Control Systems

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Contents

***Abstract*—The objective of this manual is to introduce control system design at an elementary level.**

Download python codes using

```
svn co https://github.com/gadepall/school/trunk/
    control/ketan/codes
```

1 Polar Plot

1.1 Introduction

1.2 Example

1.3 Example

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1.7 Example

2 Bode Plot

2.1 Gain and Phase Margin

2.1.1. Sketch the Bode magnitude and phase plots for

$$G(s) = \frac{(1+0.2s)(1+0.025s)}{s^3(1+0.005s)(1+0.001s)} \quad (2.1.1.1)$$

Also compute the gain margin and phase margin.

Solution:

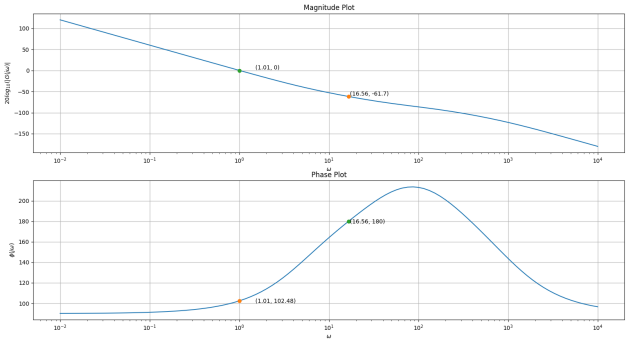

Fig. 2.1.1: Bode plot

From fig. 2.1.1,

$$\omega_{gc} = 16.55, \text{ Gain Margin} = -61.7dB \quad (2.1.1.2)$$

$$\omega_{pc} = 1, \text{ Phase Margin} = -77.52^0 \quad (2.1.1.3)$$

The program for plotting bode plot and finding phase margin and gain margin -

```
codes/ee18btech11039/bode_plot.py
```

3 PID Controller

3.1 Introduction

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