**AIN SAHMS UNIVERSITY**
**FACULTY OF ENGINEERING**
**Senior2 Mechatronics Engineering program**
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# MCT445 – Mechatronics in Automotive Application
# Lab (7)



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## Introduction

Electronic Brakeforce Distribution (EBD) is an advanced braking technology that dynamically adjusts the distribution of brake force between the front and rear wheels to optimize stopping performance and vehicle stability. Under braking, weight shifts toward the front axle, reducing the normal force—and hence traction—on the rear wheels. EBD compensates for this by reducing rear brake force and maximizing front braking efficiency.

In contrast to conventional braking systems that apply a fixed brake force ratio (e.g., 60:40), EBD responds in real time to vehicle load, speed, and wheel slip conditions. This helps prevent rear-wheel lockup, maintain optimal tire-road friction (typically near a wheel slip ratio of 0.2), and reduce stopping distance. In this experiment, EBD is implemented and compared against a fixed ratio braking system to evaluate its effectiveness in improving braking performance and safety.

# Model

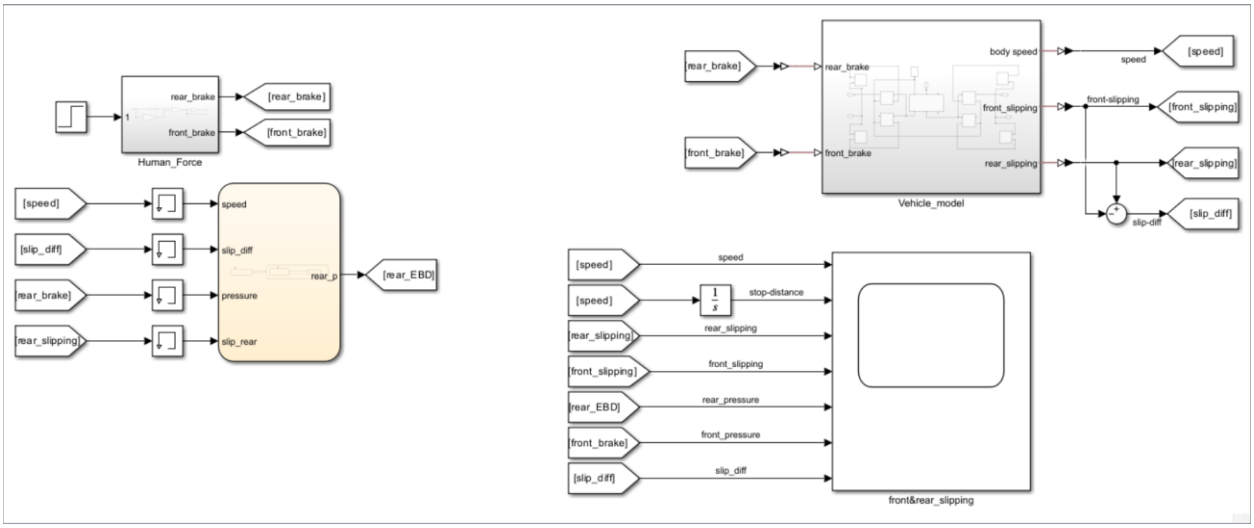


*Figure 1-overview model*

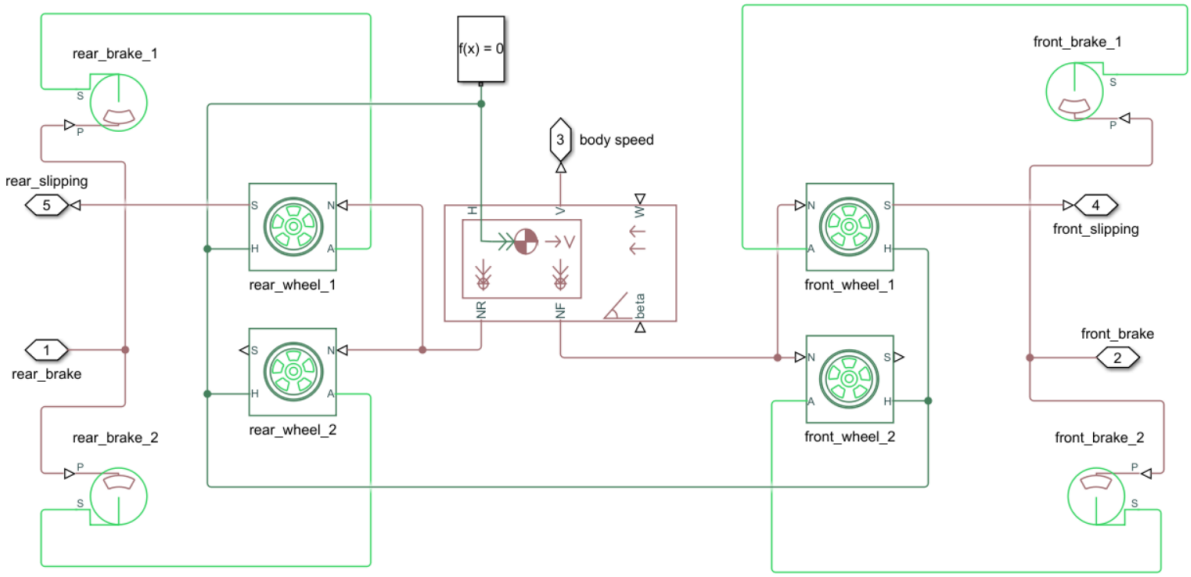


*Figure 2-vehicle model*

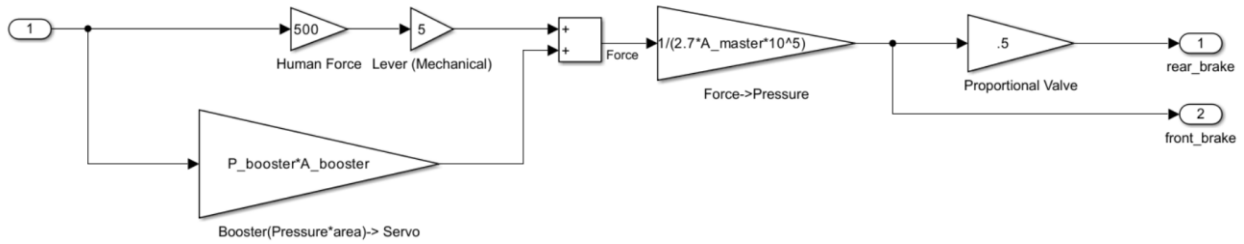


*Figure 3-brake force*

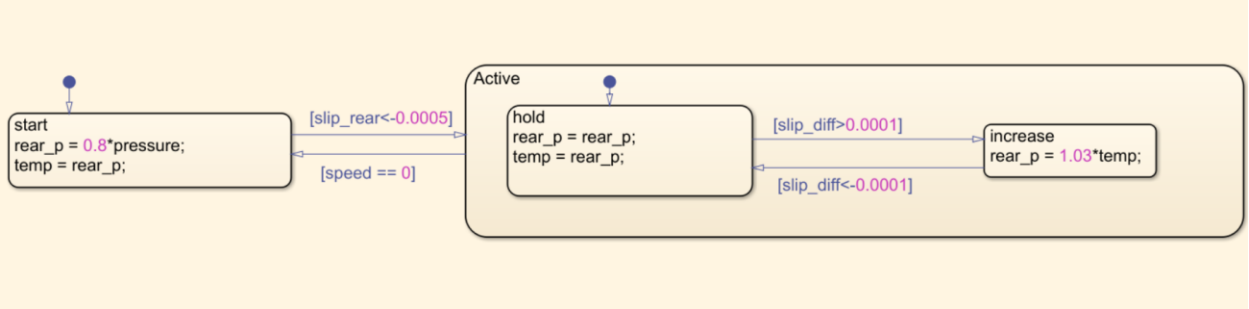


*Figure 4-stateflow chart*

# Parameters

Rear slip threshold = -0.0005
Slip diff threshold = 0.0001
Rear pressure increment = 1.03

# Results

Direct driver force brake:

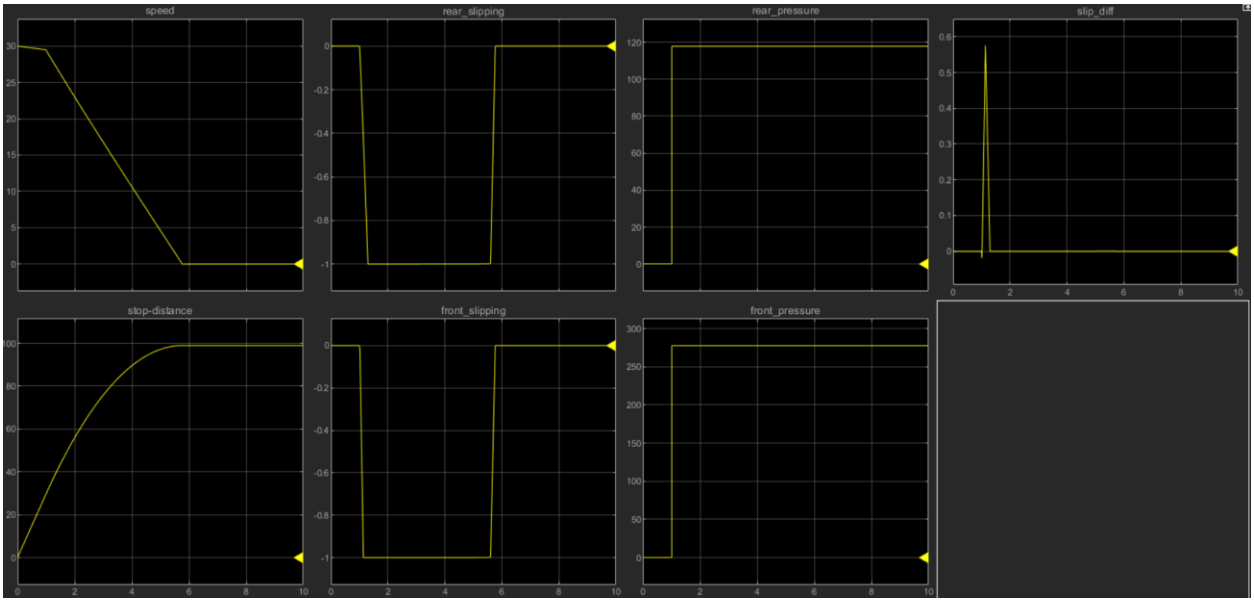


*Figure 5-direct driver force brake results*

Stop dist = 100m

EBD force brake

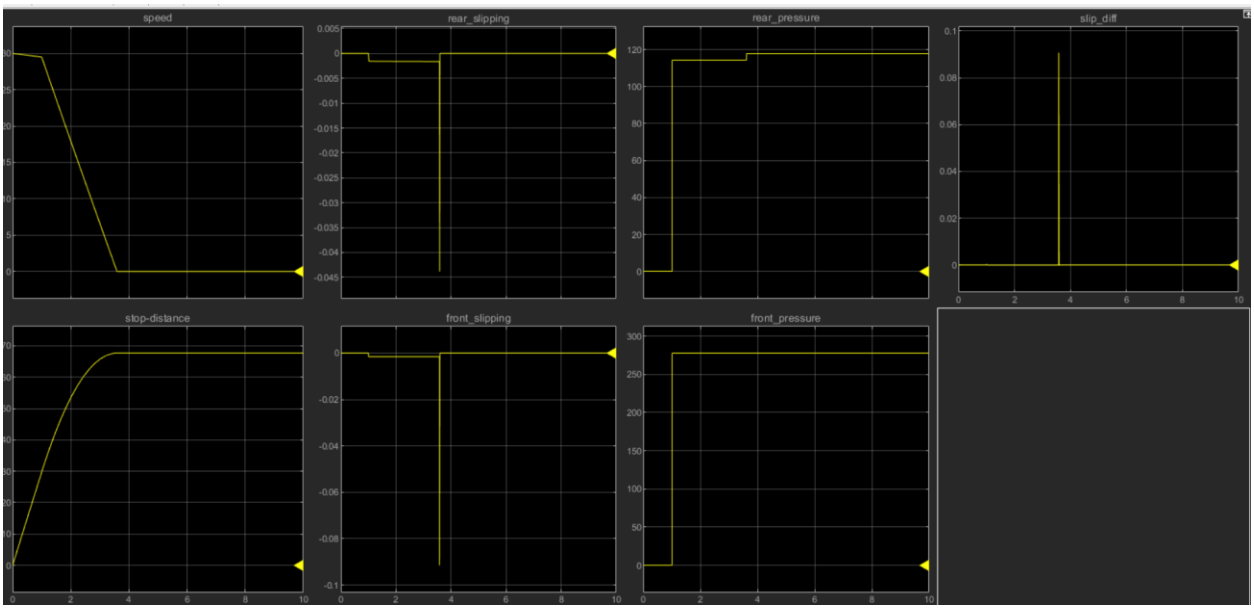


*Figure 6-EBD force brake results*

Stop dist = 67m

## Model link

https://github.com/hossam-selem/Automotive/tree/main/lab7-EBD