

## 車輛動態特性及駕駛模擬系統之研製(III)

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### 摘要

本研究之主要目的在於研製一車輛動態特性分析及駕駛模擬系統。第一年期(88 年度)已完成分析、歸納及推導車輛動態系統之數學模式,並以虛擬實境(VR)技術建立 3D/VR 環境,配合數值分析方法,以資料擷取軟硬體設施及視窗環境之動態資料交換功能,將車輛動態特性經數值分析軟體計算所得的數據輸入 VR 軟體中,以進行模擬分析,完成一簡易車輛動態特性模擬分析系統。第二期(89 年度)計畫中建構更完整之車輛動態特性及駕駛模擬系統,利用五支油壓缸及三個電位計構成駕駛模擬座,作為控制及量測之實體,模擬分析實車之動態特性。宥於人力的限制,該期只進行二自由度之模擬及控制,並在本期(第三年期,90 年度)進一步加入資料手套、頭戴式顯示器、投影式螢幕等硬體設備,編撰更人性化之人機介面、使系統更穩定化之 PID 控制器、更逼真的虛擬實境場景、整合完成五自由度的模擬與控制。

關鍵字: 車輛動態特性;駕駛模擬系統

# **The Research and Development of a Vehicle Dynamic and Driving Simulation System (III)**

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## **Abstract**

The purpose of this study is to develop a vehicle dynamics simulation system. In the first year, the author analyzed and derived the mathematical models of vehicle dynamic systems, developed a virtual reality (VR) simulation system, and constructed a simple driving simulator. The data of vehicle dynamic systems were acquired and transferred to VR simulation system through the dynamic data exchange function provided by the Windows environment. In the second year, motion analysis and matrix operations are executed and a more sophisticated driving simulator is constructed by adding five hydraulic cylinders, a real vehicle steering system, and three potentiometers. The control system is able to perform two degrees of freedom driving simulation. This year, a data glove, head mounted device, and a projector are further installed. In addition, more user-friendly man-machine interface and a PID controller which makes the motion control more stable, and more vivid virtual reality environment are added and compiled. By doing these, the construction of a five-degree-of-freedom driving simulator is complete.

**Key words:** Vehicle dynamics; Driving simulation system