Modeling Analysis and Optimization of the Unlocking Travel of the Car Door Outer Handle㊀

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Abstract: The outer handle of the door in the car is an important part of man-machine interaction. The unlocking process directly affects the customer experience, which in turn affects the reputation and positioning of the production. This paper analyzes and optimizes the spatial arrangement and structural parameters of the internal components of the system that affect the unlocking stroke of the outer door handle. Using the mathematical model of the outward opening movement, taking the lock body, the exterior door handle, and the door lock outward opening lever as the research objects, the movement process model of the side door lock system in the process of opening the door with the outer handle is established. With the analysis of the model, the main factors affecting the unlocking stroke of the outer handle are determined. At the same time, with the 1/2 implementation of the four-factor and five-level secondary rotation center combination analysis method was adopted. Through the optimization analysis of the evaluation indicators such as the exterior door handle unlocking stroke ratio and the handle limit stroke, the optimized outer handle unlocking stroke ratio was finally obtained as 0.67, and the remaining stroke of the lock body is greater than 0.5mm, which meets the requirements of the design specification and provides a reference for the design and development of future automotive products.

Key words: space arrangement, side door lock, outer handle, unlocking stoke ratio

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