



Simulated Braking Performance Comparison of an Electric Drum Brake and a Hydraulic Drum Brake Systems

Kittirattanachai A¹, and Watechagit S^{1,*}

¹ Department of Mechanical Engineering, Faculty of Engineering, Mahidol University, Nakornpathom, 73170, Thailand

* Corresponding Author: sarawoot.wat@mahidol.ac.th

Abstract. The most important safety equipment for the operation of a vehicle is the brake equipment. This research attempts to development an all-electric braking system that can be used in an electric vehicle. Since the drum brake requires lower actuation input than the disk brake in order to deliver the same amount of braking force. It seems logical to be used in the electric vehicle as far as minimizing the energy usage is concerned. The proposed electric drum brake system conceptually is not new as it has been used as a trailer brake for a tractor-trailer vehicle. Adopting the trailer brake for a passenger vehicle requires proper downsizing and different braking control scheme. This paper presents the modelling and simulation results of the proposed electric drum brake. The main interest is its braking performance which can be investigated by the brake force profile or the brake force characteristic. The results are compared to the braking performance of the conventional hydraulic drum brake system which is validated using data from literatures. The simulation results show that the braking force of electric drum brake system is two times higher than that is of the hydraulic drum brake system subjected to same actuation force. The results from this paper will be valuable to the development of the controller in the future.

Keywords: Electromagnetic trailer brake, Electric drum brake, Brake performance, Braking force and Mathematic models.