SYST003 - LINEAR CONTROL SYSTEMS
HOMEWORK IV – Frequency domain

Instructions

- ✓ Deadline: 1st December 2019 at 23:59
- ✓ Report in English
- ✓ Max 8pages
- ✓ Special care to Figure (fontsize, axis, label, coherent title, …)
- ✓ Submission online: https://submit.montefiore.ulg.ac.be

Statement

1- Framework (max 1/2page)
   - In case you have updated your model for example

2- Constraints and simulation specifications (max 1page)
   - Recall your constraints (numerical values and briefly why)
   - Describe your realistic scenario (time-evolution of your perturbation signal)
   - Choice of cross over frequency (/!\ explain your choice)

3- Loop shaping (NO PID !)
   explain your reasoning when you add a component in your controller
   - Compute the transfer function of your open loop system H(s)
   - Component utility and explain why it is useful to shape L (“predict the behavior”)
   - Parameter description
   - Explain your trade-off / discuss parameter choice in
     - bode diagram (or Nyquist or both)
     - output signal
     - control input signal

4- Gang of four:
   - Do not explain the theory related to the gang of four.
   - Show them and explain your results
   - You can also analyze the effect of the different bloc of your controller on S or T.

5- Discuss the presence of delays in your system through the controller design
   You should be able to see/explain the impact of the delay in your bode diagram or Nyquist plot

6- Not mandatory for this deadline:
   - Effect of the noise
   - Discuss the utility of a feedforward
   - Comparison between time domain and frequency domain

Rem: be careful with your units, when you use a bode diagram check if you are working in frequency [Hz] or in pulsation [rad/s]