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

**Track Drive Cycle Graph:**

**Model Inputs:**

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| **Sl No** | **Parameter** | **Value** | **Units** |
|  | **Chassis** |  |  |
|  | 1. Coefficient of rolling resistance | 0.015 |  |
|  | 1. Gross Vehicle Mass | 900 | Kg |
|  | 1. Gravity constant | 9.81 | m/s |
|  | 1. Grade Angle | 0 | degree |
|  | 1. Area | 1.8585 | m^2 |
|  | 1. Air Density | 1.225 | Kg/m^3 |
|  | 1. Drag Coefficient | 0.9 |  |
|  | 1. Radius of wheel | 0.2286 | m |

**Program:**

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| 1. **To Import Track Data:** | 1. **To define all input parameters:** |
| data=csvRead("track\_1.csv")  Drive.time=data(3:384,1)  Drive.values=data(3:384,2) | //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:**

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| **Vehicle Resistive Forces** |
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| **Wheel** |
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**Conclusion:**

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| **Sl No** | **Parameters** | **Values** | **Units** |
|  | **Chassis** |  |  |
|  | * Rolling Force | 132.5 | N |
|  | * Gradeability Force | 0 | N |
|  | * Maximum Aerodynamic Force | 5000 | N |
|  | * Maximum Acceleration Force | 20000 | N |
|  | * Maximum Wheel Speed | 3200 | Rpm |
|  | * Maximum Wheel Torque | 5000 | Nm |