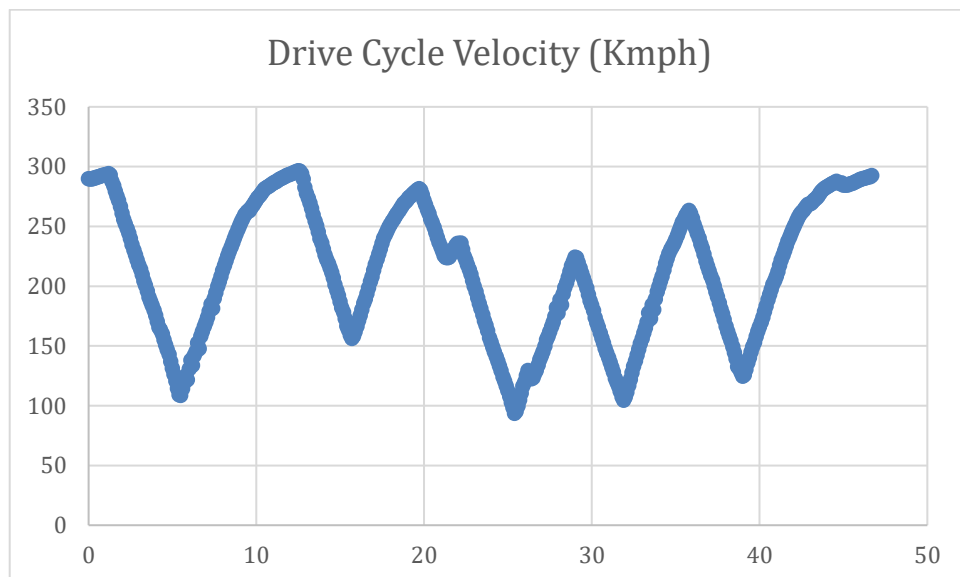


Course name	Numerical Modeling & Simulation in Scilab Xcos
Lesson name	Numerical Modelling Formula 1 Vehicle Resistive Forces in Scilab-Xcos
Lesson objective	Practice blocks & acquaint to use GUI of Scilab-Xcos
Created by	Khojasteh Z Mirza

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

Track Drive Cycle Graph:



Model Inputs:

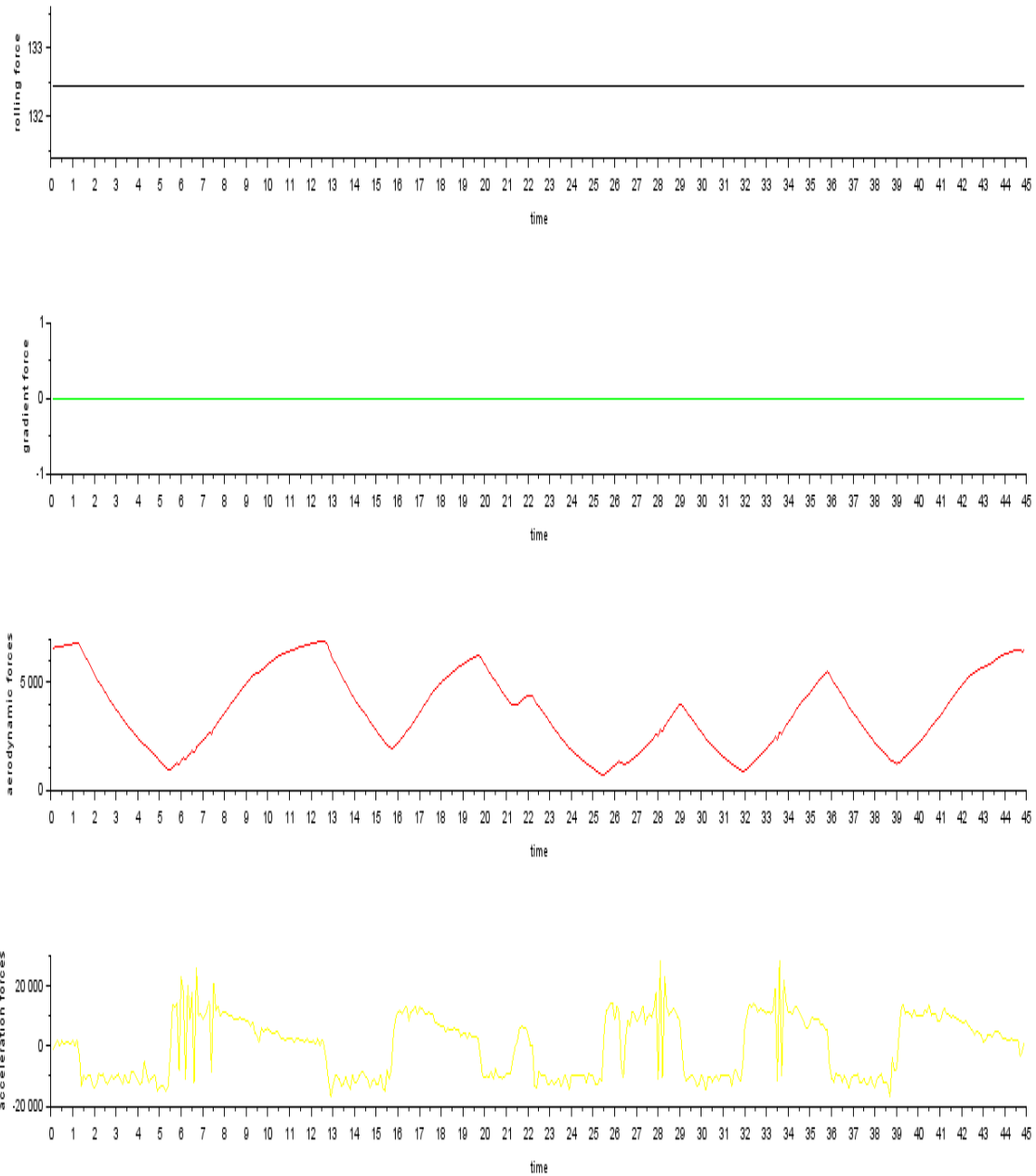
SI No	Parameter	Value	Units
1.	Chassis		
2.	I. Coefficient of rolling resistance	0.015	
3.	II. Gross Vehicle Mass	900	Kg
4.	III. Gravity constant	9.81	m/s
5.	IV. Grade Angle	0	degree
6.	V. Area	1.8585	m ²
7.	VI. Air Density	1.225	Kg/m ³
8.	VII. Drag Coefficient	0.9	
9.	VIII. Radius of wheel	0.2286	m

Program:

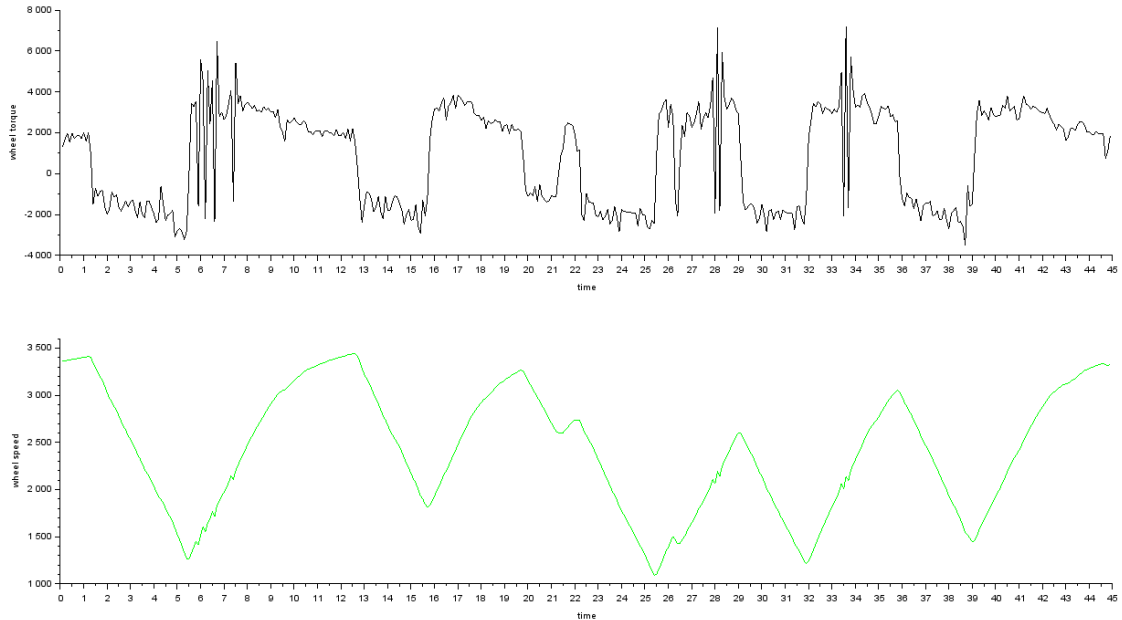
A. To Import Track Data:	B. To define all input parameters:
<pre>data=csvRead("track.csv") Drive.time=data(3:470,1) Drive.values=data(3:470,2)</pre>	<pre>//Coefficient of rolling resistance Crf=0.015 //Gross Vehicle Mass GVM =900 //Gravity constant g=9.81 //Gross vehicle weight GVW=GVM*g //Area A=1.8585 //Density rho=1.225 //Drag coeff Cd=0.9 //Radius of wheel Rw=0.2286</pre>



Vehicle Resistive Forces



Wheel



Conclusion:

Sl No	Parameters	Values	Units
1.	Chassis		
2.	• Rolling Force	132.5	N
3.	• Gradeability Force	0	N
4.	• Maximum Aerodynamic Force	5500	N
5.	• Maximum Acceleration Force	20500	N
6.	• Maximum Wheel Speed	3500	Rpm
7.	• Maximum Wheel Torque	5300	Nm