2025

第十届软体机器人大会

基础理论与关键技术研讨暨软体机器人创新设计竞赛

***EquiMus*: Energy-Equivalent Dynamic Modeling and Simulation of Musculoskeletal Robots Driven by Linear Elastic Actuators**

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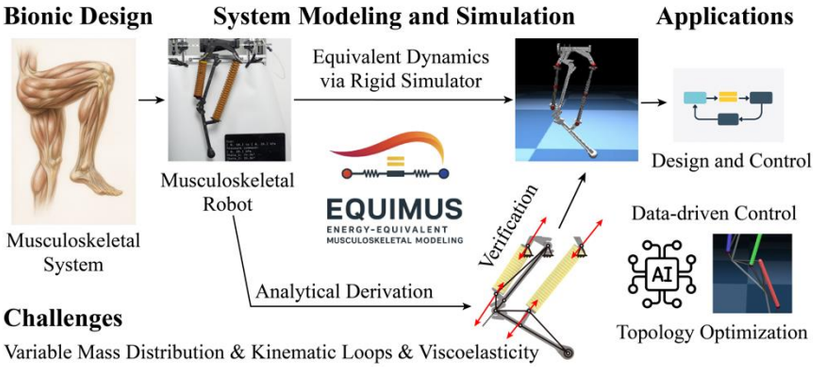
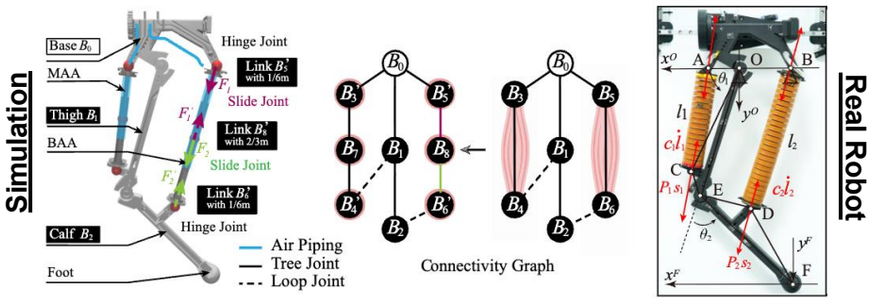
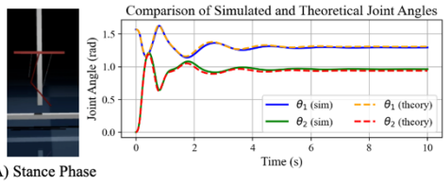
Background | Gap between **Embodied AI** and **Soft Robotics**

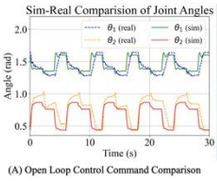


Results | *EquiMus* Implementation on **a bionic robotic leg**

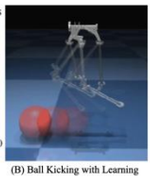




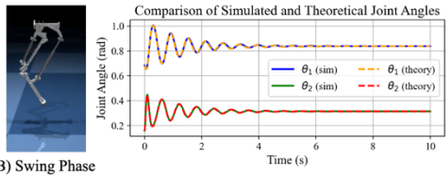
(A) Stance Phase



(A) Open Loop Control Command Comparison



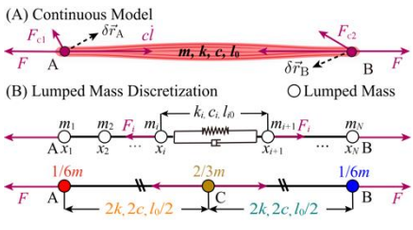
(B) Ball Kicking with Learning



(B) Swing Phase

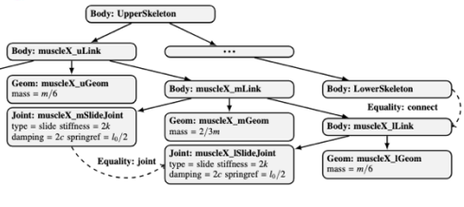
Let's connect & collaborate!

Methods | **Energy - equivalent** Modeling and Simulation



We proposed ***EquiMus***, an energy-equivalent dynamics and simulation for the rigid-soft musculoskeletal robots with linear elastic actuators. The method captures dynamic mass redistribution, supports loop-closure constraints in MuJoCo, and remains real-time capable.

Experiments on a pneumatic leg show close sim-to-real agreement and enable downstream usage in PID auto-tuning, model-based control, and reinforcement learning.



IEEE RA-L'25 **https://github.com/fly-pigTH/EquiMus**