不同車速設定和路徑下，車身重心高度變化之車輛運動，分析控制側滾參數下對側滾速度之影響。根據車輛行駛狀況並配合模糊控制器進行計算，可使智慧型防側滾車輛更精確地修正重心位置，以更安全之模式達到穩定操控行駛之設計要求。本研究可迅速評估分析車輛防側滾穩定性系統所需之性能，對於國內相關產業如機械、車輛、電腦資訊、控制、通訊等開啟另一項商機，並可提升國內主動式車輛防側滾系穩定性系統與車體穩定控制自主研發設計能力，同時協助相關研發工程師改善和縮短研發試誤之時間，提升國內車輛及相關產業進入先進科技技術的行列。

關鍵詞：車輛翻覆運動、模糊控制系統、翻覆穩定度指標、線傳即時車體穩定控制、動態硬體迴路模擬

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