

## **Design and Control of an Active Gait Trainer**

Fu-Cheng Wang, Chung-Huang Yu, Tai-Yu Chou and Nai-Chung Chang

### **Abstract**

This paper demonstrates the design and control of an active gait trainer for children with walking disabilities. Compared to the traditional rehabilitation procedures in which two or three trainers are required to assist the patient, a motor-driven mechanism was constructed to improve the efficiency of the procedures. The work was carried out in four steps. First, a six-bar mechanism was designed to mimic the preferred trace of ankle joints. Second, system identification techniques were applied to obtain the system transfer functions. Third, robust control algorithms were used to design  $H_\infty$  robust controllers to follow the traces. Finally, the designed controllers were implemented for performance verification. Based on the simulations and experimental results, the proposed mechanism and control are deemed effective.