

Project I Description

Project Name: Augmented Balance Exoskeleton System for Paraplegic Persons

Sponsor: Phoenix Industries – LAU – Michael Haddad

Team Size: 2 MEE Students

Project Overview

T3-T4 and T4-T5 paralyzed persons are normally unable to stand-up or walk. Michael Haddad defied this paralysis and developed novel method of locomotion. His major breakthrough is his ability to balance himself on two sticks. The aim of this project is to develop an exoskeleton system that provides a normal paralyzed person with an augmented balance using reaction wheels. Also proper sensors and data acquisition systems should be designed to monitor the efforts and energy consumption of the user.

Project Areas and Majors needed

Instrumentation (1 MEE Student)

Control Systems (1 MEE student)

Project Deliverables

Design and Build the following systems:

- Develop the mathematical models of a reaction wheel balancing system.
- Design and simulate the reaction wheel to support a falling patient that has a weight of 80Kg at an angle of 10° .
- Build and test the balancing system.
- Design and build a system that monitors the heart rate, SpO₂, breathing rate, stepping rate, moving rate, and strains in the exoskeleton.