Question: Problem 2 (25 marks): For the system of Figure 2, apply the Rout...

Problem 2 (25 marks): For the system of Figure 2, apply the Routh-Hurwitz Criterion to tell how many closed-loop poles are located in the right half-plane, in the left half-plane, and on the jw-axis. Notice that here is positive feedback.

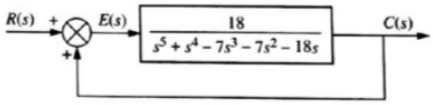


Figure 2

Show transcribed image text

Expert Answer

Mustak answered this
260 answers

Was this answer helpful? 1 0

Given feedback is positive, hence closed loop transfer function is. $\frac{G(s)}{1 - G(s)H(s)}$

we need $1 - G(s)H(s) = 0$ which is characteristic equation

$$1 - \frac{18}{s^5 + s^4 - 7s^3 - 7s^2 - 18s} = 0$$

$$s^5 + s^4 - 7s^3 - 7s^2 - 18s - 18 = 0.$$

By Routh hurwitz criterion.

s^5	1	-7	-18
s^4	1	-7	-18
s^3	$\frac{-7+7}{1}$	$\frac{-18+18}{1}$	0
s^3	0	0	0.

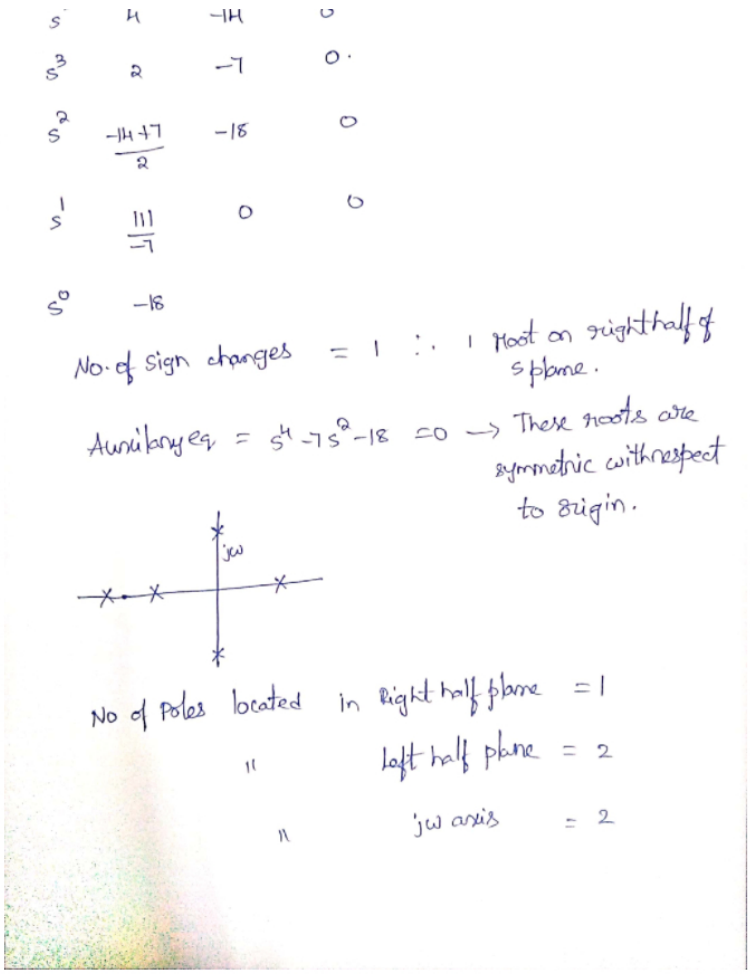
→ this indicates system is either marginal stable or unstable.

Auxiliary equation is $s^4 - 7s^2 - 18 = 0$.

differentiate Auxiliary eq $4s^3 - 14s = 0$.

Replace this coefficients in s^3 row.

s^5	1	-7	-18
s^4	1	-7	-18
3			



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Practice with similar questions

Q: 4. Using the Routh-Hurwitz criterion, tell how many closed-loop poles of the system shown in Figure 3 lie in the right half-plane and whether the system is stable or not C(s) 450 s4+3s3+10s2+30s+150 Figure 3 A closed-loop control system

A: See answer

Q: Problem 3 (25 marks): For the system of Figure 3, apply the Routh-Hurwitz Criterion to tell how many closed-loop poles are located in the right half-plane, in the left half-plane, and on the jw-axis. Notice that here is positive feedback. R(S) + C(s) 18 3 +54-733 - 752 - 185 Figure 3

A: See answer

Up next for you in Electrical Engineering

| Find the output response, c(t), for each of the systems shown in Figure 3.1. Also find the time constant, rise time,...

| Find the output re
the time constant,

See answer

2) For each of the transfer functions shown below, find the locations of the poles and zeros, plot them on the s pl...

d. $T(s) = \frac{20}{s^2 + 6s + 144}$

e. $T(s) = \frac{s+2}{s^2+9}$

$\frac{(s+5)}{}$

See answer

See more questions for subjects you study

Questions viewed by other students

Q: Problem 3 (25 marks): Given the unity feedback control systems of Figure 3 where G(s) = find K and a to yield a 2% error in the steady state and a 20% overshoot. ce G(s) Figure 3

A: See answer

Q: Problem 3 (25 marks): For the system of Figure 3, apply the Routh-Hurwitz Criterion to tell how many closed-loop poles are located in the right half-plane, in the left half-plane, and on the jw-axis. Notice that here is positive feedback. R(S) +

C(s) 18 3 +54-733 - 752 - 185 Figure 3

A: See answer

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