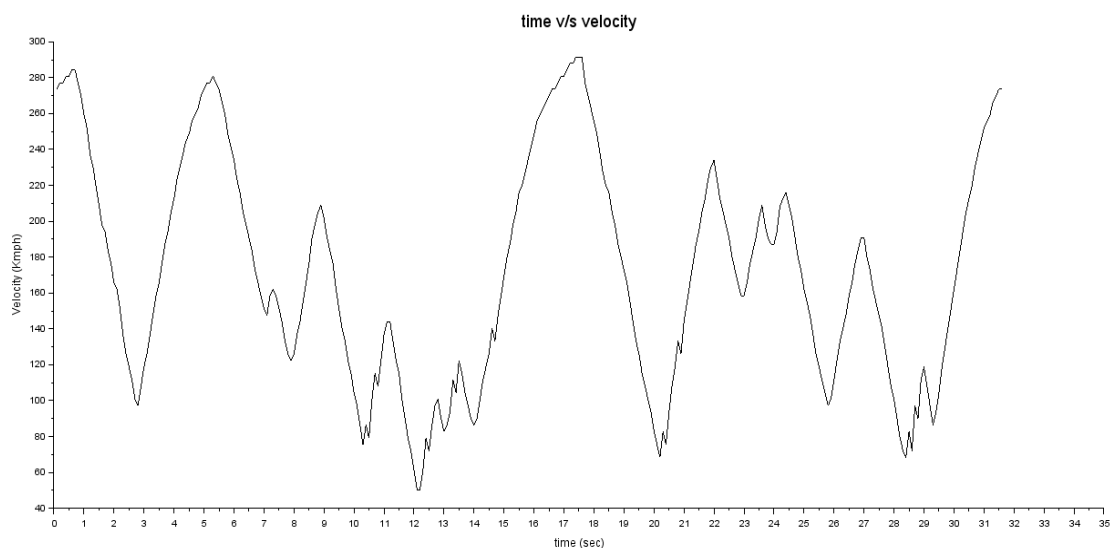


Course name	Numerical Modeling & Simulation in Scilab Xcos
Lesson name	Numerical Modelling Formula 1 Vehicle Resistive Forces in Scilab-Xcos
Lesson objective	Practice blocks & acquaint to use GUI of Scilab-Xcos
Created by	Nishchay N

**Problem statement:** Model the Formula 1 Vehicle Resistive Force in Scilab-Xcos to plot the vehicle resistive force.  
 (Track 3)

**Track Drive Cycle Graph:**



### Model Inputs:

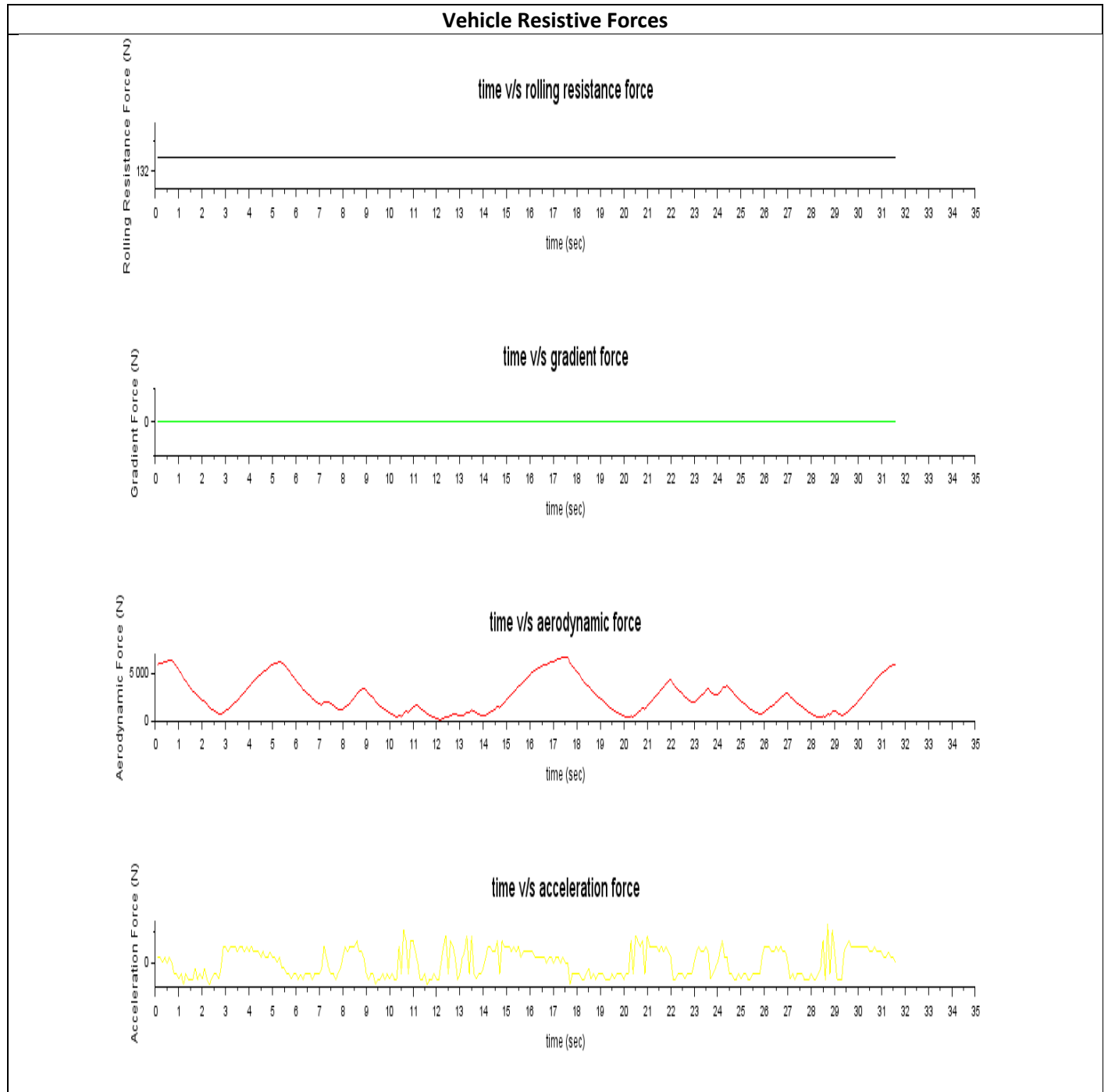
SI No	Parameter	Value	Units
1.	<b>Chassis</b>		
2.	I. Coefficient of rolling resistance	0.015	
3.	II. Gross Vehicle Mass	900	Kg
4.	III. Gravity constant	9.81	m/s
5.	IV. Grade Angle	0	degree
6.	V. Area	1.8585	m <sup>2</sup>
7.	VI. Air Density	1.225	Kg/m <sup>3</sup>
8.	VII. Drag Coefficient	0.9	
9.	VIII.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

### Program:

A. To Import Track Data:	B. To define all input parameters:
<pre>// Reading Imports for Track 3  // Form track 3 data = csvRead("Track_2.csv"); Drive.time = data(2:317,1); Drive.values = data(2:317,2);</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>

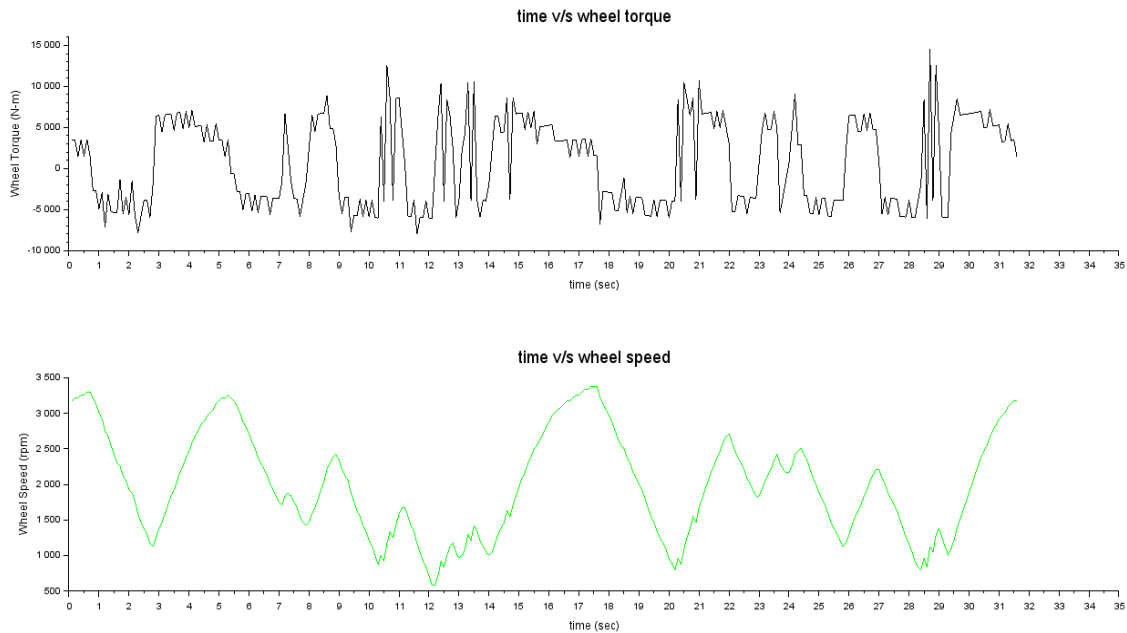


**Results:**





## Wheel



### Conclusion:

Sl No	Parameters	Values	Units
1.	Chassis		
2.	• Rolling Force	132.435	N
3.	• Gradeability Force	0	N
4.	• Maximum Aerodynamic Force	6722	N
5.	• Maximum Acceleration Force	63000	N
6.	• Maximum Wheel Speed	3384	Rpm
7.	• Maximum Wheel Torque	14602	Nm