線控四輪轉向系統之車輛操控特性研究

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摘 要

本文主要探討線控四輪轉向之操控特性控制，由於線控四輪轉向系統是將傳統轉向機柱利用馬達取代進而驅動轉向機，由於已經沒有轉向機柱機械結構，因此可在控制核心內加入不同的車輛穩定控制策略，並使車輛能夠達到四輪轉向，同時將車輛之重心側滑角以及橫擺率降低，改正傳統二輪轉向在低速上的機動性和高速過彎時的安全性、操控性以及穩定性。本研究在軟體模擬上為使用CarSim做模擬，進而分析車輛在動態上之穩定性，並與MATLAB\Fuzzy Logic Toolbox做結合，以增進CarSim在模擬車輛動態上的準確度。 本研究運用CAN Bus通訊協定以及分散式架構來建構線控轉向系統實驗平台。並利用LabVIEW圖控程式來建立控制平台系統的人機介面並包含即時監控功能。本研究於線控轉向系統實驗平台上，可分別驗證線控前輪轉向與線控後輪轉向，並利用閉迴路控制，除可精準控制前輪轉向，依據車速做判斷，達到後輪低速逆相位轉向及高速同相位轉向之控制目標。 本研究於線控實驗平台設計線控轉向之備用系統，並實現於線控實驗平台上，利用鋼索以及滾輪機構設計出線控轉向之備用系統。本研究將鋼索機構與線控轉向系統相互連結，即在平常線控轉向系統作動時，鋼索與線控轉向系統共同作動，在線控轉向系統喪失轉向功能時，能毫無時間差的介入線控轉向系統做轉向動作，讓駕駛者可以順利將車輛停置路邊等待救援。 關鍵字：線控轉向系統，四輪轉向，備用系統，CarSim。

關鍵詞 : 線控轉向系統、四輪轉向、備用系統

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