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Lab Assignment 6

Date: 3-12-2021

**Control Theory Lab 6 dated 03-12-2021.**

**Python Code:**

1. Practically build the circuit in the lab and plot the frequency response of the system Or simulate the circuit in circuit simulation software like tinkerCAD, Proteus, etc and plot the frequency response of the system

A picture containing chart

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Graphical user interface

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**2. Compute the transfer function of the system. Computer the frequency response of the system on paper and plot the same on semilog paper**

Table

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**Code:**

import control

import numpy as np

import matplotlib.pyplot as plt

import math

a0 = 1

a1 = 0.001

b0 = 1

b1 = 0

# Transfer Function

num = np.array([b1 , b0])

den = np.array([a1 , a0])

H = control.tf(num,den)

print(H)

w = [1,100,200,300,400,500,600,700,800,900,1000,1200,1400,1600,1800,2000]

freq = []

for i in range(0, len(w)):

a = w[i]/(2\*math.pi)

freq.append(a)

mag, phase, omega = control.freqresp(H, w)

plt.plot(freq, mag)

plt.title("Frequency Vs Magnitude")

plt.xlabel("w")

plt.ylabel("h")

plt.show()

plt.plot(freq, phase)

plt.title("Frequency Vs Phase")

plt.xlabel("w")

plt.ylabel("phase")

plt.show()

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0.001 s + 1

**Chart, line chart

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**Chart, line chart

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**Learning outcomes:**

1. Using Control Library in Python
2. Computing frequency response of a circuit in python
3. Converting angular frequency to frequency & plotting with Magnitude and phase of the frequency response of a system

**Conclusion:**

This lab helped us to learn how to plot the frequency response graph on different platforms. We plotted the frequency response graph on excel visualization, using proteus simulation, and in Python. We also computed the formula on paper.