ANTI-LOCK BRAKING SYSTEM

SIMULINK MODELLING

1. Command Window Inputs:

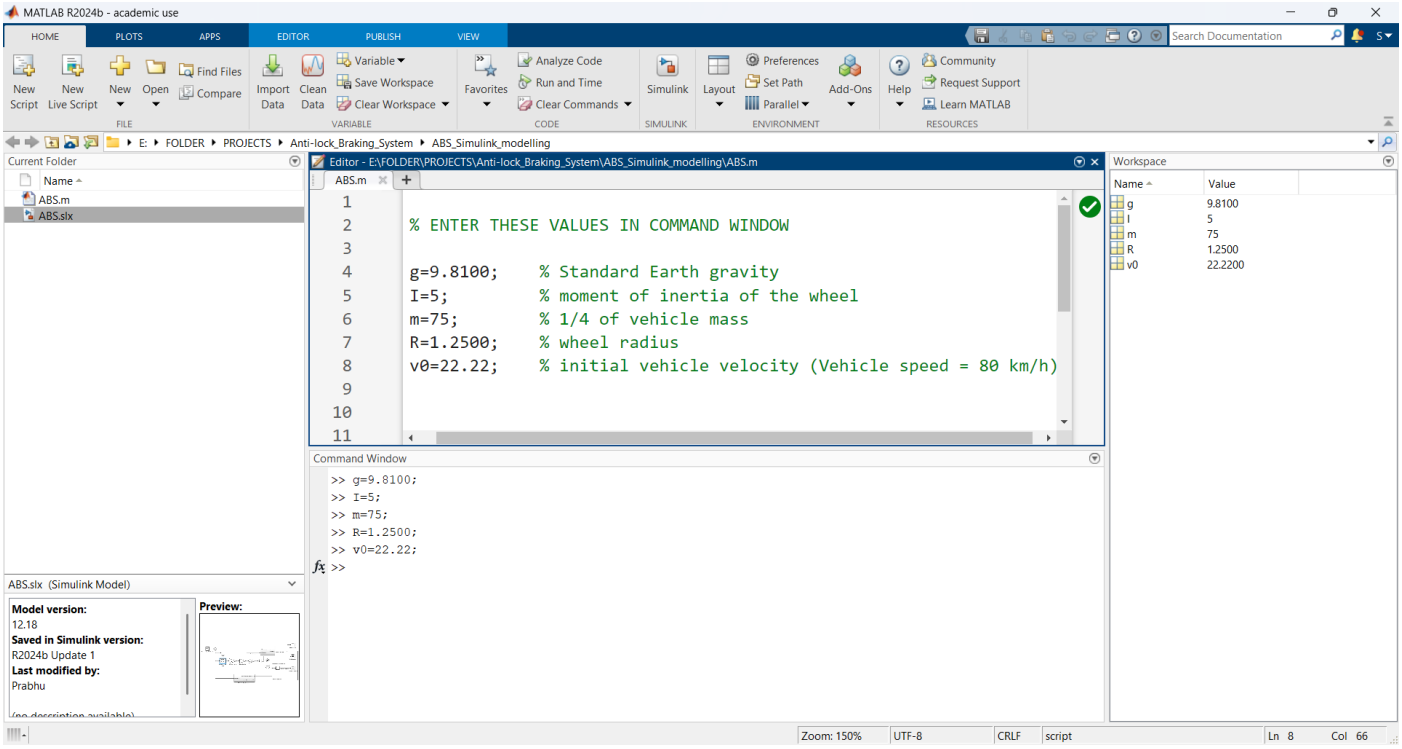

FIG.1.1: User Entered Input values (MATLAB Command Window)

2. ABS Simulink System Model:

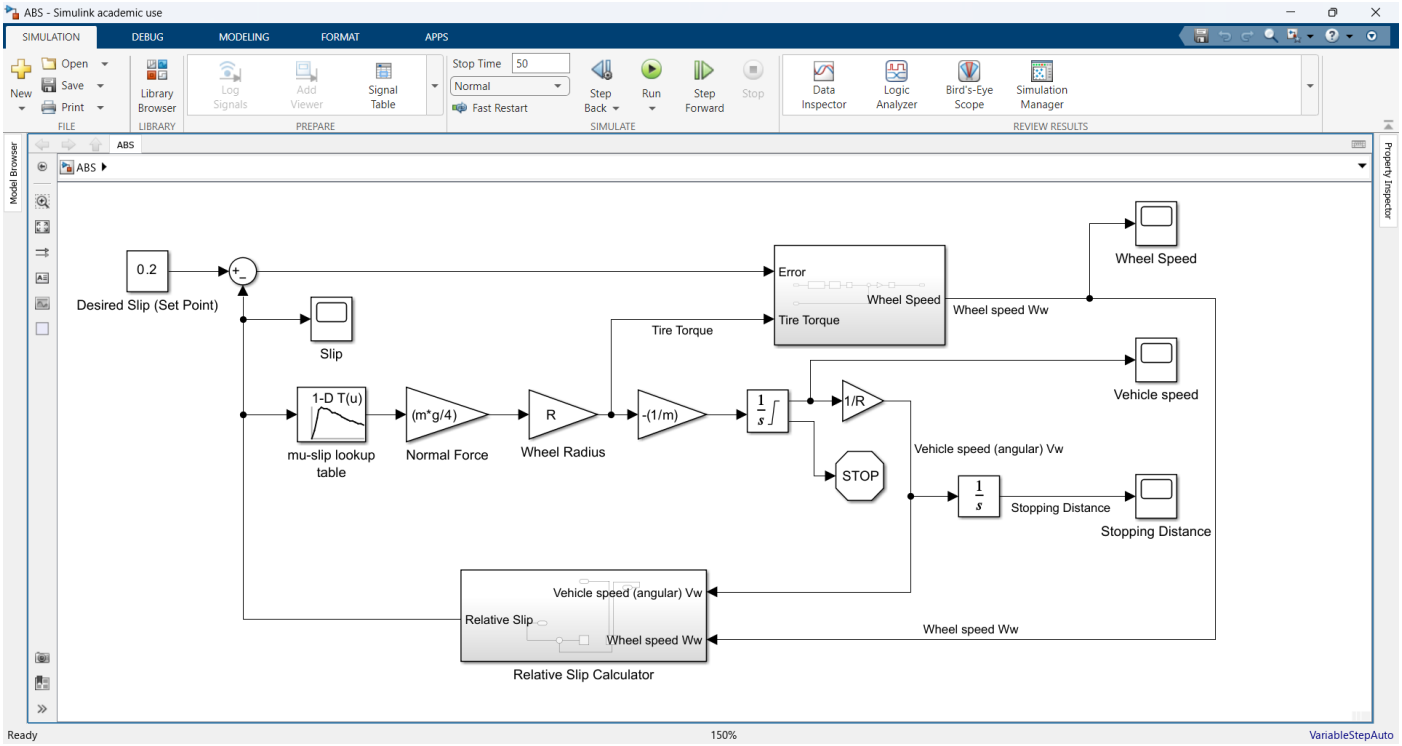

FIG1.2: Shows the complete ABS Simulink architecture including wheel dynamics, vehicle dynamics, slip calculation, and friction modeling.

3. Wheel Speed Response:

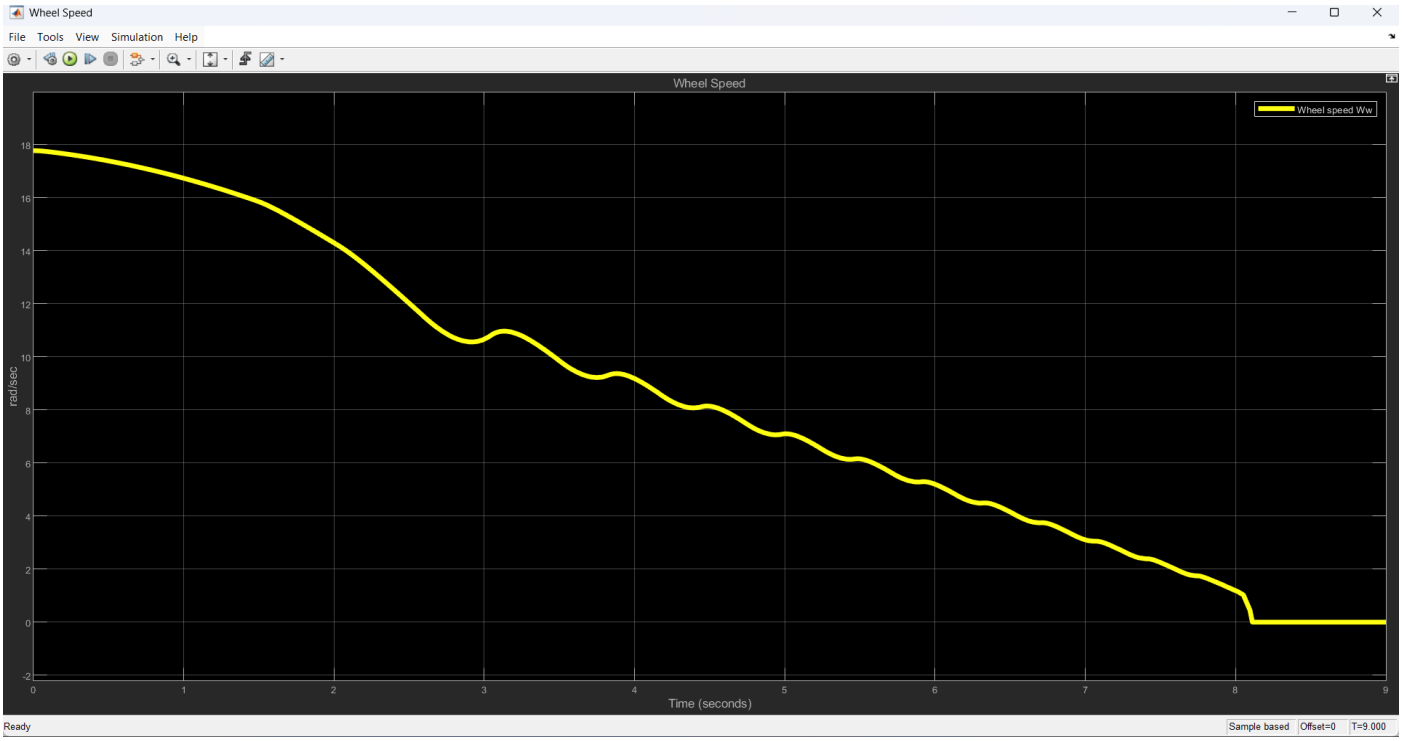

FIG1.3: Illustrates oscillatory wheel speed caused by ABS modulation, gradually decreasing to zero while preventing wheel lock.

4. Vehicle Speed Response:

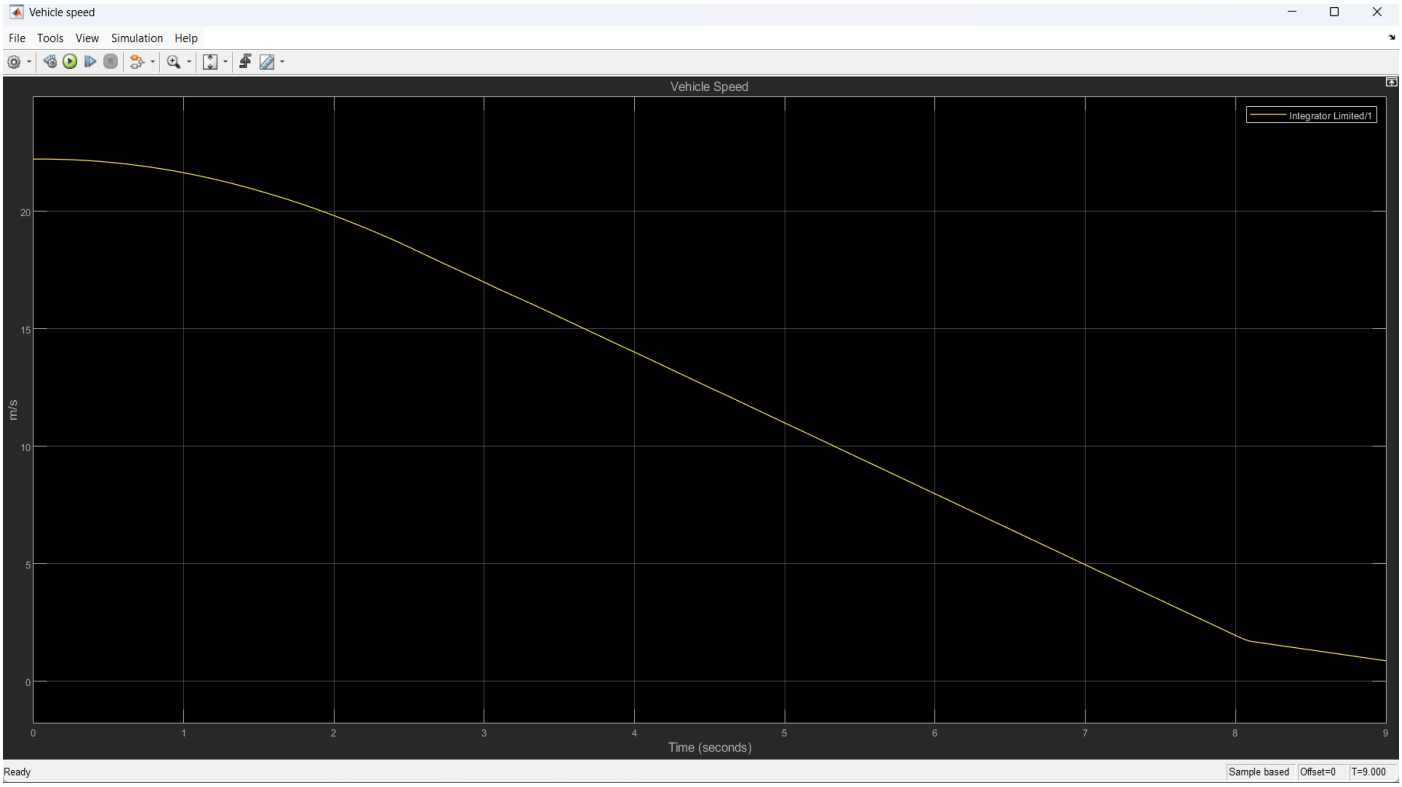

FIG1.4: Represents smooth nonlinear reduction of vehicle speed from initial velocity to zero within the estimated stopping time.

5. Stopping Distance Profile:

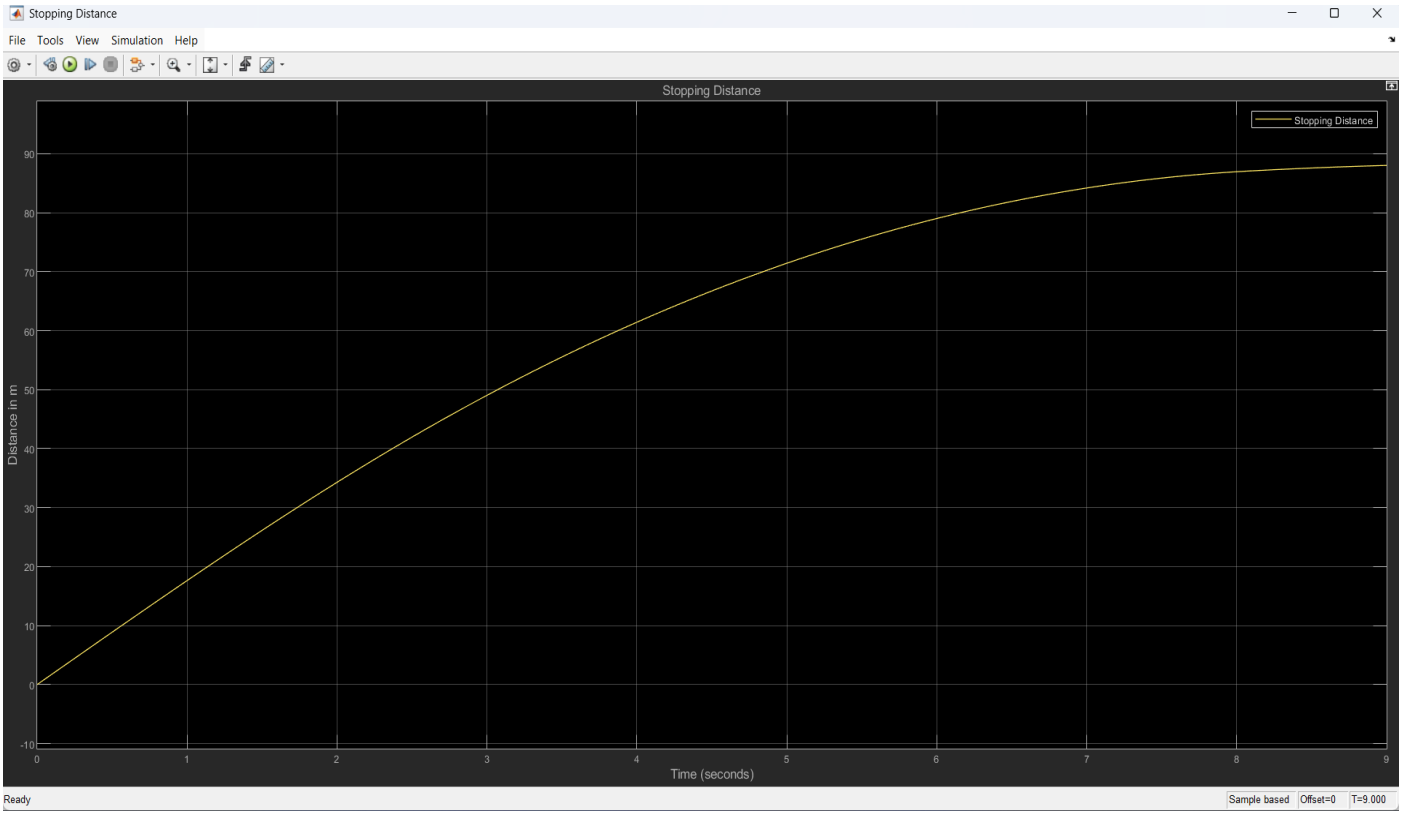

FIG1.5: Shows cumulative stopping distance obtained by integrating vehicle speed over time during braking.

6. Slip Ratio:

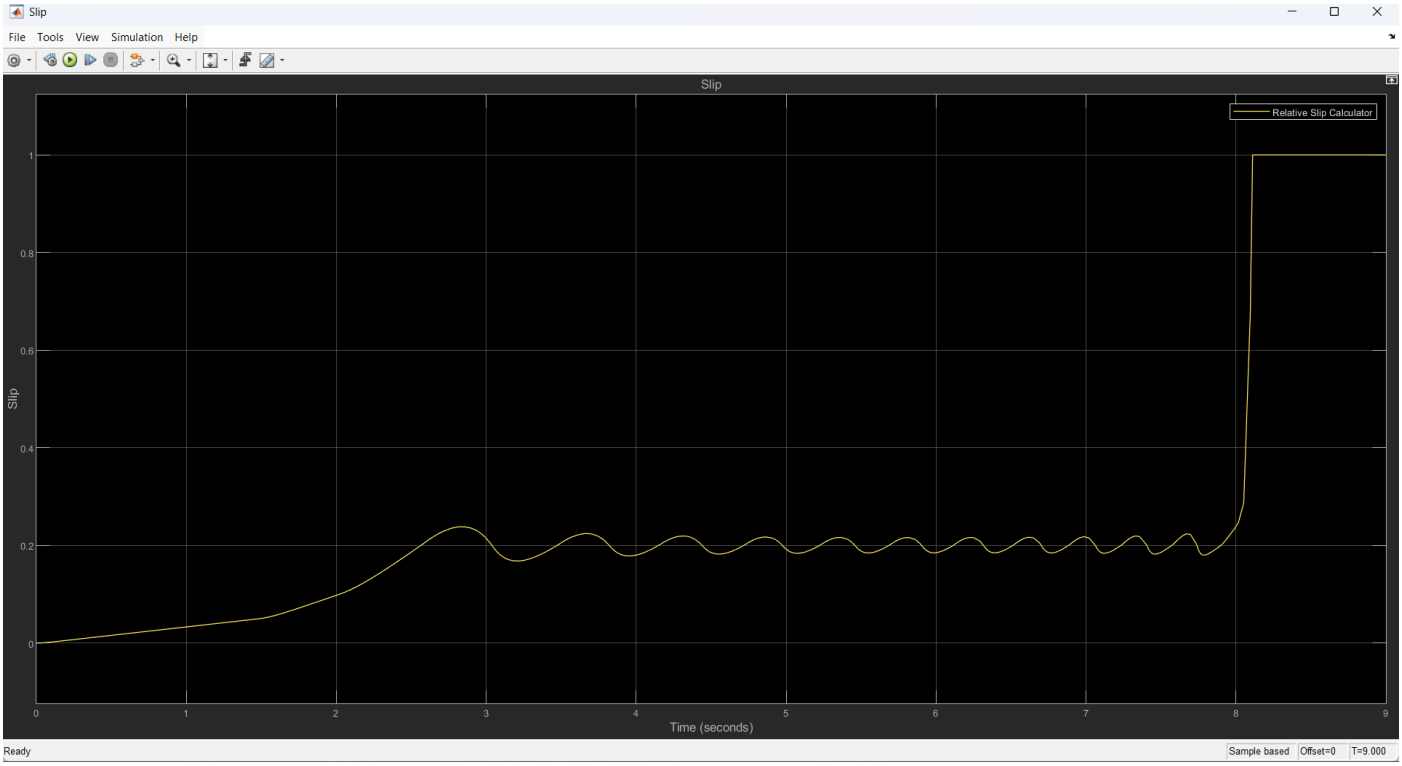

FIG1.6: Demonstrates how ABS maintains wheel slip around the optimal range to maximize tire-road friction and ensure vehicle stability.