車輛行駛狀態下坐姿人體之動態反應分析
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ABSTRACT

Recent years, automobile researchers have become more concerned about vehicle vibration and are seeking more comfortable environments for occupants. Therefore, improving and equipping new devices entail high cost and large amounts of time. Therefore, it is necessary to save the cost and time of product development by using numerical simulation. In addition, studies of effects of vibration on seated human subjects have become commodious and popular. In this study, the main purpose is to concentrate on analyzing thoroughly the biodynamic response of the seated human body in driving conditions, including five primary objectives. The first is to provide an analytical study on two kinds of biomechanical human model: lumped-parameter and multi-body model. Analyzed results show that the multi-body model has good performances for purpose of this study. The second is to introduce and to analyze systematically two kinds of vehicle suspension systems: full-car and half-car models on two different road surfaces. For reality, full-car model is recommended for analyzing the generated dynamic responses due to road unevenness. The third objective focuses on the integrated human-vehicle model and riding evaluation of seated human in driving conditions. The last one is to analyze the deep effects of contributing factors on biodynamics of seated human subjects such as location of driver/passengers, velocity and acceleration of vehicle, mechanical properties of seat (hip cushion, backrest support, and seat structure), sitting postures, and headrest support. This study presented in this study would provide a profound understanding of biodynamic responses of seated human subject and it may offer vehicle engineers a good reference in designing vehicle suspension systems.

關鍵詞 : 生物力學,全車模型,半車模型,人體座姿

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