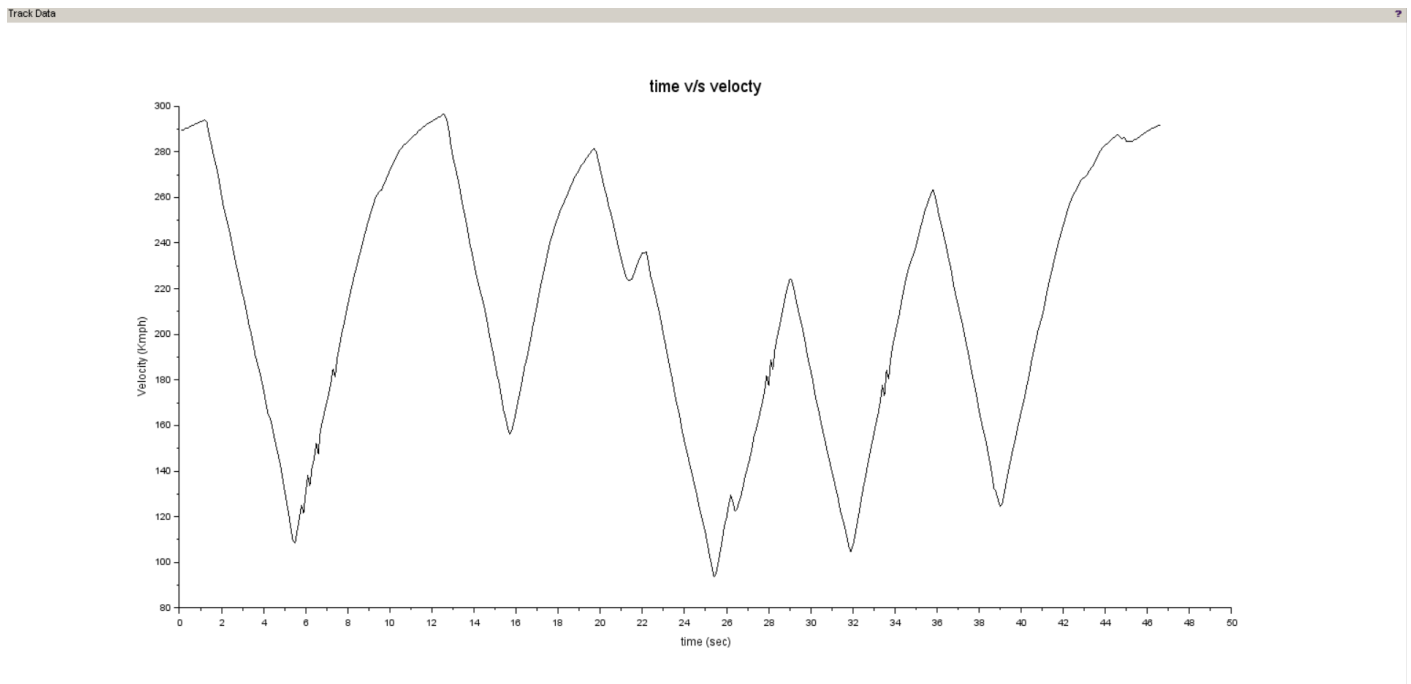


Course name	Numerical Modeling & Simulation in Scilab Xcos
Lesson name	Numerical Modelling Formula 1 Vehicle Resistive Forces in Scilab-Xcos
Lesson objective	Practice blocks & acquaint to use GUI of Scilab-Xcos
Created by	Nishchay N

Problem statement: Model the Formula 1 Vehicle Resistive Force in Scilab-Xcos to plot the vehicle resistive force.
 (Track 1)

Track Drive Cycle Graph:



Model Inputs:

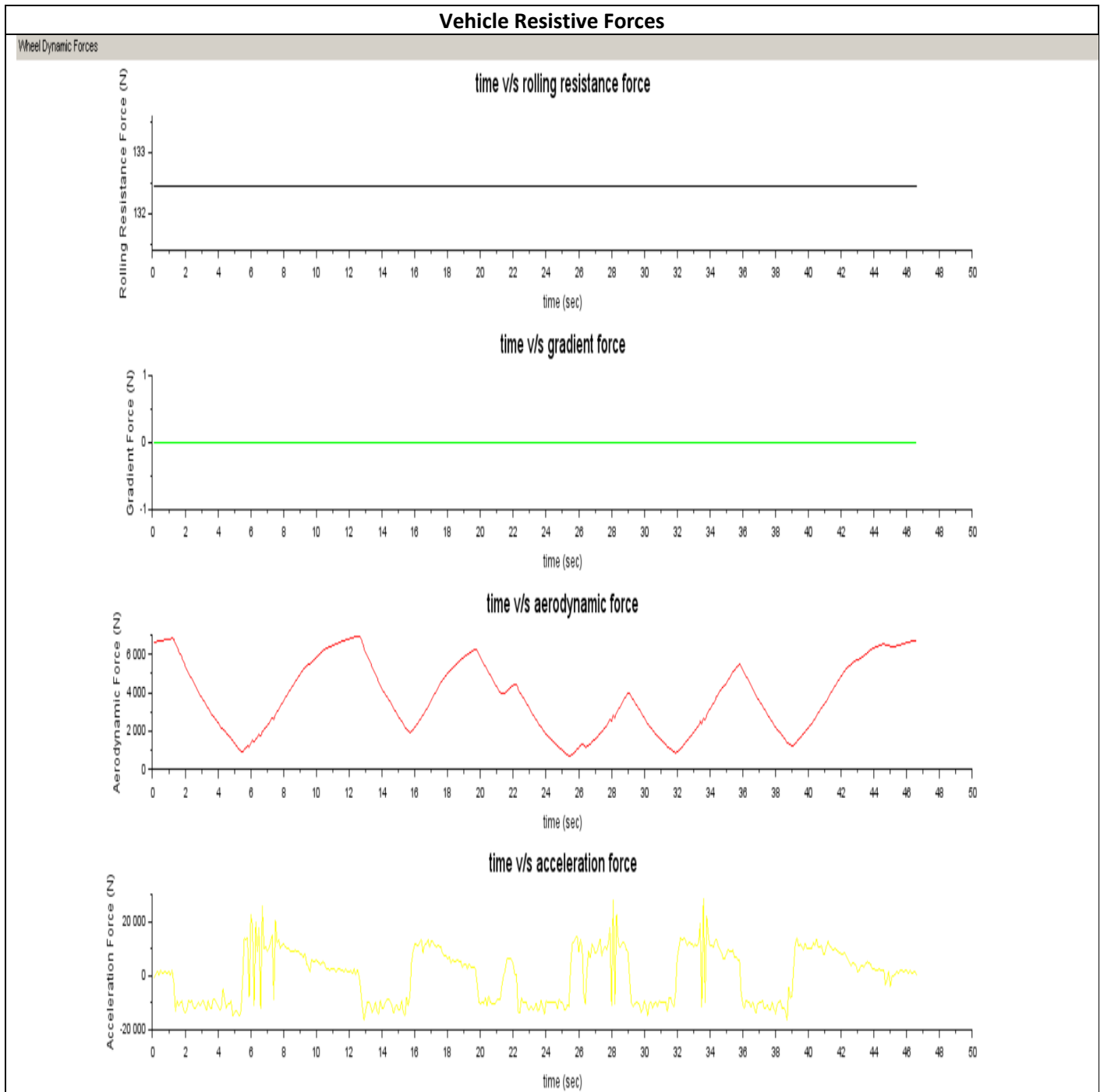
SI No	Parameter	Value	Units
1.	Chassis		
2.	I. Coefficient of rolling resistance	0.015	
3.	II. Gross Vehicle Mass	900	Kg
4.	III. Gravity constant	9.81	m/s
5.	IV. Grade Angle	0	degree
6.	V. Area	1.8585	m ²
7.	VI. Air Density	1.225	Kg/m ³
8.	VII. Drag Coefficient	0.9	
9.	VIII. Radius of wheel	0.2286	m

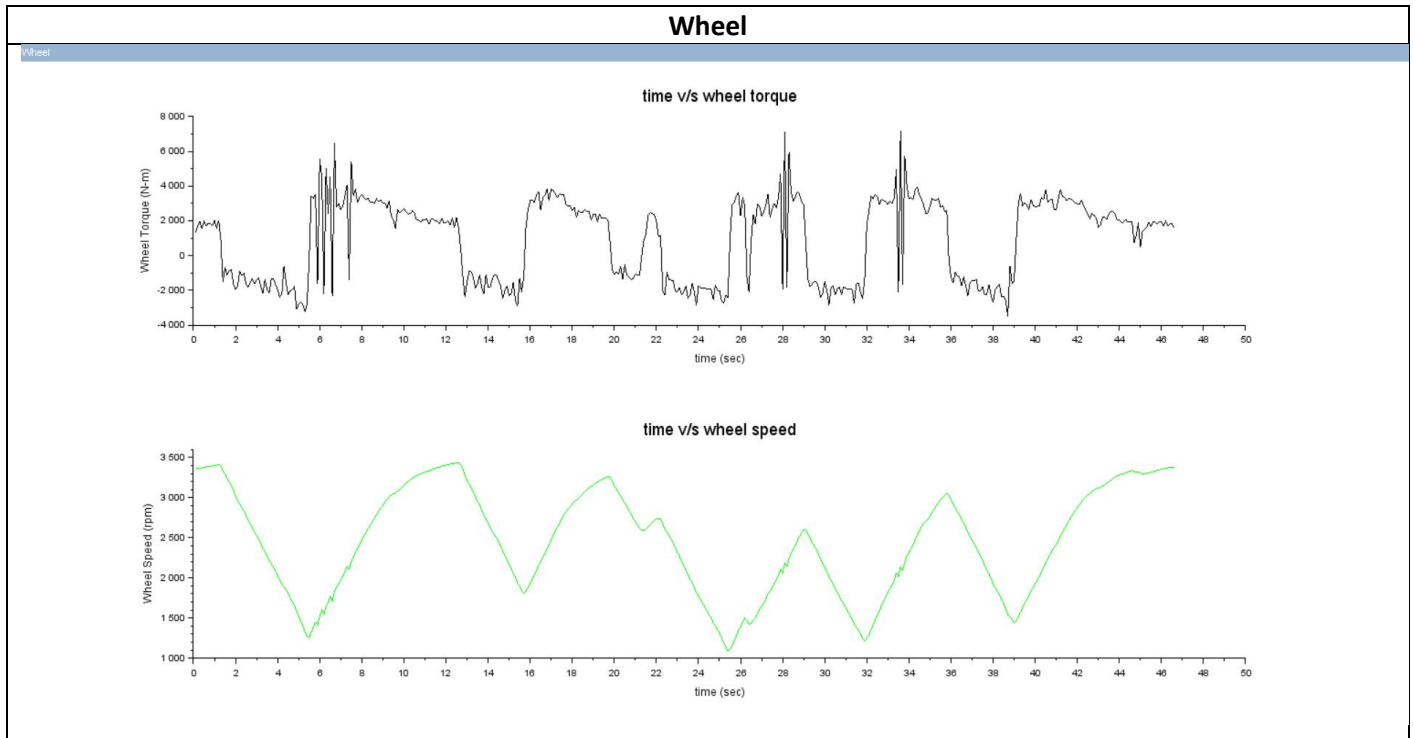
Program:

A. To Import Track Data:	B. To define all input parameters:
<pre>// Reading Imports for Track 1 // Form track 1 data = csvRead("track.csv"); Drive.time = data(3:470,1); Drive.values = data(3:470,2);</pre>	<pre>// Data required for Calculation of model Crf = 0.015 // coeff of rolling resistance GVM = 900 // Gross Vehicle Weight in Kg g = 9.81 // m/s A = 1.8585 // frontal area in m^2 rho = 1.225 // density of air in kg/m^3 Cd = 0.9 // Coefficient of Drag Rw = 0.2286 // radius of wheel in m</pre>



Results:





Conclusion:

Sl No	Parameters	Values	Units
1.	Chassis		
2.	• Rolling Force	132.435	N
3.	• Gradeability Force	0	N
4.	• Maximum Aerodynamic Force	6946	N
5.	• Maximum Acceleration Force	28625	N
6.	• Maximum Wheel Speed	3440	Rpm
7.	• Maximum Wheel Torque	7120	Nm