

無人車輛動態路徑模擬與控制之研究

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摘要

本研究之主旨為整合建構無人地面載具車輛之動態模擬方法。論文使用物件導向動態模擬程式建立無人履帶型車輛牽引力驅動模型，供無人履帶型車輛之地面牽引力進行研究分析。依據不同輸入之地面參數值與車速變化，進行無人履帶型車輛設計與控制參數對於車輛直行與轉向性能之影響模擬評估控制分析。使用無人履帶型車輛加速度模組、無人履帶型車輛爬坡性能模組與路徑動態規劃模擬，能快速的預估無人車輛之行駛與操控性能。不同表面特徵參數和車輛設計參數進行比較，找到更好的性能，以評估分析無人地面載具車輛所需之性能的規格，包括加速時間、爬坡性能和動態迴轉半徑。由動態路徑模組進行了測試不同的汽車速度在繞錐測試和變換車道測試。結果顯示實際路徑與預定路徑幾乎一致，響應特性良好，可以減少無人地面載具車輛發展的時間。防撞雷達和其他傳感器，包括車速，衛星定位系統（GPS），三軸加速規和影像紀錄器於不同的車輛駕駛條件，建立個別數據擷取系統資料的融合。收集之數據根據不同的駕駛加速和減速條件，可用於未來的無人地面載具車輛和適應性巡航控制（ACC）系統的驗證數據庫。該雷達測量數據和分析過程中制定了許多設定條件，車輛涉及許多技術，將用於研究和開發最新的無人地面載具車輛控制器。

關鍵詞：履帶無人車輛驅動轉向動態模擬、履帶型車輛加速度與爬坡性能分析、無人車路徑動態規劃模擬、無人車感測系統資料綜整

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