

Powertrain Simulation Plots

Included here are simulation plots generated using the powertrain model for three different scenarios:

In all scenarios, car is moving on a road with constant grade with the throttle at a constant position

Scenario 1 : $\text{tps} = 10\%$, $\text{grade} = 0$

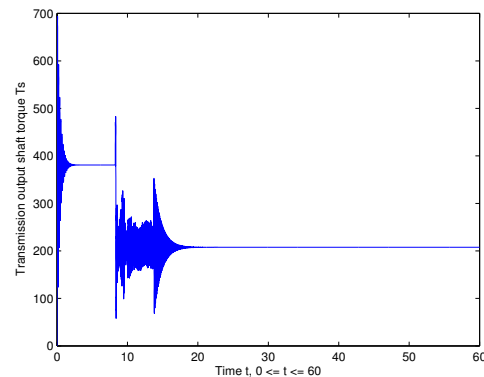
Scenario 2 : $\text{tps} = 50\%$, $\text{grade} = 0.1$ radians

Scenario 3 : $\text{tps} = 80\%$, $\text{grade} = 0.2$ radians

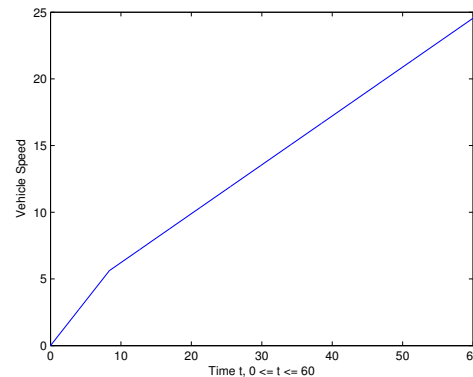
The last scenario is simulated twice: once with step size 0.001s , and then with step size 0.0005s . The first two scenarios are simulated with step size 0.001s .

Powertrain Simulation Plots: $\text{tps}=10\%$, $\text{grade}=0$

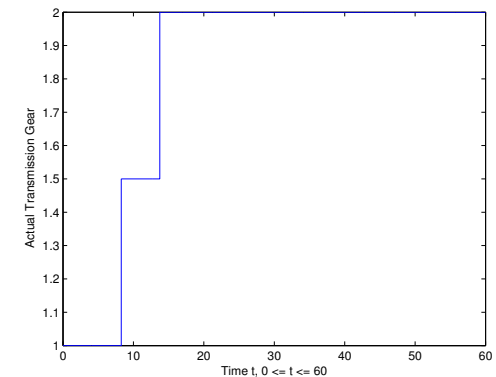
Transmission Torque



Vehicle Speed



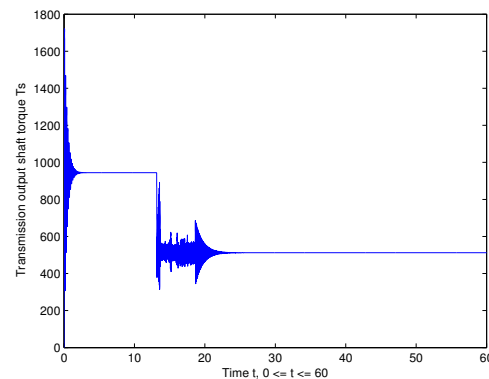
Gear



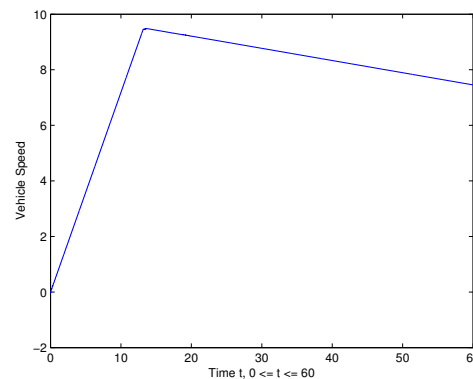
Gear change from 1st to 2nd at around 10s.

Powertrain Simulation Plots: tps=50%,grade=0.1

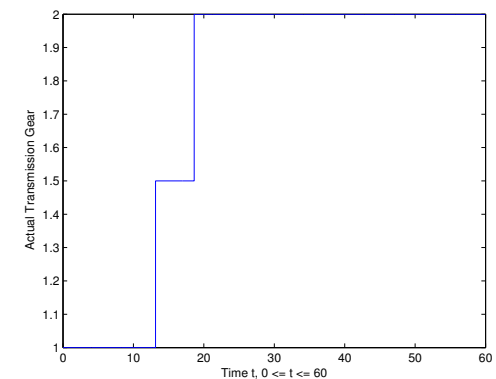
Transmission Torque



Vehicle Speed



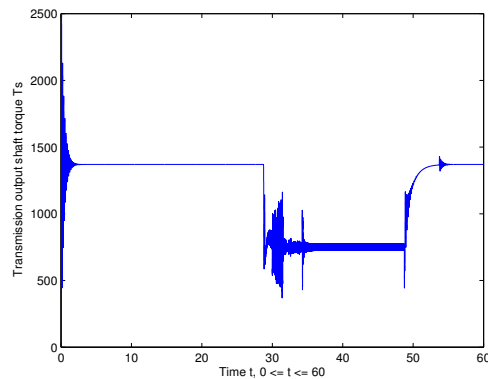
Gear



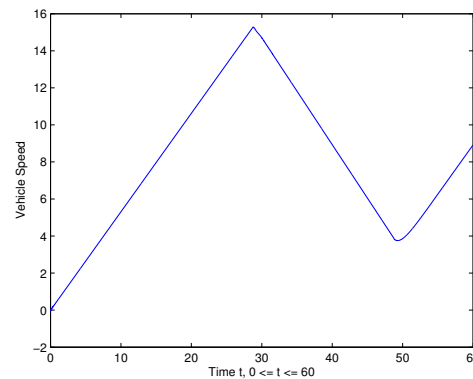
Gear change from 1st to 2nd at around 12s.

Powertrain Simulation Plots: $\text{tps}=80\%$, $\text{grade}=0.2$

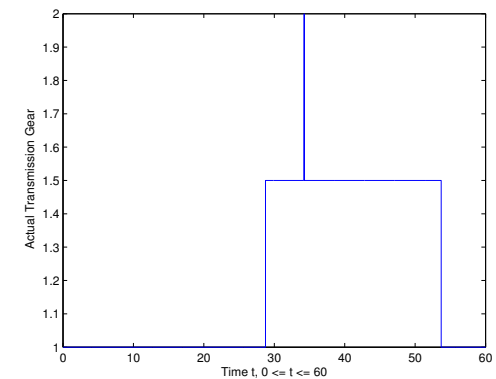
Transmission Torque



Vehicle Speed



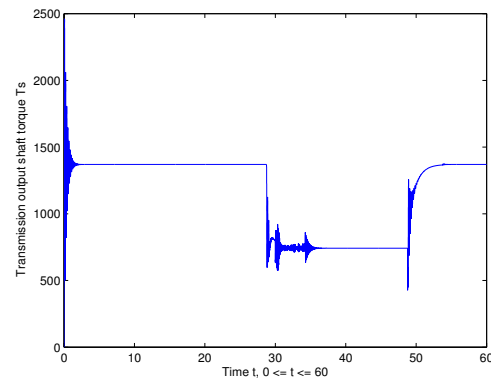
Gear



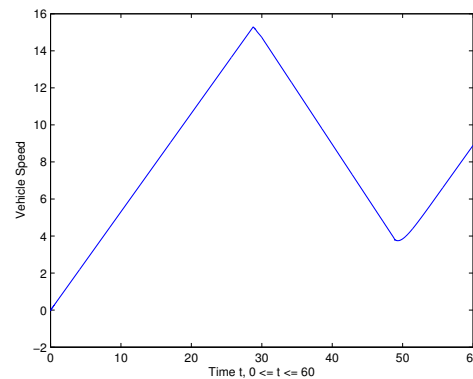
Gear change from 1st to 2nd at around 30s and an (incorrect) elongated back switch to 1st at 40–50s.

Powertrain Simulation Plots: $\text{tps}=80\%$, $\text{grade}=0.2$

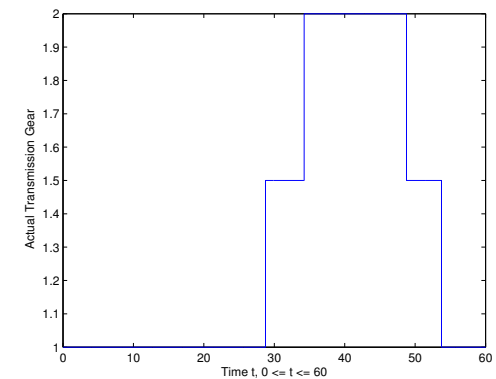
Transmission Torque



Vehicle Speed



Gear



Gear change from 1st to 2nd at around 30s and correctly switching back to 1st at 50+s.