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Lab Assignment 8

Date: 18-08-2020

**Control Theory Lab 8 dated 28-12-2021.**

**Python Code:**

import numpy as np

import control

from matplotlib import pyplot as plt

from control import matlab

R = 240

L = 40

C1 = 0.001

A = [[0,1/C1],[-1/L,-R/L]]

B = [[0],[1/L]]

C = [[1,0],[0,R]]

D = [[0],[0]]

S = control.ss(A,B,C,D)

print(S)

print("here")

tf = control.ss2tf(S)

print(tf)

T,y= control.step\_response(tf[0,0])

plt.plot(T,y)

plt.xlabel("Time")

plt.ylabel("Vout")

plt.show()

**Output:**

A = [[ 0.0e+00 1.0e+03]

[-2.5e-02 -6.0e+00]]

B = [[0. ]

[0.025]]

C = [[ 1. 0.]

[ 0. 240.]]

D = [[0.]

[0.]]

Here

Input 1 to output 1:

25

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s^2 + 6 s + 25

Input 1 to output 2:

6 s

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s^2 + 6 s + 25

Chart, line chart

Description automatically generated

**Learning outcomes:**

1. Using Control Library in Python
2. Creating state-space models in python
3. State-space models of RLC circuit

**Conclusion:**

In this lab, we learn how to derive the transfer function of a given system, and how to derive the State Space Model from a Differential Equation.