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A Finite Element Model of the Human Buttocks for Prediction of Seat Pressure Distributions

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Abstract:

Seating comfort is becoming increasingly important for the automotive industry. Car manufacturers use seating comfort to distinguish their products from those of competitors. However, the development and design of a new, more comfortable seat is time consuming and costly. The introduction of computer models of human and seat will accelerate this process. The contact interaction between human and seat is an important factor in the comfort sensation of subjects. This paper presents a finite element (FE) model of the human buttocks, able to predict the pressure distribution between human and seating surface by its detailed and realistic geometric description. A validation study based on volunteer experiments shows reasonable correlation in pressure distributions between the buttocks model and the volunteers. Both for simulations on a rigid and a soft cushion, the model predicts realistic seat pressure distributions. A parameter study shows that a pressure distribution at the interface between human and seat strongly depends on variations in human flesh and seat cushion properties.

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