



**Michigan
Technological
University**

MEEM 5812: Automotive Control Systems

Spring, 2023

Project – 5 Rule Based Antilock Brakes

**By
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1. Plots showing your controller's performance. The plot generated by the simulation with the three subplots is what I want here. Note that you should generate 2 plots (one for each road condition) for each of the 3 controllers (a total of 6 plots).

Ans. The plots showing controller's performance are as follows:

I. Dry Surface Controller:

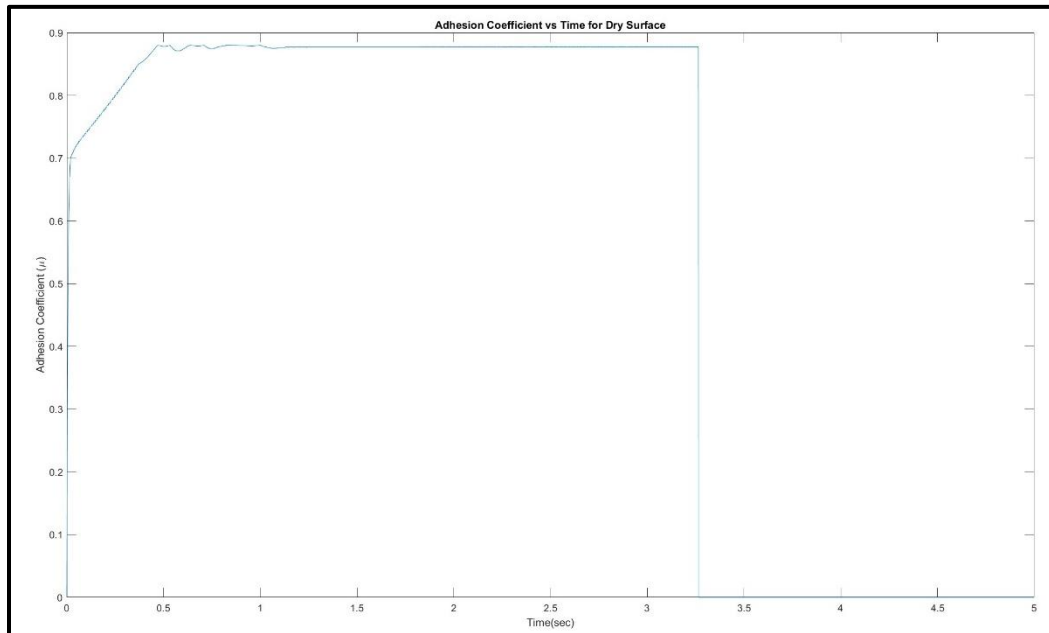


Figure 1: Adhesion Coefficient vs Time plot for Dry Surface

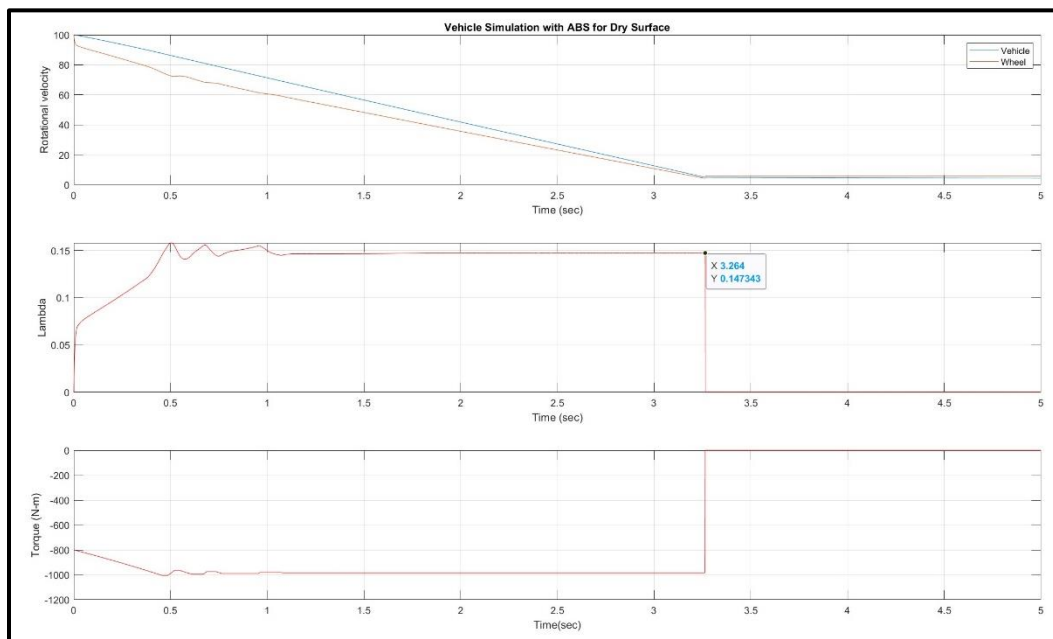


Figure 2: Vehicle Simulation with ABS for Dry Surface

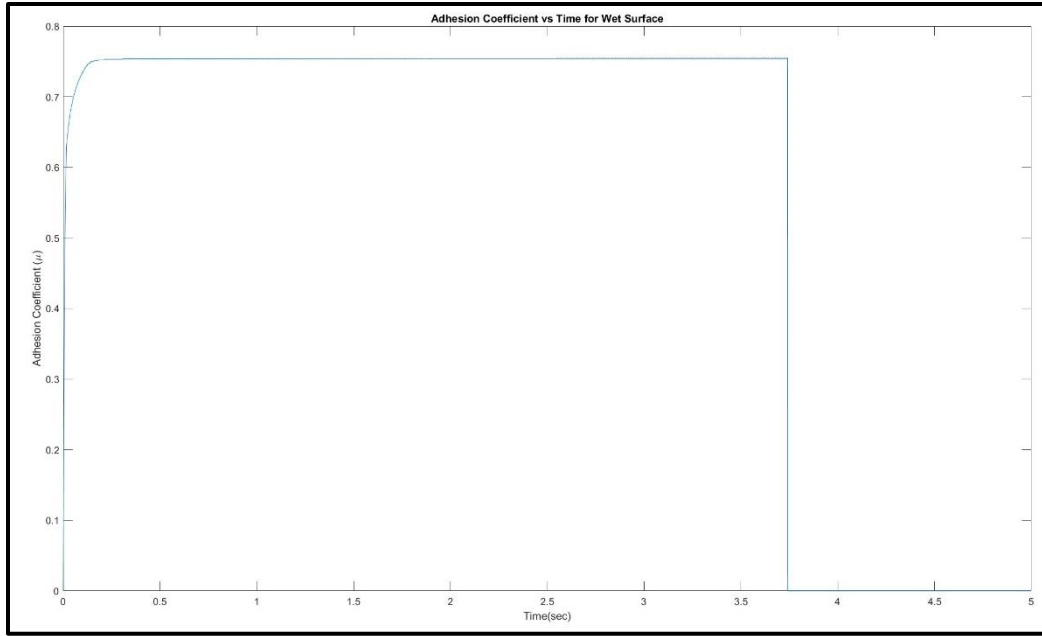


Figure 3: Adhesion Coefficient vs Time plot for Wet Surface

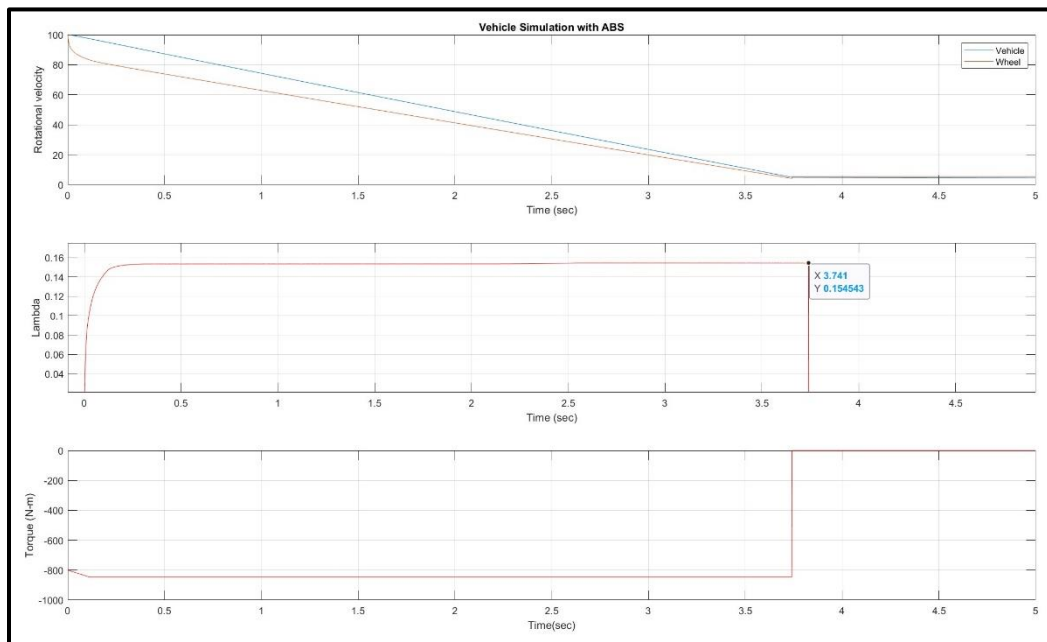


Figure 4: Vehicle Simulation with ABS for Wet Surface

II. Wet Surface Controller:

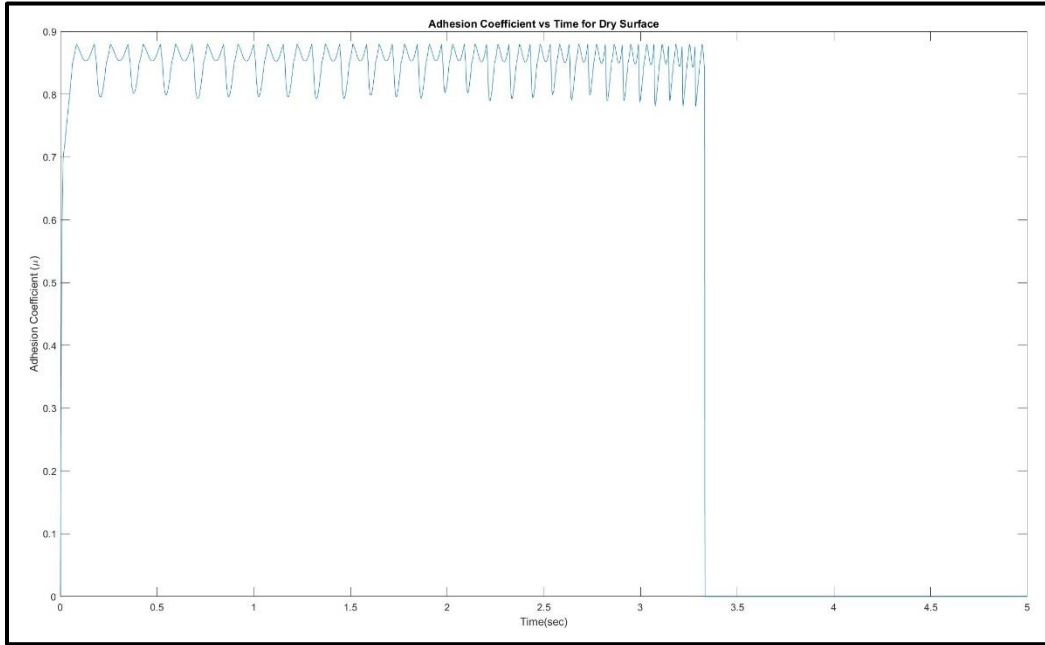


Figure 5: Adhesion Coefficient vs Time plot for Dry Surface

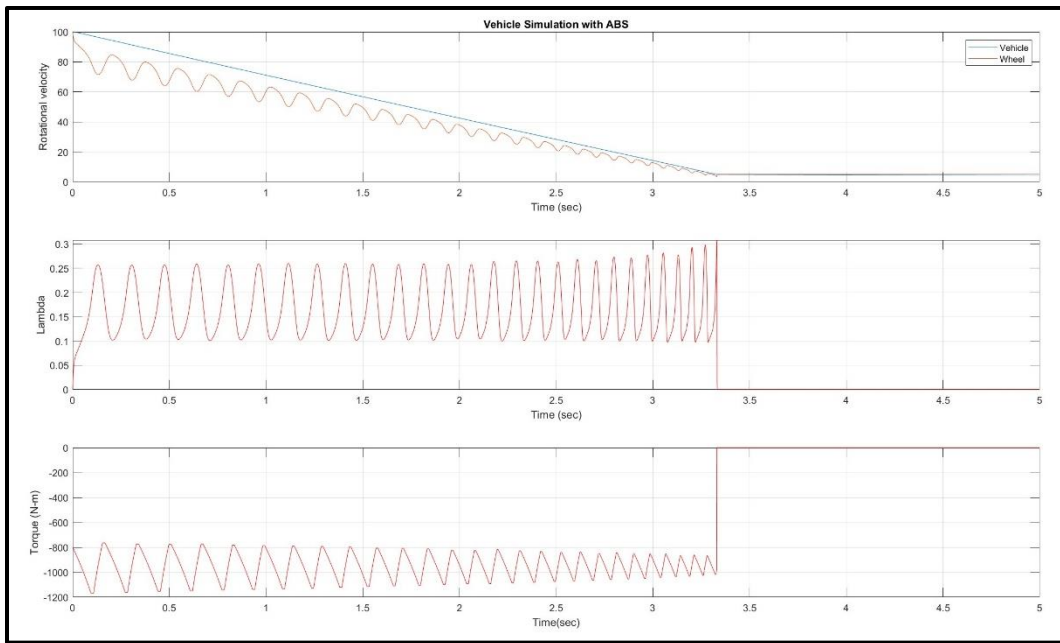


Figure 6: Vehicle Simulation with ABS for Dry Surface

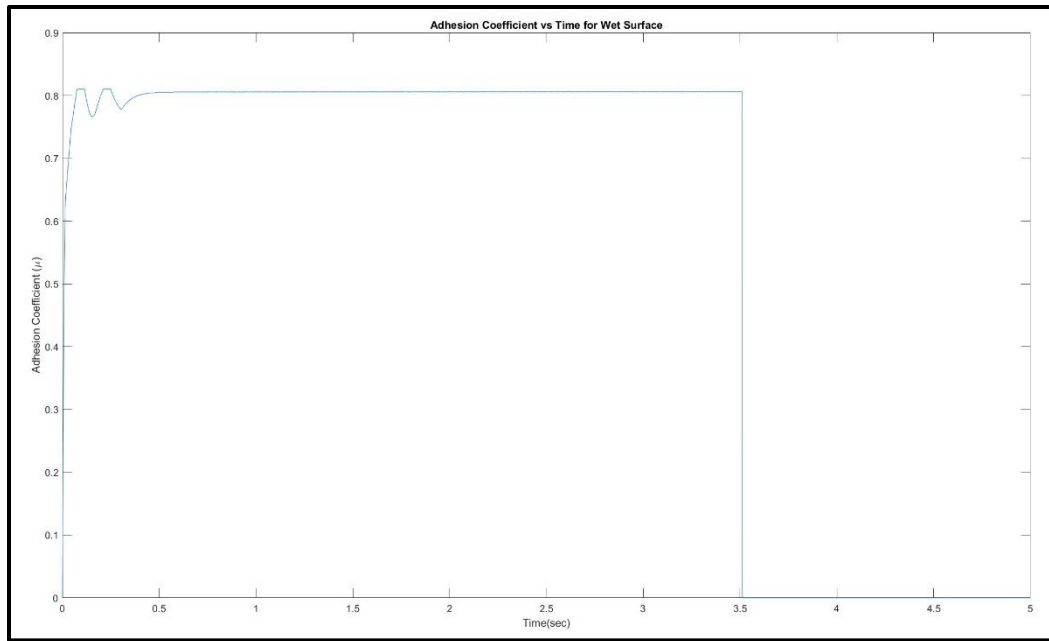


Figure 7: Adhesion Coefficient vs Time plot for Wet Surface

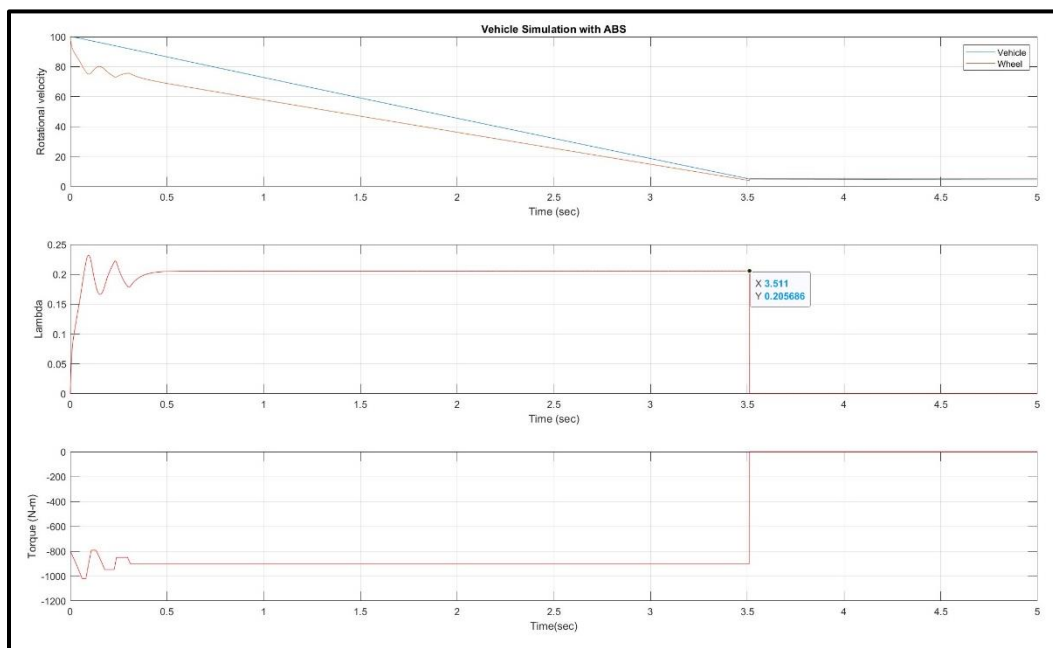


Figure 8: Vehicle Simulation with ABS for Wet Surface

III. Combined Controller:

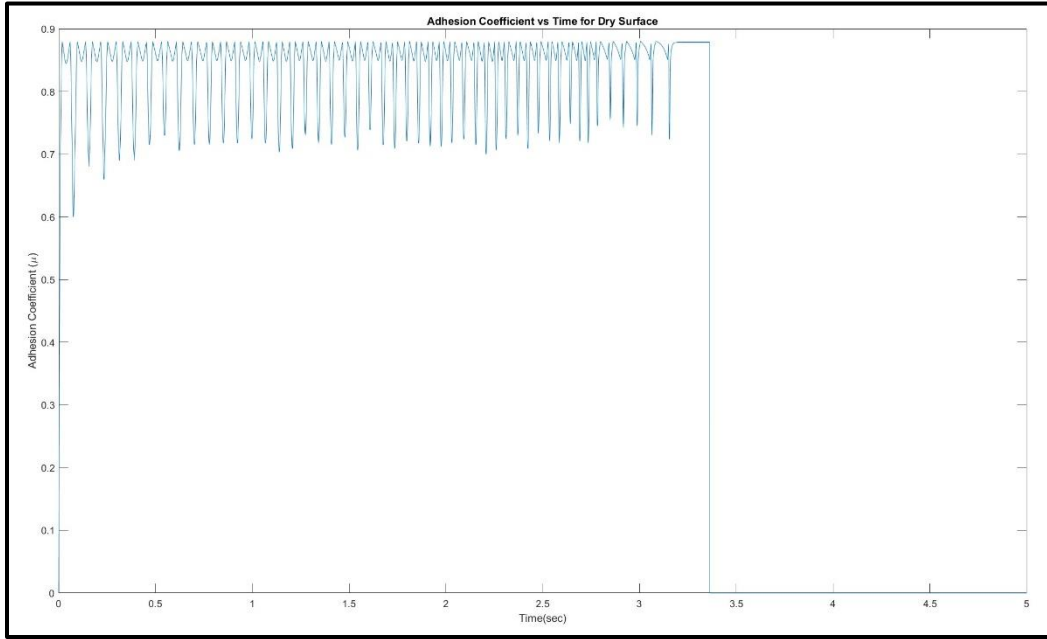


Figure 9: Adhesion Coefficient vs Time plot for Dry Surface

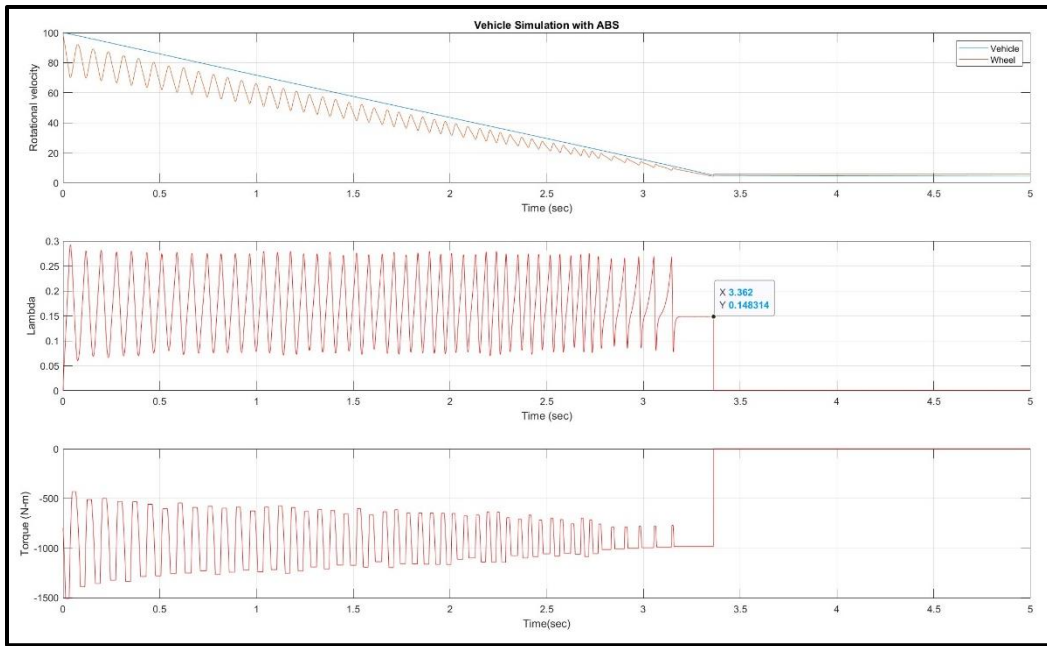


Figure 10: Vehicle Simulation with ABS for Dry Surface

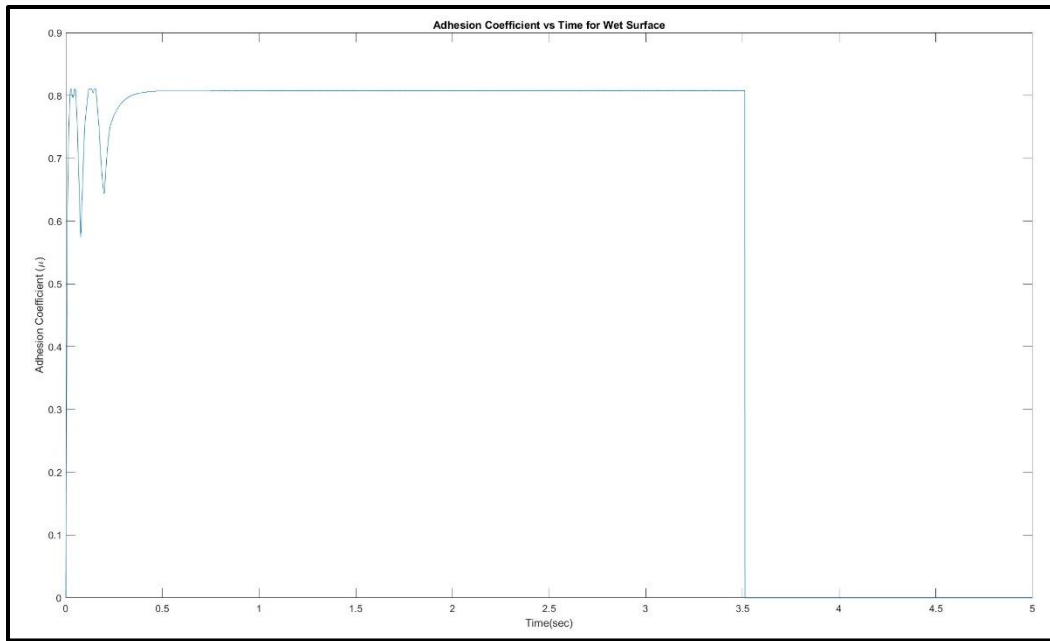


Figure 11: Adhesion Coefficient vs Time plot for Wet Surface

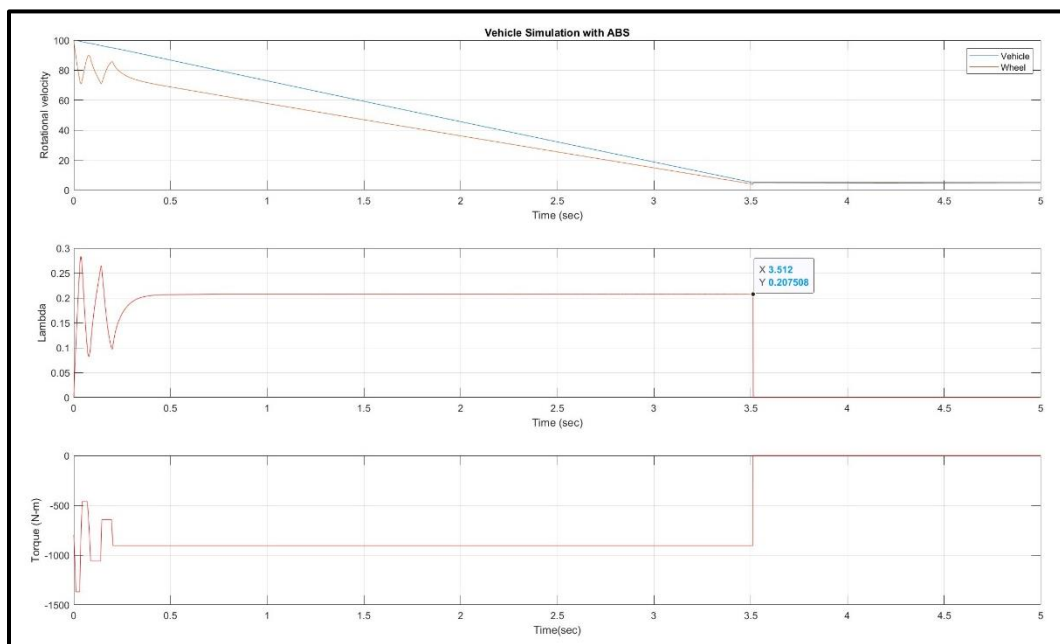


Figure 12: Vehicle Simulation with ABS for Wet Surface

2. One page showing the stopping times for the 6 cases.

Ans. The stopping times for the 6 cases are as follows:

1. Dry surface controller for dry surface: 3.264 sec
2. Dry surface controller for wet surface: 3.741 sec
3. Wet surface controller for dry surface: 3.331 sec
4. Wet surface controller for wet surface: 3.511 sec
5. Combo controller for dry surface: 3.362 sec
6. Combo controller for wet surface: 3.512 sec