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Motion Optimization–an Empirical and Theoretical Study

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Abstract

Elderly people often suffer from joint pains. One of possible reasons is that during their early lifetimes, the elderly form improper habitual motion patterns and result in chronic damage to their joints. To relief the joint pains, physical therapist often guides the patients to follow certain motion patterns. This raises the question whether the loads to the musculoskeletal system can be reduced by adjusting body postures and motion patterns. This paper thus investigates the influence of moving tracks on body loadings. We investigate the influence of moving tracks on two common movements, namely sit-to-stand and level walking, and propose a method to evaluate the effects on joint loads. Three types of motion data, i.e., recorded habitual, recorded guided and theoretical optimal, are utilized for analysis. The results indicate that different moving tracks do cause different loadings on joints.