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Antropomorfic parameters of a nonlinear dynamic model of self-sustained hopping

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Abstract: In this work, we study the dynamics of legged locomotion adopting a combination of experiments and mathematical models. Our recently developed planar model is capable of self-sustained human-like hopping motion. However, the biomechanical indicators, such as joint angle ranges, joint velocities and joint torques which provide stable motions are not compatible with realistic parameter values. In general, parameters can be optimized with respect to a variety of cost functions, such as energy efficiency, impact reduction, locomotion speed or hopping height. In contrast to these performance measures, our current objective is to minimize the gap between the measurement and simulation results of human locomotion in terms of the aforementioned biomechanical indicators. This will finally provide realistic anthropomorphic motion, reducing the gap between real life legged locomotion and locomotion based on mathematical models.

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[3)] Ambrus M. Zelei, Ph.D.: Dept. of Applied Mechanics - Budapest University of Technology and Economics, 1111 Budapest, Műegyetem rkp. 5., Hungary (HU), zelei@mm.bme.hu , the author presented this contribution at the conference in the special session: "Analysis and control of bioinspired and biomimetic dynamical systems — sensors, manipulators and locomotors" organized by C. Behn and A.M. Zelei.