MISR UNIVERSITY FOR SCIENCE AND TECHNOLOGY
COLLEGE OF ENGINEERING
MECHATRONICS DEPARTMENT

MTE 506 DIGITAL CONTROL

LAB 2 – SPRING 2020

Lab 2

Goals of The Lab

Discretization of Analog Control Systems

- Assertion on the notion of modeling and simulation
- Converting a dynamic system to mathematical model

Lab 2

Simulating RL Circuit

Review on previous lab

Simulating RL Circuit

Using MATLAB script for simulation

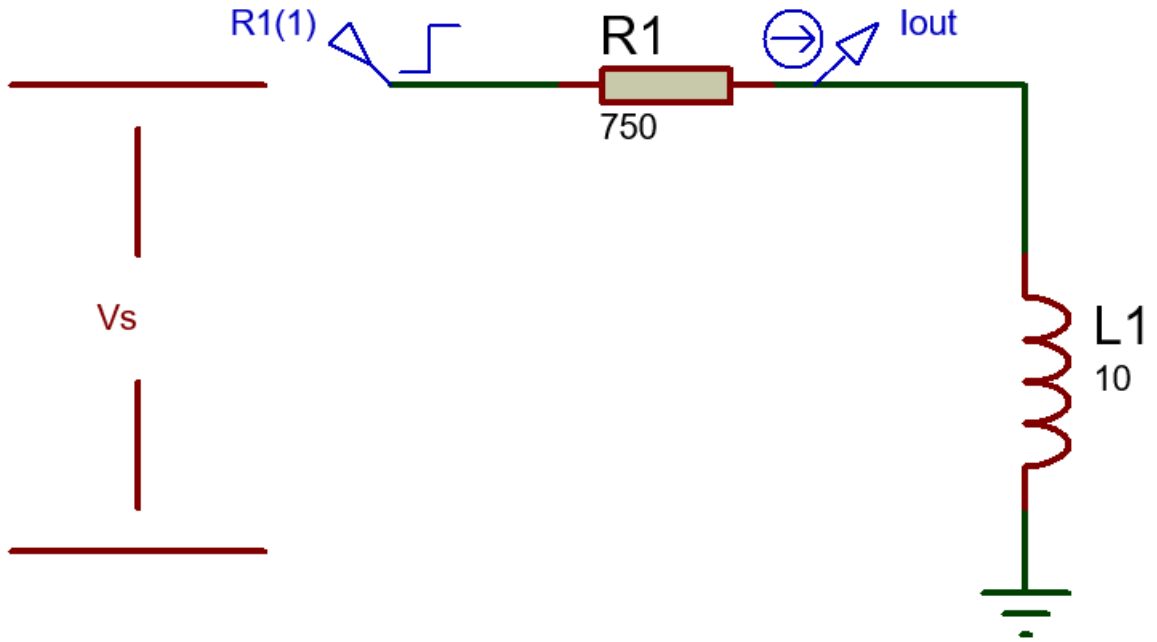
Simulating RL Circuit

Using Simulink for implementing RC response

Lab 2

POP-UP QUIZ 1

Simple example



$$v_s(t) = v_R(t) + v_L(t)$$

$$v_s(t) = Ri(t) + L\frac{di}{dt}$$

$$v_s(t) = Ri(t) + L\frac{i(t) - i(t - \Delta t)}{\Delta t}$$

$$\boldsymbol{i(t) = \frac{vs(t)\Delta t + Li(t - \Delta t)}{(L + R\Delta t)}}$$

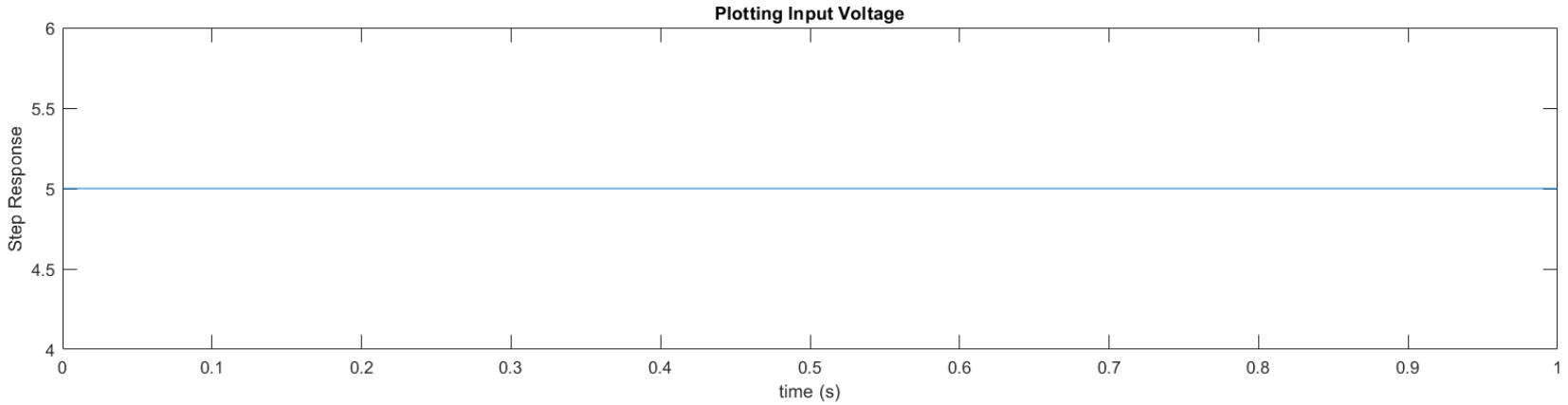
$$v_s(t)\Delta t = Ri(t)\Delta t + Li(t) - Li(t - \Delta t))$$

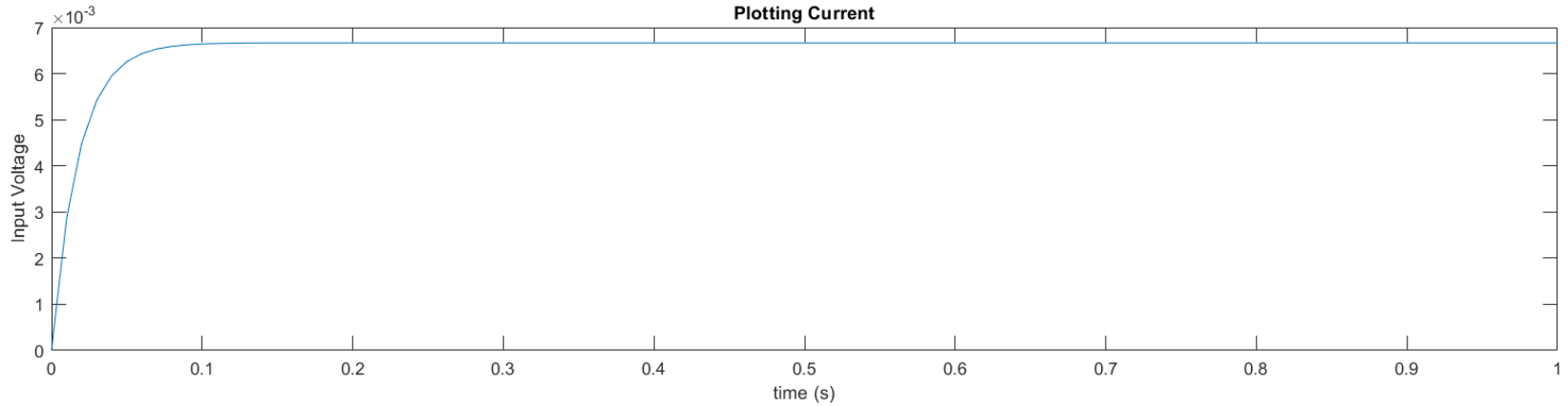
$$v = 5\ V$$
$$R = 750\ \Omega$$
$$L = 10\ H$$

Lab 2

Modeling of RL Circuit

Simple example

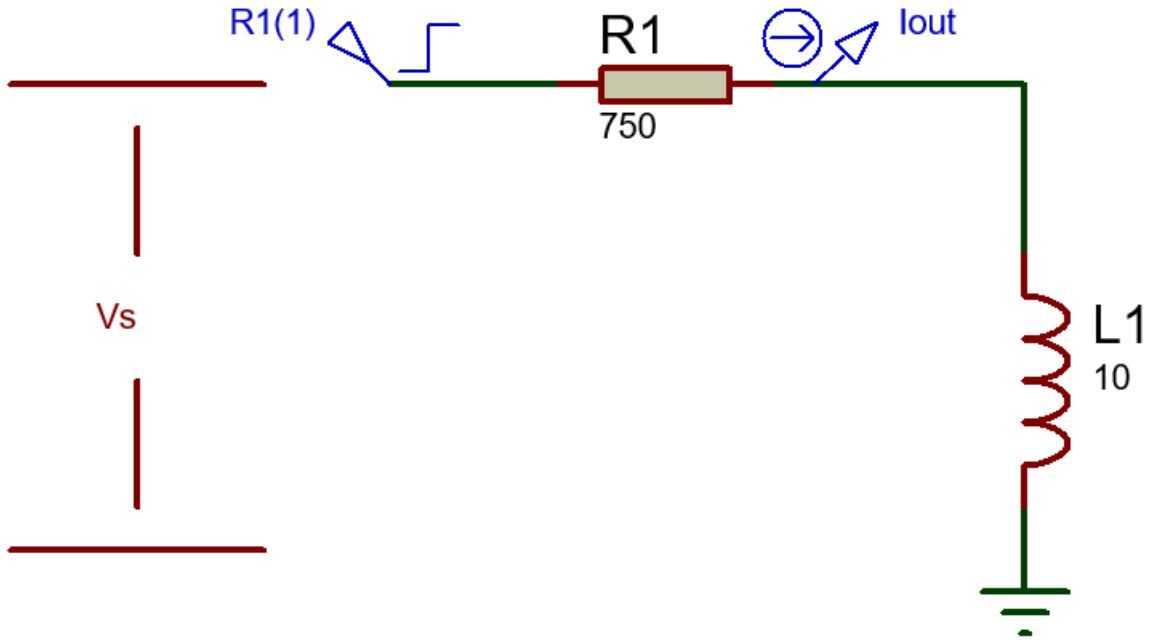


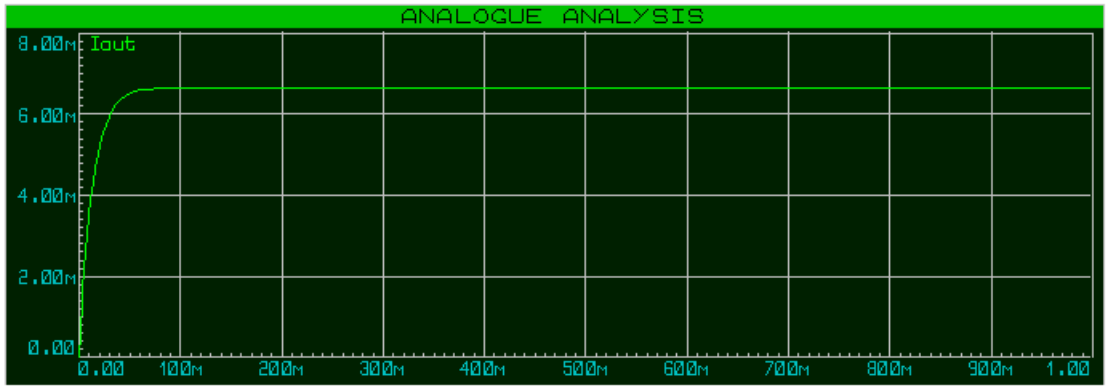


Lab 2

Modeling of RL Circuit

Simple example





Lab 2

Modeling of RL Circuit

Simple example

$$v = Ri(t) + L\frac{di}{dt}$$

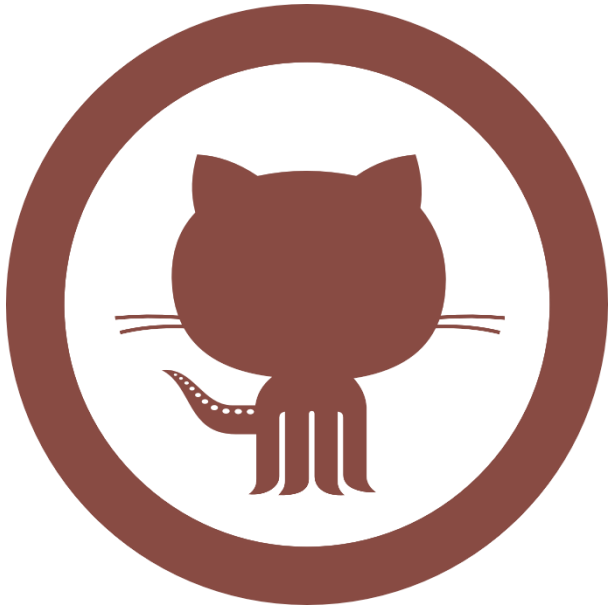
$$L\frac{di}{dt} + Ri(t) = v$$

$$\frac{L}{R}\frac{di}{dt} + i(t) = \frac{v}{R}$$

$$\boldsymbol{\tau\frac{di}{dt} + i(t) = Kv}$$

$$\tau = \frac{L}{R} \qquad K_2 = \frac{1}{R}$$

$$\boldsymbol{\frac{I(s)}{V(s)} = \frac{K}{\tau s + 1}}$$



Don’t forget to pull the lab update from.

http://github.com/wbadry/mte506

END OF LAB 2