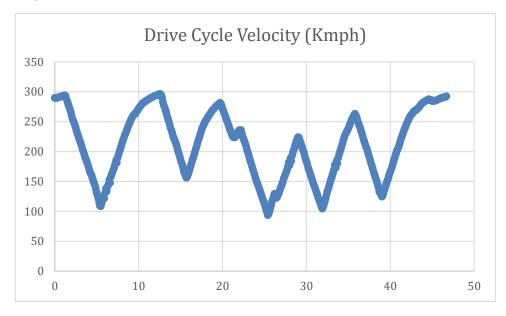


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Course name	Numerical Modeling & Simulation in Scilab Xcos	
Lesson name	Numerical Modelling Formula 1 Vehicle Resistive Forces in	
	Scilab-Xcos	
Lesson objective	Practice blocks & acquaint to use GUI of Scilab-Xcos	
Created by	Khojasteh Z Mirza	

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

Track Drive Cycle Graph:





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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.csv")	//Coefficient of rolling resistance
Drive time = deta(2,470.1)	Crf=0.015
Drive.time=data(3:470,1) Drive.values=data(3:470,2)	//Gross Vehicle Mass
211,011,011,011	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



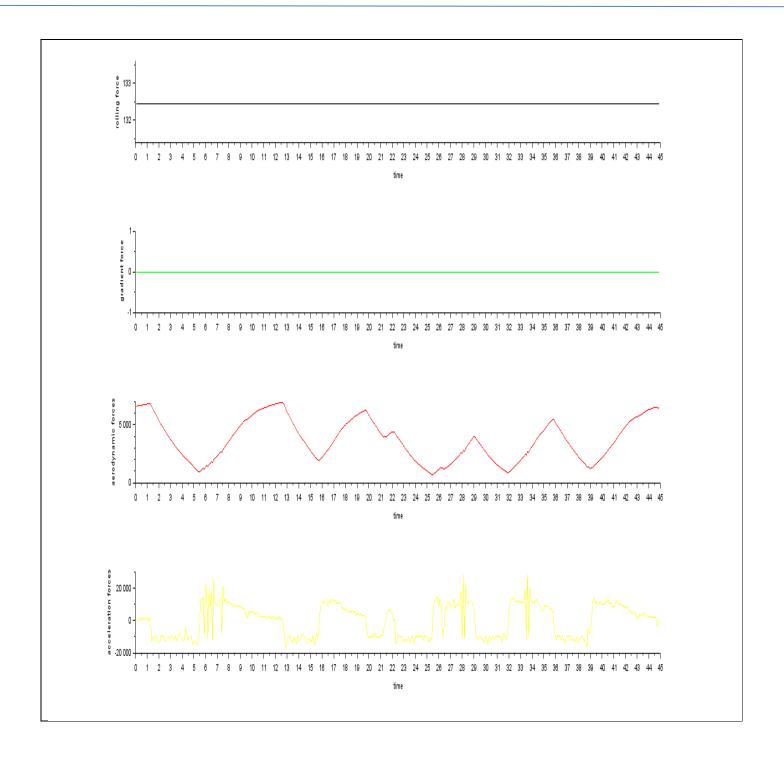
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Results:					
	Vehicle Resistive Forces				



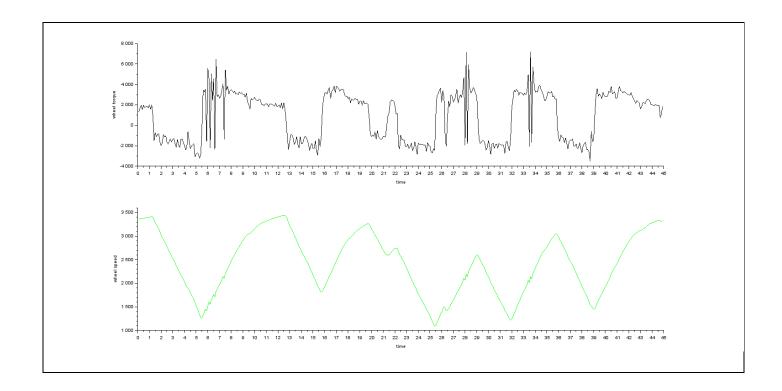
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Wheel

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Conclusion:

SI 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