

無人自行車運動控制之研究

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摘要

本論文主旨在發展無人自行車平穩行駛控制系統的設計與實現技術。首先建立自行車動態資料量測系統，其包含的元件有側傾角感知器、編碼器等，對自行車的側傾角、前叉轉向角度、車速等進行量測。無人自行車控制系統是以工業電腦作為控制器的平台，使用PID控制理論作為控制器的主要核心，以側傾角的回朔訊號和參考信號比較後，再經由LabVIEW程式中控制器的作動產生一電壓訊號，而對伺服馬達產生轉矩進而使自行車進行平穩行駛控制。設計以伺服馬達作為驅動器的轉向機構，用來模擬騎士騎乘操控狀態。最後進行無人自行車操控實驗，本論文中所使用的資料擷取程式與控制法則程式，皆使用虛擬儀控軟體LabVIEW所撰寫，在實驗上所得之數據，可以驗證本論文所設計的系統與控制器的可行性。

關鍵詞：無人自行車；PID控制；工業電腦

目錄

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