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标题: Simulation Analysis of Impulsive Ankle Push-Off on the Walking Speed of a Planar Biped Robot

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摘要: Ankle push-off generates more than 80% positive power at the end of the stance phase during human walking. In this paper, the influence of impulsive ankle push-off on the walking speed of a biped robot is studied by simulation. When the push-off height of the ankle joint is 13 cm based on the ground (the height of the ankle joint of the swing leg) and the ankle push-off torque increases from 17 to 20.8 N center dot m, the duration of the swinging leg actually decreases from 50 to 30% of the gait cycle, the fluctuation amplitude of the COM (center of mass) instantaneous speed of the robot decreases from 95 to 35% of the maximum speed, and the walking speed increases from 0.51 to 1.14 m/s. The results demonstrate that impulsive ankle push-off can effectively increase the walking speed of the planar biped robot by accelerating the swing leg and reducing the fluctuation of the COM instantaneous speed. Finally, a comparison of the joint kinematics of the simulation robot and the human at a normal walking speed shows similar motion patterns.

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