



## **Module 12: Assignment 2: Modelling Transfer Function**

## Problem Statement:

As part of the EV modeling team at a telecommunications company, you're tasked with designing an electronic filter circuit for signal processing in an electric vehicle (EV) communication system. The circuit's dynamics are described by a second-order differential equation governing current flow.

## Task to be Performed:

Given the differential equation governing the circuit's dynamics in the time domain:

$$L \frac{d^2 i}{dt^2} + R \frac{di}{dt} + \frac{1}{C} i = V_{in}(t)$$

### Where:

$i$  is the current flowing through the circuit,

$L$  is the inductance of the circuit,

$R$  is the resistance of the circuit,

$C$  is the capacitance of the circuit, and

$V_{in}(t)$  is the input voltage to the circuit.

- Develop a Simulink model to represent the electronic filter circuit.
- Derive the transfer function using both time domain and state space representation methods.