



The Modeling of Trunk for Simplified Human Body Dynamics on a Vehicle

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Abstract. With the spread of autonomous vehicles, drivers that used to drive actively the automobile become passive passengers. Thus, in order to maintain passenger comfort, consideration of human motion is required. In order to develop autonomous technology, verification experiment is required. However, experiment with actual vehicle lead to high developing cost. For this reason, consideration of human motion via numerical simulation is proposed. The model, which is able to analyze the motion involving both active and passive motion, is proposed. In previous research, compared with the dummy model used to simulate the experimental model, the human body dynamic model can simulate the actual human motion control more precisely. In addition, the usefulness of human body dynamics model on acceleration of vehicle can be confirmed. Human body dynamics model is composed of three-link rigid model. This model is able to simulate actual human motion of head and spine. However, it is unable to simulate lumbar motion in sagittal plane with high accuracy. Therefore, in order to simulate the lumbar motion with high accuracy, this research aims to propose four-link rigid model, which the lumbar section is divided into two rigid bodies. Four-link rigid model is compared with conventional three rigid body model.

Keywords: Biomechanics, Human Motion, Numerical Simulation, Multibody Dynamics