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강연제목: 스프링 기반 모델을 활용한 회전 다리 동작의 통합적 이해

Bridging Gait Modeling and Swing Leg Behavior with a Spring-based Model

Abstract:

The swing leg plays a crucial role in foot transition during bipedal walking. To better understand swing leg behavior, we present a novel spring-based model that replicates the complete swing leg dynamics including both kinematics and kinetics. The model incorporates a linear spring with rest length variation and a torsional spring at the hip joint to generate realistic motion along with the corresponding joint forces and torque. Simulation results demonstrated successful replication of swing leg dynamics with significantly improved accuracy compared to previous models. Additionally, strong correlations ($\rho > 0.8$) were observed between model parameters and gait speed. These findings suggest that the proposed model offers a comprehensive biomechanical framework for understanding human swing leg behavior, with potential applications in motion planning for gait-assistive systems such as exoskeletons.

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Brief Biosketch

Hyerim Lim received her B.S., M.S., and Ph.D. degrees in Mechanical Engineering from Korea Advanced Institute of Science and Technology (KAIST), Daejeon, South Korea in 2011, 2013, and 2018, respectively. After spending a year as a postdoctoral researcher in the Biomechanics Laboratory at KAIST, she worked as a staff researcher at the Samsung Advanced Institute of Technology, Suwon, South Korea, from 2019 to 2023. She is currently an assistant professor in the School of Mechanical Engineering at Kumoh National Institute of Technology.