

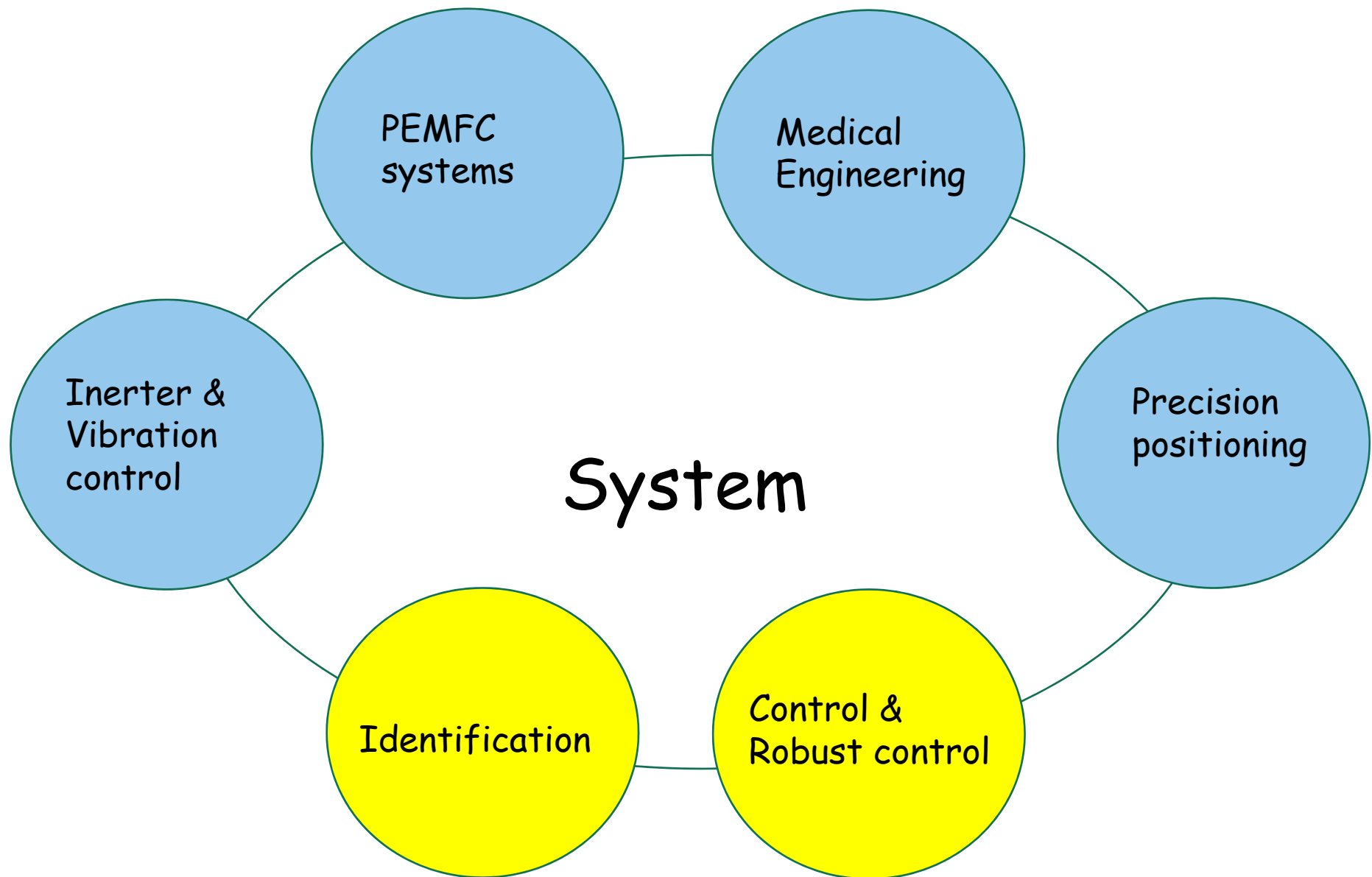
系統整合控制實驗室

System Integration & Control Lab

(工綜館 104)

王富正





研究目的及研究主題

- 研究目的：針對系統進行系統識別及控制器設計，安裝後進行系統整合及性能分析。
- 研究項目
 - 1. 慣質(*Inerter*)機構設計及應用
 - 2. 燃料電池系統控制及混合電力系統
 - 3. 醫學工程系統
 - 4. 精密定位系統
 - 5. 嵌入式系統及機器人系統之整合控制
 - 6. 強韌控制理論及應用

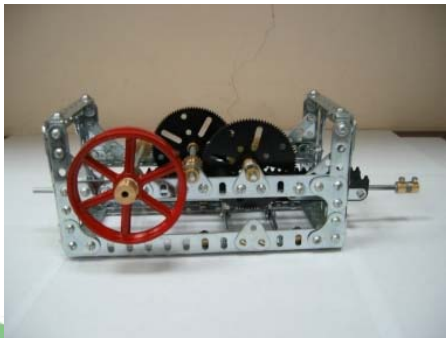


1. 慣質(Inerter)機構設計及應用

The 1st Inerter
Experiment, 2001,
Cambridge, UK



• Inerter: A new Mechanical Network Element



The **baby Inerter** model



The **hydraulic inerter**



1. Vehicle suspensions



2. Motorcycle steering



The **rack-pinion inerter**



The **Mechatronic inerter**



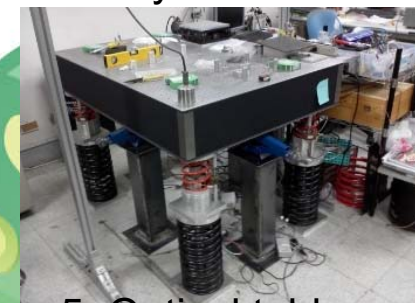
3. Train stability



The **ball-screw inerter**

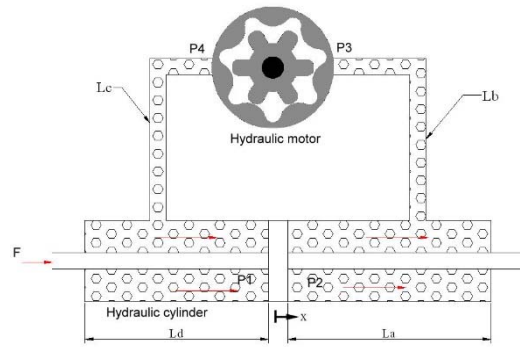


Building vibration

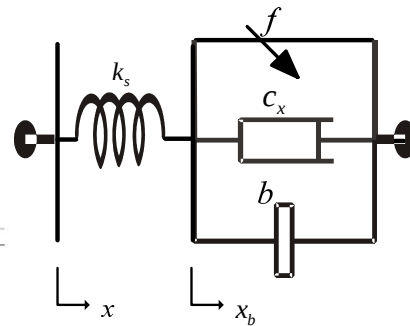


5. Optical table

2018 台英合作計畫

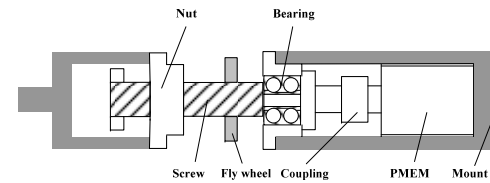


(a) 示意圖

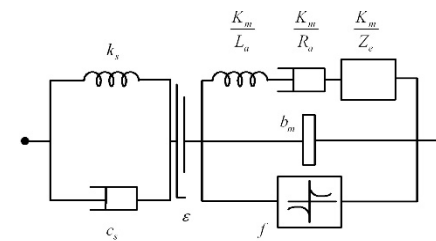


(b) 動態網路模型

圖1、液壓式慣質機構示意圖及動態模型



(a) 示意圖

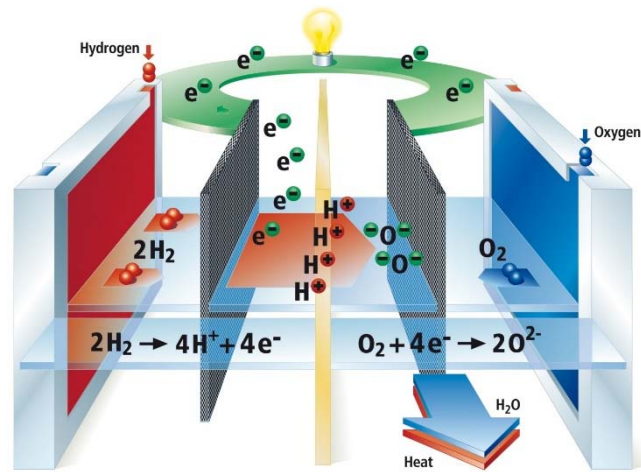


(b) 動態網路模型

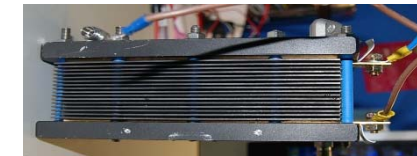
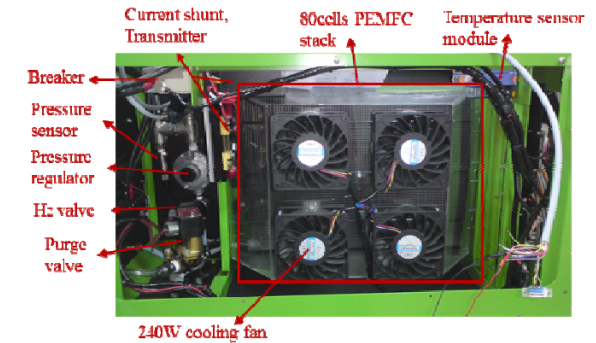
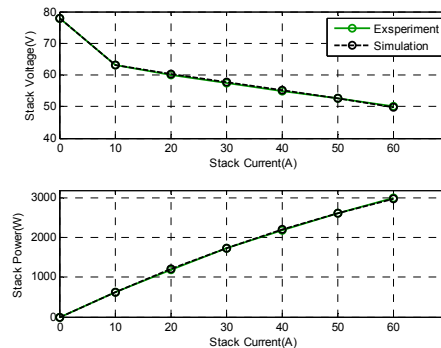
圖2、機電式慣質機構示意圖及動態模型



2. 燃料電池系統控制及混合電力系統

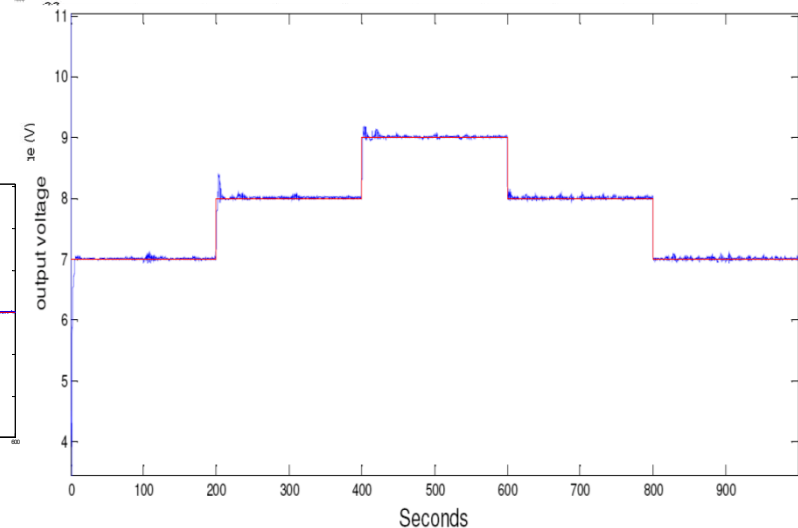
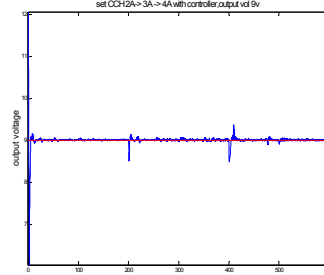
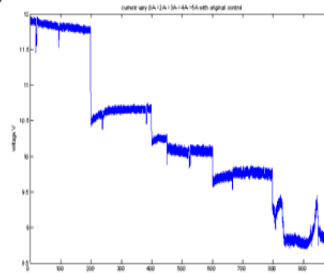


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- Flow Control:
 - Steady output voltage
 - Variable output voltage
 - Reduce fuel consumption
 - Improve performance and efficiency

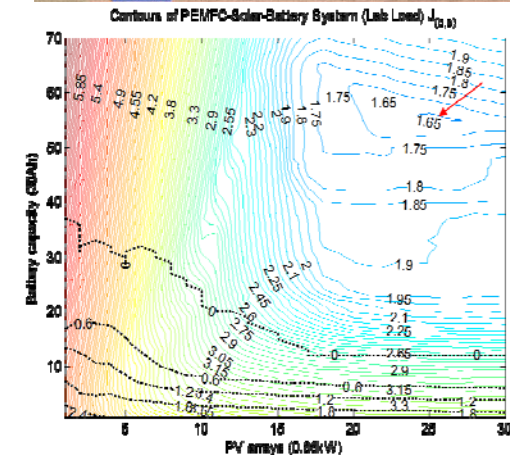
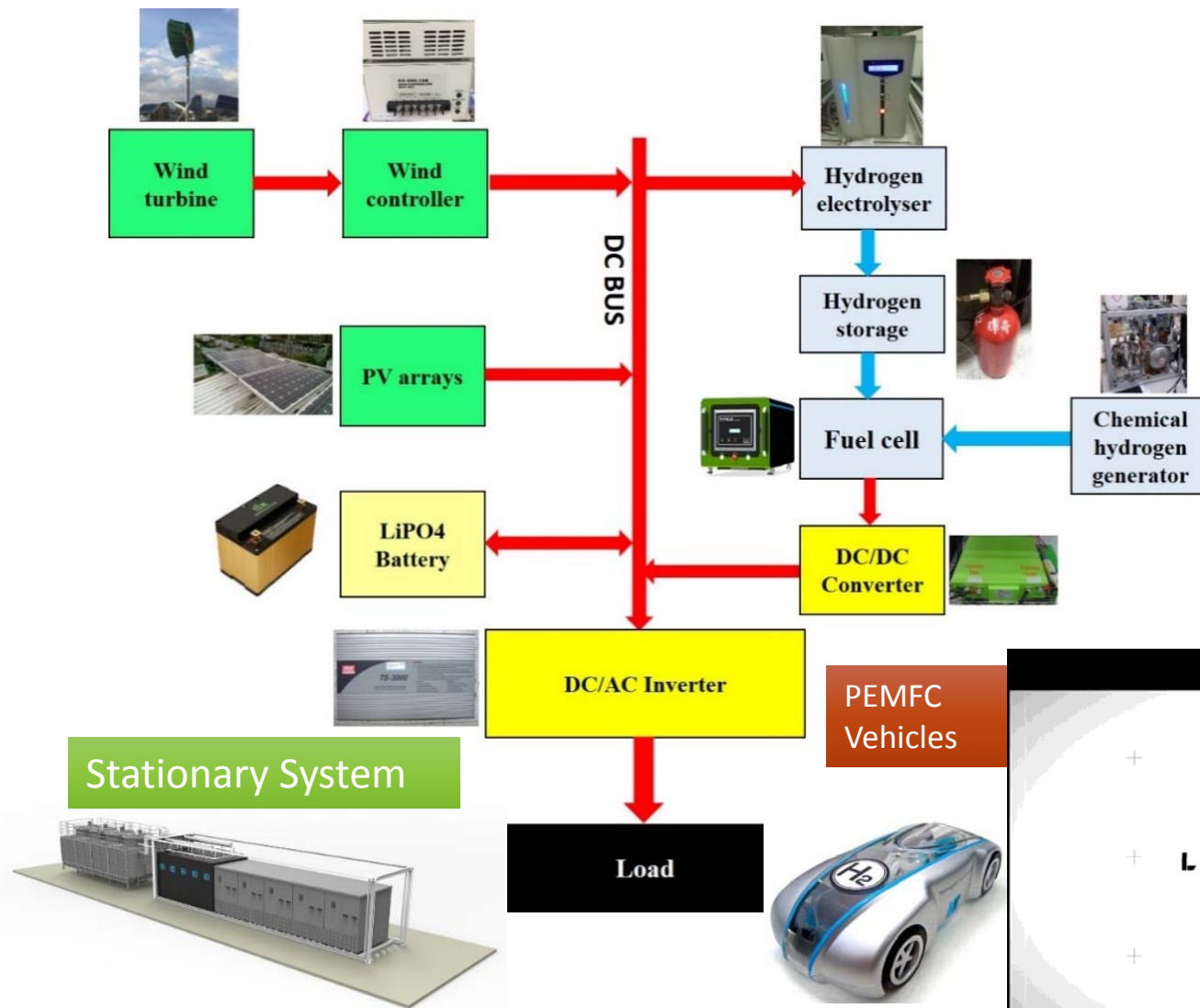
- ▶ Temperature control
- ▶ Converter control



Delta Electronics

current 8A→9A→10A.

燃料電池混合電力系統

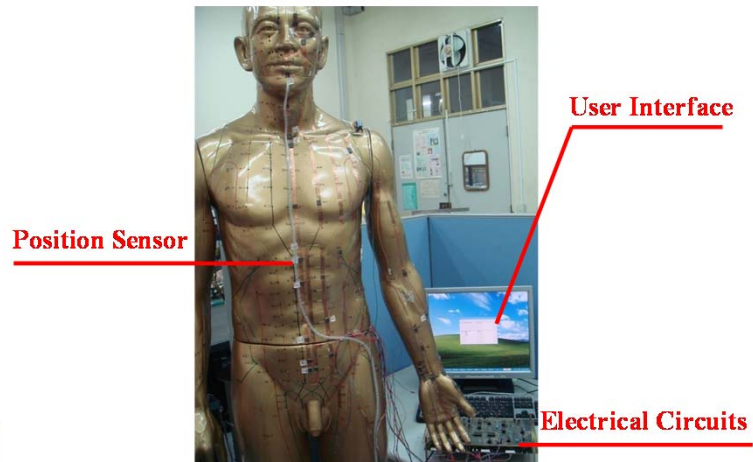


使用威力導演編輯



3. 醫學工程系統

Acupuncture Statue



人體運動
最佳化分析



兒童學步機
系統分析控制

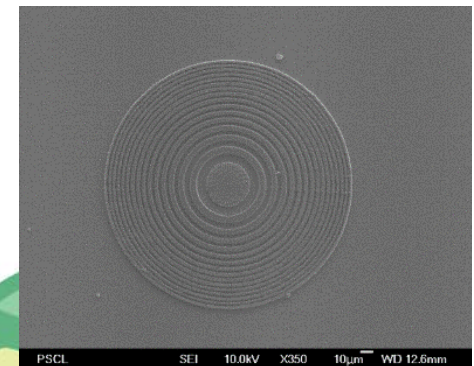
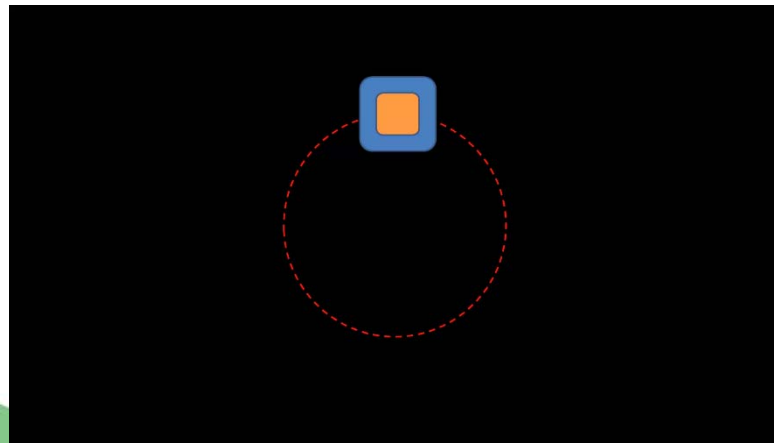
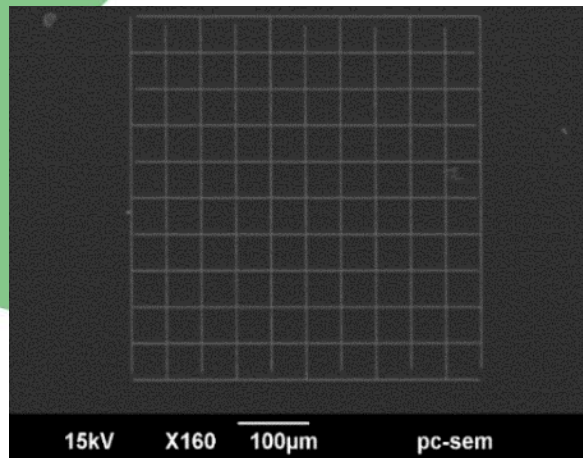
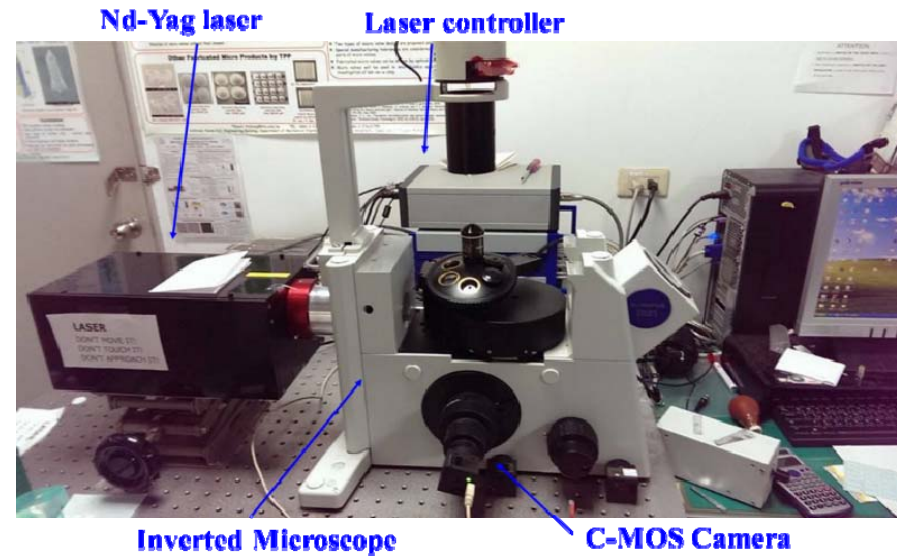
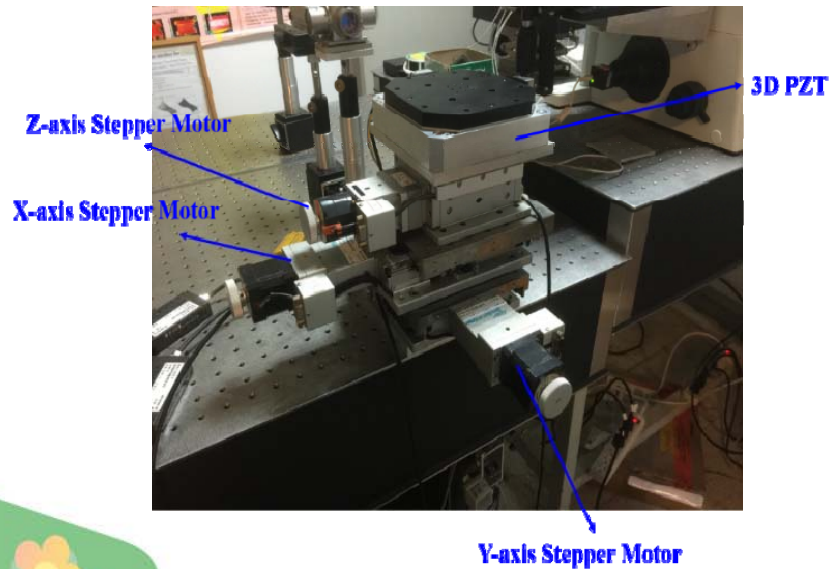


電動輪椅輔助
動力系統控制



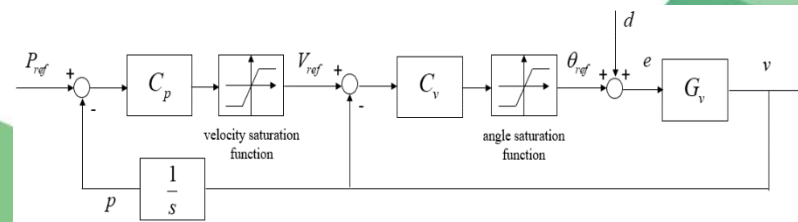
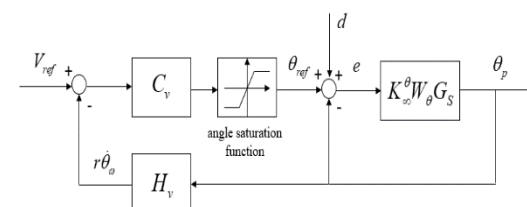
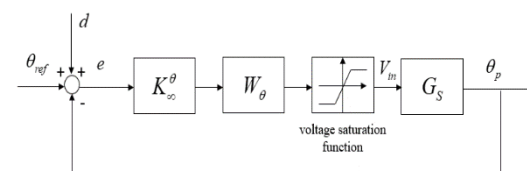
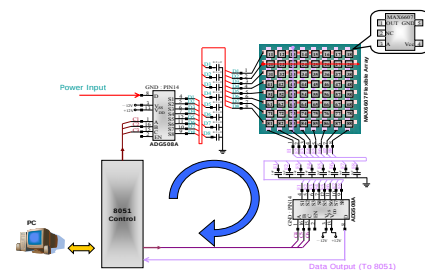
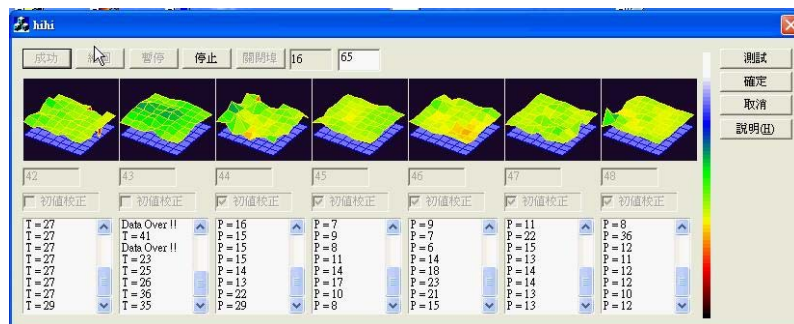
Automated Neuro-Developmental Treatment (NDT) Trainer

4. 精密定位系統

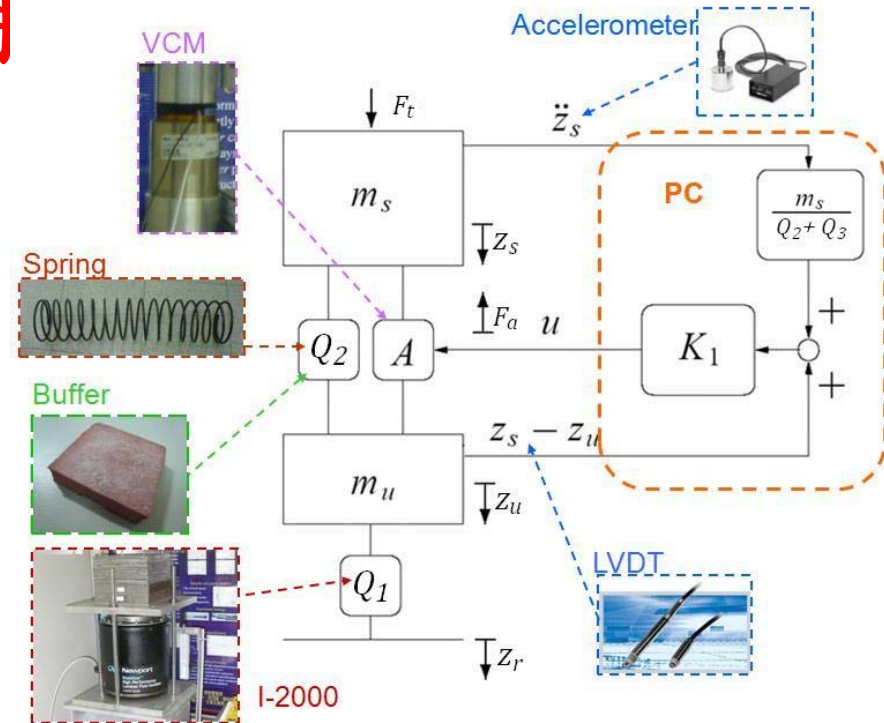
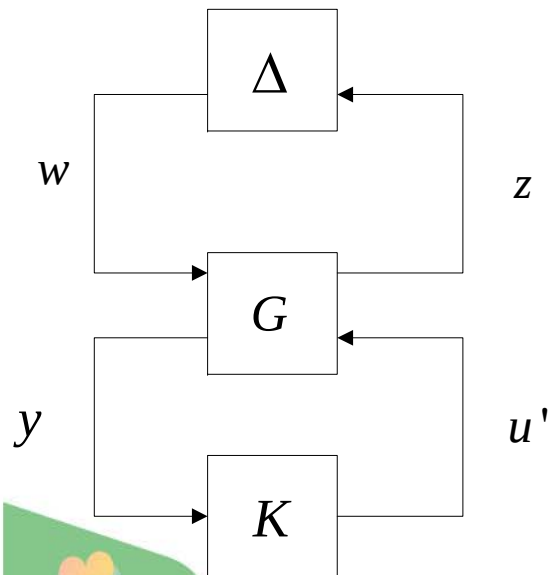


5. 嵌入式系統及機器人系統

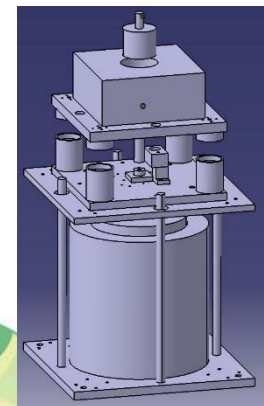
Personal Assistive Walker

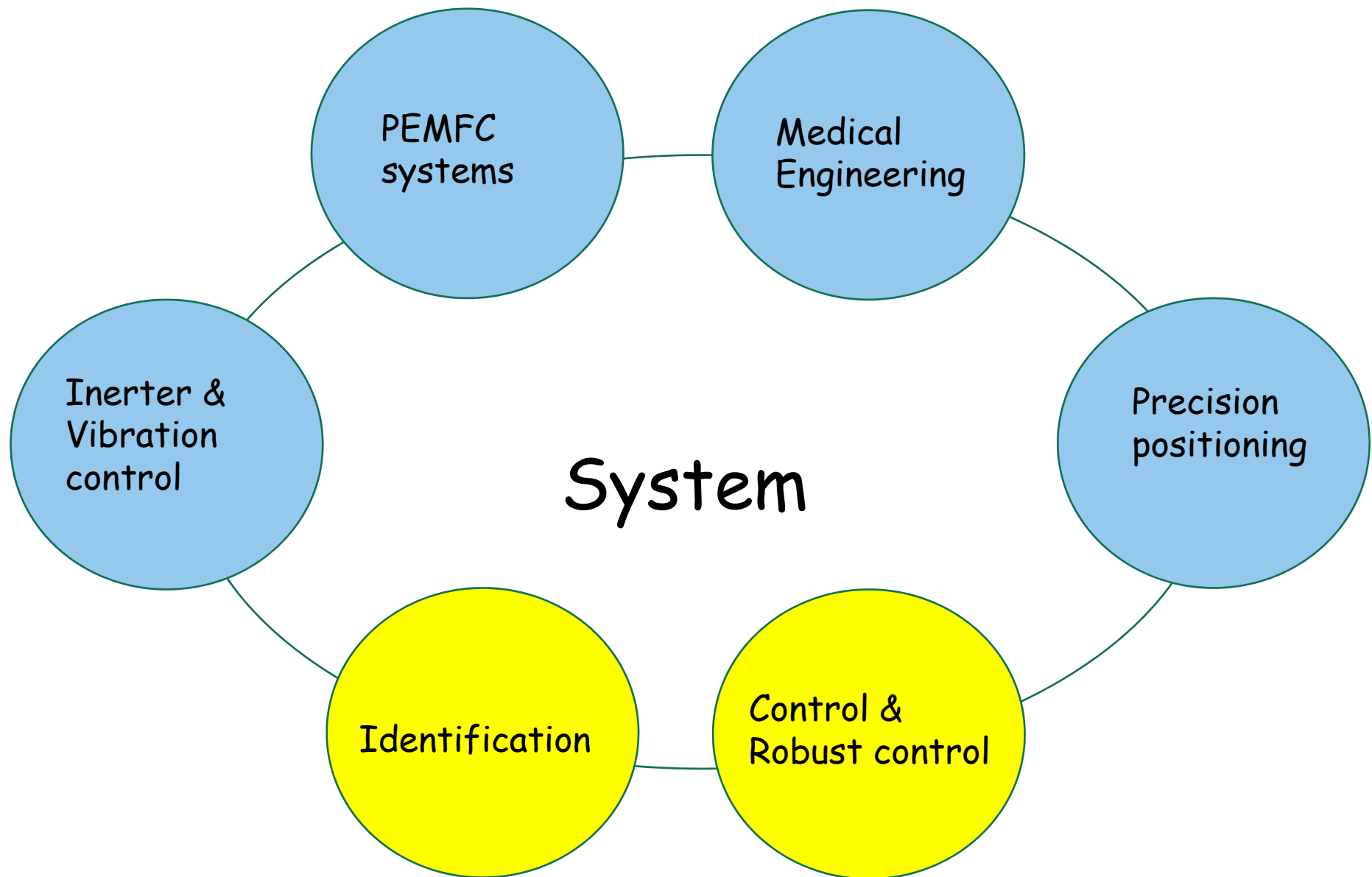


6. 強韌控制理論及應用



1. Robust Control, Loop-Shaping
2. Fix-order Robust Control
3. Robust PID Control





Further Information

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