EE 105 Feedback Control Systems
Department of Electrical and Computer Engineering
Tufts University Fall 2018
Homework #7

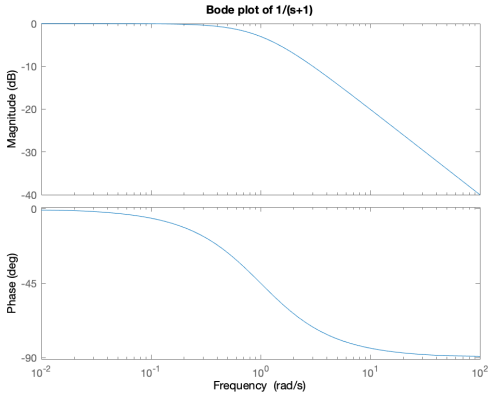
Name: *Shang Wang* Student ID: *1277417* E-mail: *shang.wang@tufts.edu*

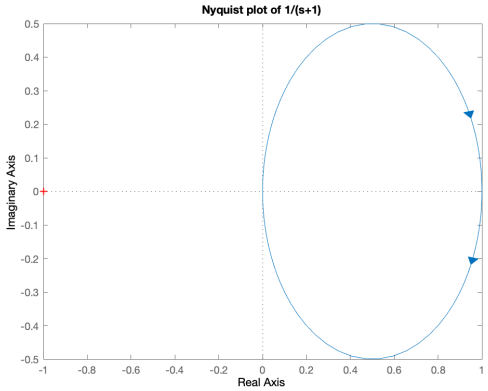
1 Problem 1

1.1 Part A

The transfer function is:

$$L(s) = \frac{1}{s+1}$$



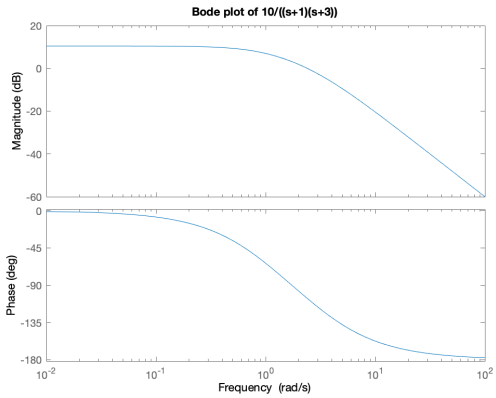


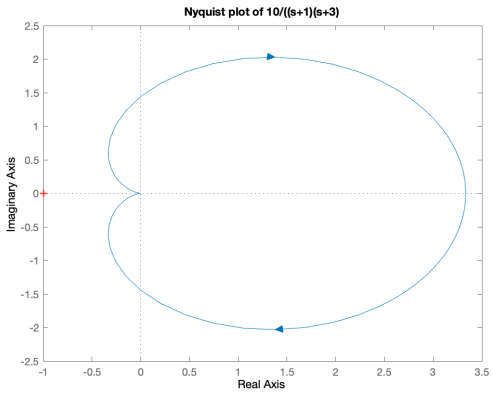
It's stable even if crank K up to infinity.

1.2 Part B

The transfer function is:

$$L(s) = \frac{10}{(s+1)(s+3)}$$



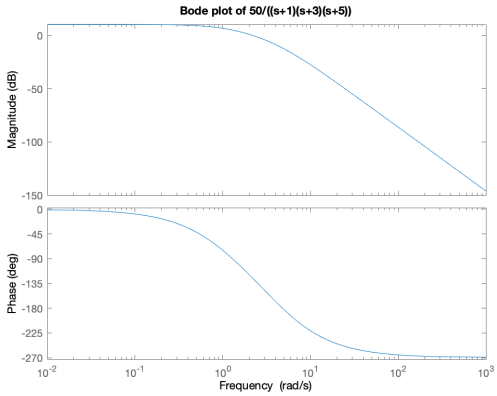


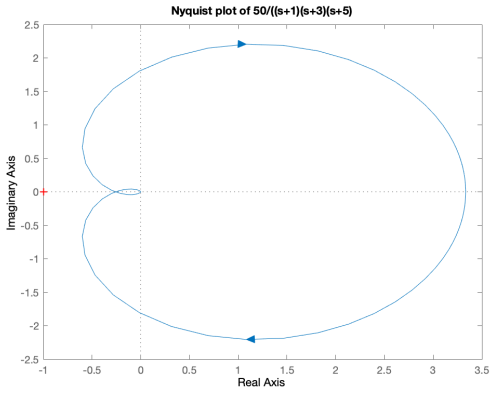
It's stable even if crank K up to infinity.

1.3 Part C

The transfer function is:

$$L(s) = \frac{50}{(s+1)(s+3)(s+5)}$$



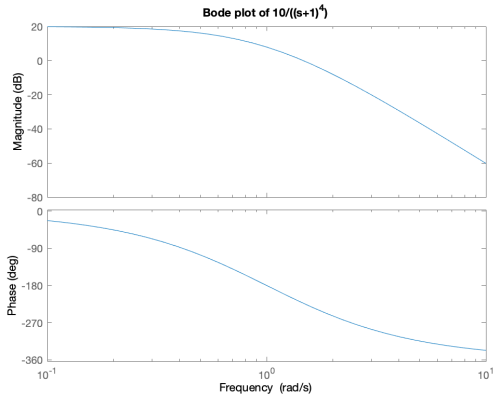


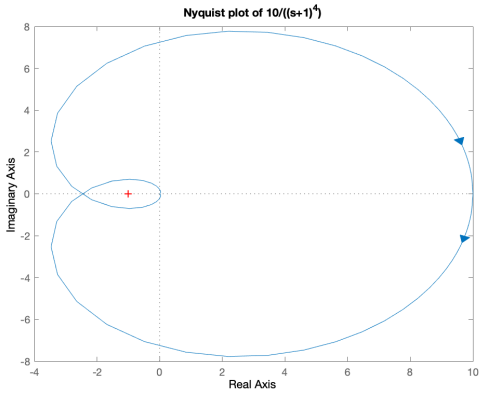
It's stable. But if give an additional gain of 4, the system will be unstable.

1.4 Part D

The transfer function is:

$$L(s) = \frac{10}{(s+1)^4}$$



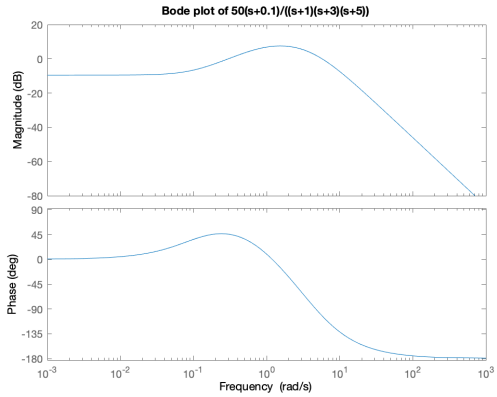


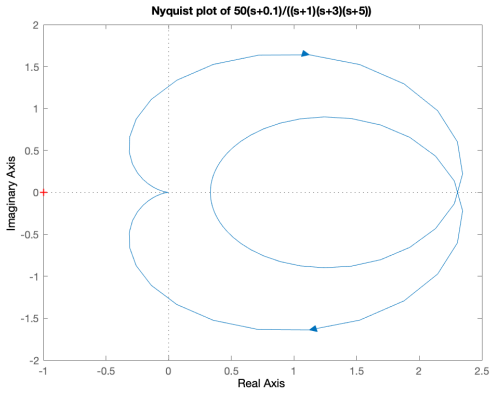
It's unstable. But if give an additional gain of 0.41, the system will be stable.

1.5 Part E

The transfer function is:

$$L(s) = \frac{50(s+0.1)}{(s+1)(s+3)(s+5)}$$



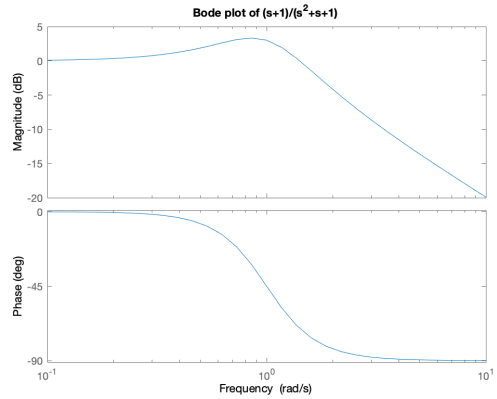


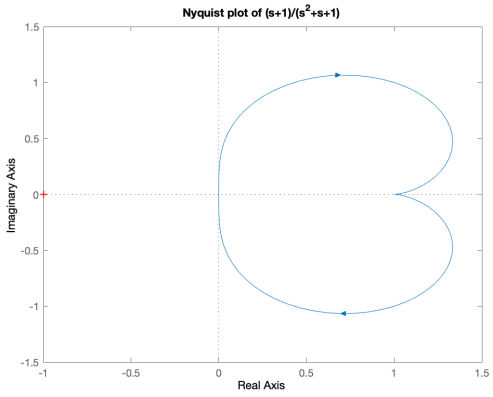
It's stable even if crank K up to infinity.

1.6 Part F

The transfer function is:

$$L(s) = \frac{s+1}{s^2+s+1}$$



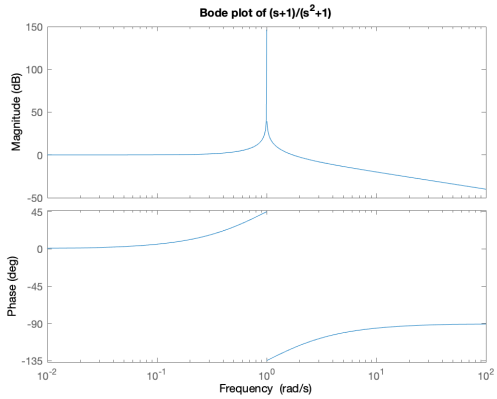


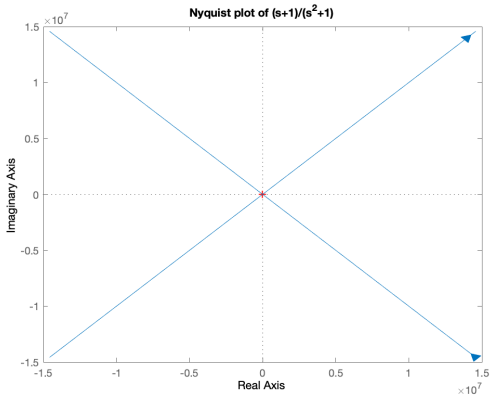
It's stable even if crank K up to infinity.

1.7 Part F

The transfer function is:

$$L(s) = \frac{s+1}{s^2+1}$$





It's stable while in close loop even if crank K up to infinity.