

Intro.exe Exercises for Chapter Intro

Exercise intro.tabernacle

If a control system has a constant controller $C(s) = K$, unity feedback ($H(s) = 1$), and plant

$$G(s) = \frac{10}{(s+2)(s+5)},$$

what is the closed-loop transfer function?

Express the result as a single fraction of polynomials in s .

Exercise intro.psalmody

What are the three primary performance criteria for most feedback control systems?

Exercise intro.calvins

Consider the block diagram of Fig. exe.1. Derive the transfer function from the command $R(s)$ to the error $E(s)$; that is, $E(s)/R(s)$. This is sometimes called the **error transfer function**.

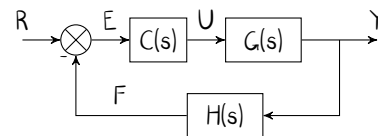


Figure exe.1: a block diagram with a controller $C(s)$.

error transfer function

Exercise intro.telesis

If a PID control system suffers from poor steady-state performance, which term of a PID controller—that is, P, I, or D—is most likely to help and why?

Exercise intro.postulant

If a PID control system suffers from slow transient response performance, increasing which PID terms—that is, of P, I, and D—are most likely to help and why?

Exercise intro.mascaron

A given feedback control system meets its transient performance requirements, but has a finite steady-state error for a unit step command. How might you recommend augmenting

the controller to achieve zero steady-state error?

Exercise intro.

stab

Stability performance