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Pressing Mechanism Design and Performance Analysis for Brake Pedal System at Low-Speed Driving
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Abstract

This article focuses on the modelling and analysis of an automatic braking mechanism for low-speed driving scenarios. The study aims to replicate the force exerted by a driver on the brake and accelerator pedals by strategically placing the suitable actuator within the pedal subsystem assembly. The primary objective is to model the pedal pressing mechanism for the braking subsystem and gain insights into driver 's behaviour during traffic congestion, thereby ensuring the effective operation of the automatic braking system. The actuator was modelled using 3D virtual environment, while the car body or dynamics was modelled using SimScape in MATLAB environment, and the simulation performance analysis was employed to evaluate the performance outcomes. It has shown that the mechanism designed mimics the actual manual pedal pressing mechanism of driver's leg where the results show that the actuator managed to produce 150 N to reach speed at 8.5 km/h at 48 mm linear actuator stroke. Therefore, the research findings are anticipated to contribute significantly to the advancement of automatic braking systems, particularly during low speed in road traffic delay, which may help in reducing the fatigue among drivers, enhancing vehicle safety, and providing valuable insights for the development of more reliable and efficient systems within the automotive industry. © 2025, Semarak Ilmu Publishing. All rights reserved.

Author Keywords

Brake system; linear actuator; modelling and simulation; virtual 3D model

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