भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad

Indian Institute of Technology Hyderabad

Department of Electrical Engineering

EE1220 – Basic Control Theory

Assignment 04 – (Frequency Response Analysis)

Submission Deadline: None

Key Learning from the Assignment:

- Polar Plot

Instructions: RN = last two digits of your roll number.

Use Graph paper for all plots/ sketches.

1. Sketch polar plot for the following
   a. $G(s)=\dfrac{1}{(1+s)(1+2s)}$
   b. $G(s)=\dfrac{1}{s^2(1+s)(1+2s)}$
   c. $G(s)=\dfrac{1}{s(1+s^2)}$
   d. $G(s)=\dfrac{(1+s/RN)(1+0.025s)}{s^3(1+0.005s)(1+0.001s)}$
   e. $G(s)=\dfrac{1}{(s+1)(s+2)(s+3)}$
   f. $G(s)=\dfrac{100(s+5)}{s(s+3)(s^2+4)}$
2. Derive an expression for the closed loop bandwidth in terms of ζ and ω_n of a two-pole system.