University Badji Mokhtar-Annaba

Department of Electronics
3rd year License in Automatique L3 (S5)

Academic year: 2025/2026

TP on Linear Systems Control (CSL)

TP 2 Study and synthesis of regulators in the frequency domain

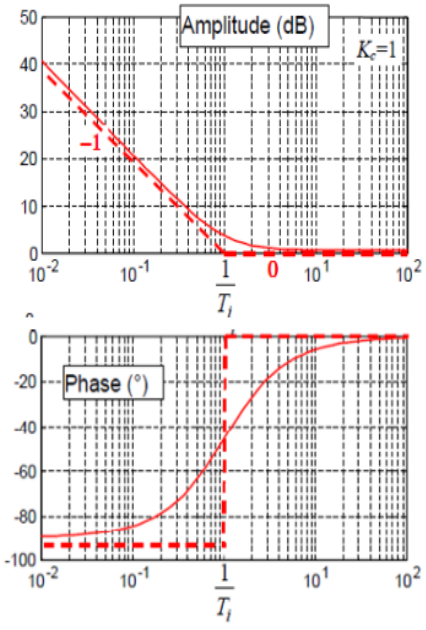
Part 2: Proportional-Integral (PI) Controller

Objective of the Lab
This lab aims to understand the effect of the actions of a PI controller in the frequency domain. We will use the Matlab/Simulink software to simulate the PI controller.

Proportional-integral (PI) controller

The advantage of integral type correction is to allow for zero static error.

L'avantage de la correction de type intégral est de permettre une erreur statique nulle.
To cancel the static error of the BF response with a proportional P controller, we will add the integral action I:
C= Kc*ε+ Ki*1/s
Effect of the corrector
The PI controller: increases the system's class and thus improves accuracy.
• Introduction of an integrator
• Gain at low frequencies (ωc0<<1/Ti) infinite ⇒ zero static error.
• The gain of the corrected system will not be modified at high frequencies if (ωc0>>1/Ti) ⇒(speed) unchanged.
• The phase of the corrected system is only modified at low frequencies (unlike I).
• The phase margin is not modified if (ωc0>>1/Ti)



Requested work: Redo the work from part 1 but this time using a PI controller