Development of a Human Vibration Model Considering Muscles and Stiffness of Intervertebral Discs

Authors : Young Nam Jo, Moon Jeong Kang, Hong Hee Yoo

Abstract : Most human vibration models have been modeled as a multibody system consisting of some rigid bodies and springdampers. These models are developed for certain posture and conditions. So, the models cannot be used in vibration analysis in various posture and conditions. The purpose of this study is to develop a human vibration model that represent human vibration characteristics under various conditions by employing a musculoskeletal model. To do this, the human vibration model is developed based on biomechanical models. In addition, muscle models are employed instead of spring-dampers. Activations of muscles are controlled by PD controller to maintain body posture under vertical vibration is applied. Each gain value of the controller is obtained to minimize the difference of apparent mass and acceleration transmissibility between experim ent and analysis by using an optimization method.

Keywords : human vibration analysis, hill type muscle model, PD control, whole-body vibration

Conference Title : ICCB 2015 : International Conference on Computational Biomechanics

Conference Location : Paris, France

Conference Dates : November 19-20, 2015