"The Importance of Neuromechanical Limb Models in the Design of Leg Prostheses and Orthoses"

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Abstract:
A long-standing goal in rehabilitation science is to apply neuromechanical principles of human movement to the development of highly functional prostheses and orthoses. Critical to this effort is the development of actuator technologies that behave like muscle, device architectures that resemble the body’s own musculoskeletal design, and control methodologies that exploit principles of biological movement. In this lecture, I discuss how agonist-antagonist actuation, polyarticular limb architecture, and reflex behaviors can result in quiet, stable, and economical legged mechanisms for walking and running. Neuromechanical models are presented to examine the importance of limb morphology and neural control on locomotory performance. These models are then used to motivate design strategies for prosthetic and orthotic mechanisms.

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