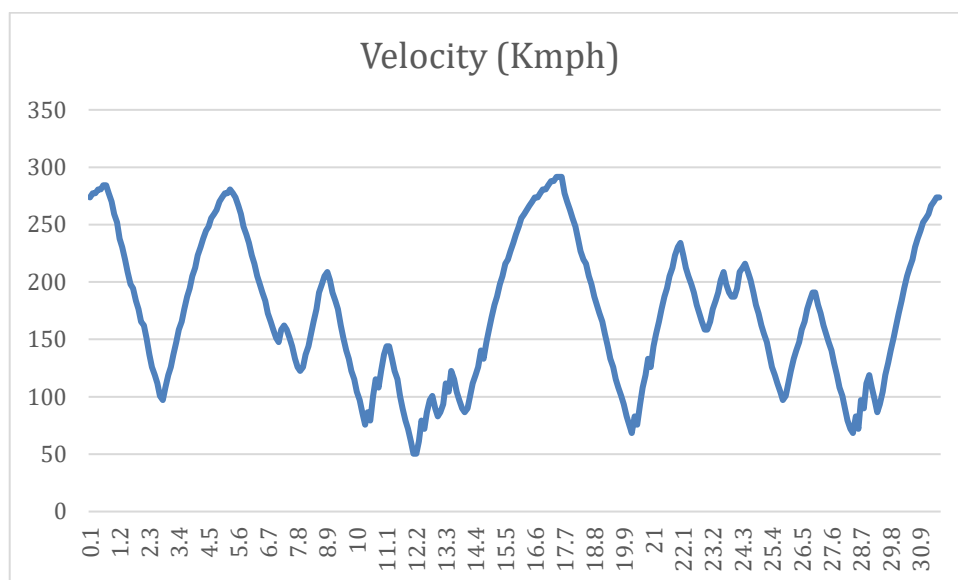| Course name	Numerical Modeling & Simulation in Scilab Xcos
Lesson name	**Numerical Modelling Formula 1 Vehicle Resistive Forces in Scilab-Xcos**
Lesson objective	**Practice blocks & acquaint to use GUI of Scilab-Xcos**
Created by	Khojasteh Z Mirza

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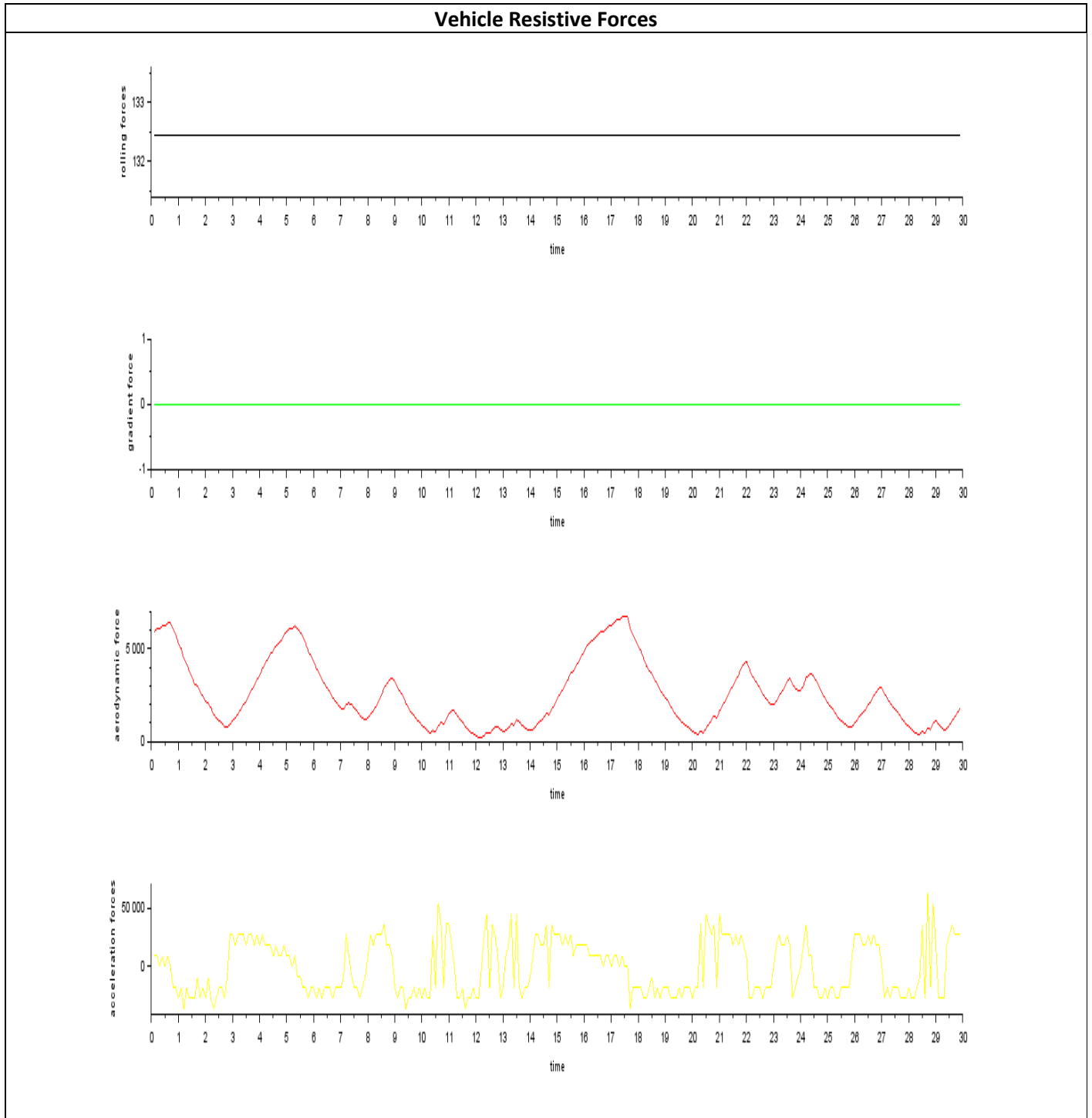
Track Drive Cycle Graph:

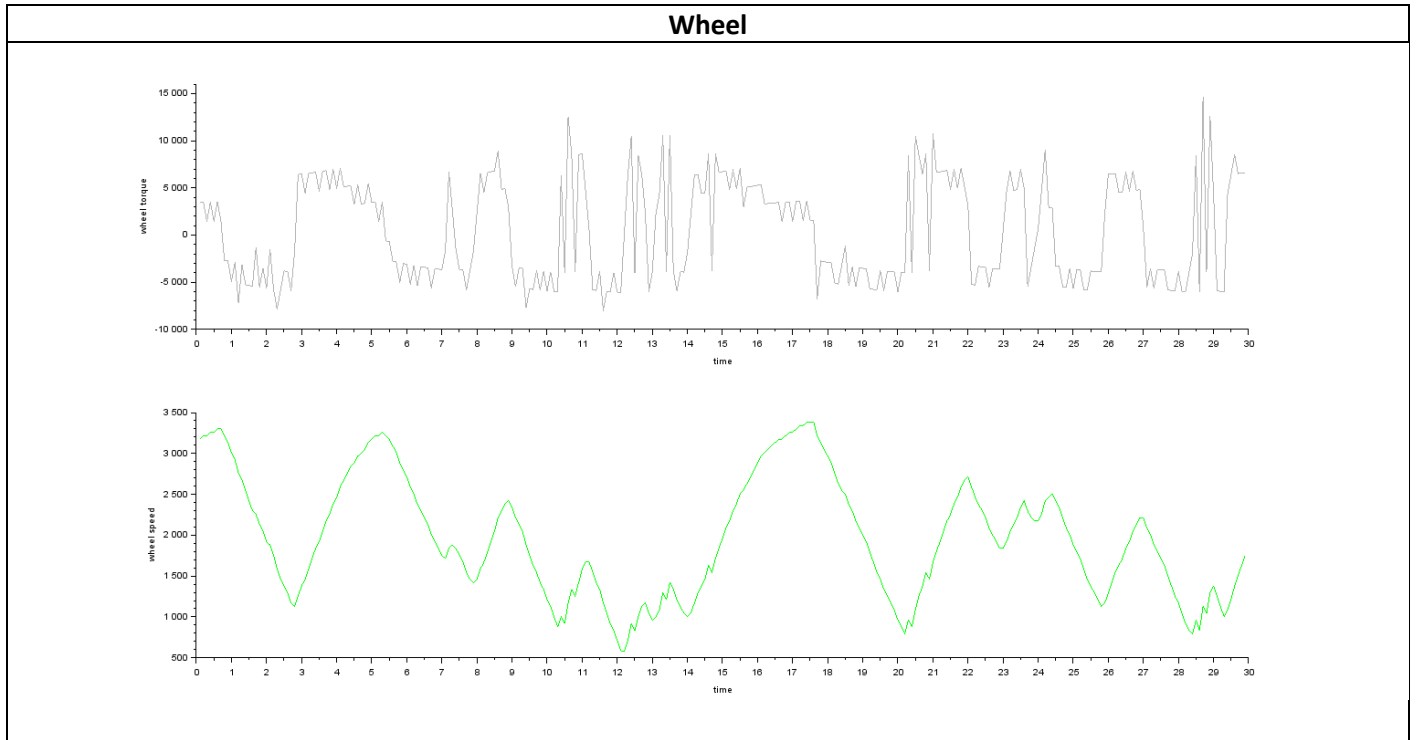Decibels Lab Private Limited   CIN: U80904KA2019PTC126675
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1st sector, HSR layout   contact@decibelslab.com
Bangalore, Karnataka, 560102

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

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Program:

A. To Import Track Data:	B. To define all input parameters:

``
data=csvRead("track_2.csv")
 	
Drive.time=data(2:317,1)
Drive.values=data(2:317,2)
``
	``
	//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
	``

Results:

Vehicle Resistive Forces

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Wheel

Conclusion:

Sl No	Parameters	Values	Units
1.	**Chassis**		
2.	• Rolling Force	132.5	N
3.	• Gradeability Force	0	N
4.	• Maximum Aerodynamic Force	5200	N
5.	• Maximum Acceleration Force	50000	N
6.	• Maximum Wheel Speed	3500	Rpm
7.	• Maximum Wheel Torque	15000	Nm