Biomedical Engineering Department Seminar

Friday, April 20, 2007
Location: Cullimore Hall, Lecture Hall 3
Time: 12:00 - 1:00 PM

INVERSE DYNAMIC MODELING FOR CHARACTERIZATION OF SPASTICITY

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Spasticity affects subjects with cerebral palsy, stroke, multiple sclerosis, and traumatic brain injury. The need to develop a deeper understanding of spasticity is driven by the existing limited understanding and the lack of satisfactory interventions for this disabling phenomenon.

An inverse model is implemented to describe the motion in the pendulum knee drop test. Using the lambda theory as a conceptual framework to explain neuromuscular control, it has been demonstrated that the equilibrium point of the passive knee is dynamic and exhibits a pseudo-exponential trajectory in spasticity that is different from the non-spastic case. In spasticity, this research has also demonstrated that the passive stiffness—intrinsic and non-reflex mediated stiffness—is increased. This work now allows biomechanical variants to be linked with two important clinical concepts associated with spasticity. Increases in passive stiffness can be equated with increased tone. The dynamic equilibrium point trajectory can be used to explain the hyperactive stretch reflex.

Refreshments will be served.