Question: 4. Using the Routh-Hurwitz criterion, tell how many closed-lo…

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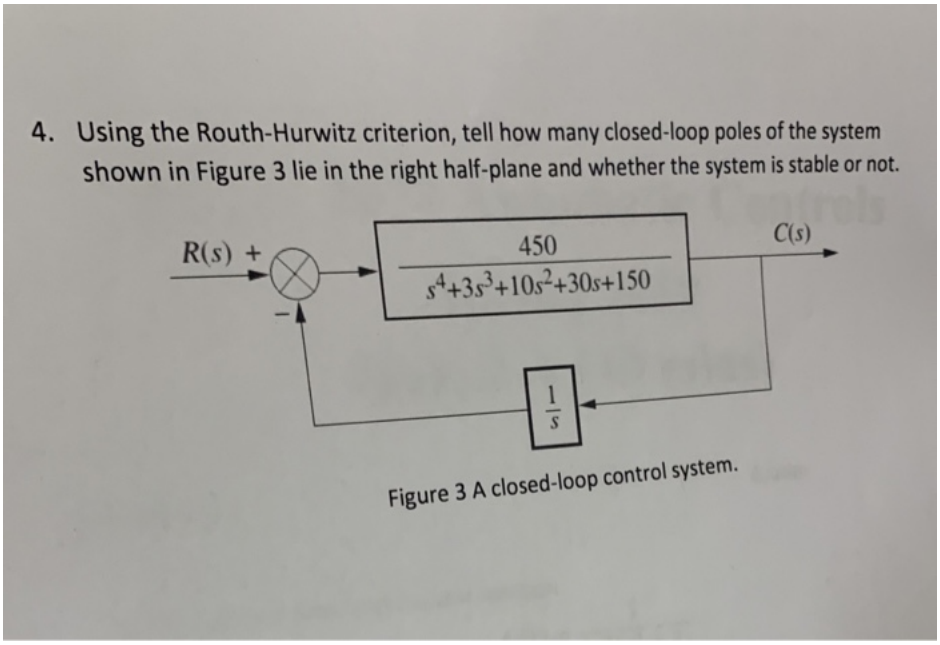

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Expert Answer

Anonymous answered this
69 answers

Was this answer helpful? 0 1

Given data

$$\text{Equation} = \frac{450}{s^4+3s^3+10s^2+30s+150}$$

Characteristic Equation $= 1 + G(s)H(s) = 0$

$$1 + \frac{450}{s^4+3s^3+10s^2+30s+150} \times \frac{1}{s} = 0$$

$$s^5+3s^4+10s^3+30s^2+150s+450 = 0$$

Using R.H. Criteriam

s^5	1	10	10
s^4	3	30	450
s^3	$\frac{(30-30)}{3}$	$\frac{4500-300}{30}$	0
s^2	$\frac{30\epsilon+450}{\epsilon}$	450	0
s^1	$-\left(\frac{150(30\epsilon+450)}{\epsilon}-450\epsilon\right) \Big/ \frac{30\epsilon+450}{\epsilon}$		0
s^0	$\frac{30\epsilon+450}{\epsilon}$		0

$\boxed{s^0 = 450}$

To Check no. of Sign Changes as $\epsilon \to 0^+$

$$\frac{30\epsilon+450}{\epsilon} \Rightarrow +\infty$$

$$\frac{-150(30\epsilon+450)-900\epsilon^2}{30\epsilon+450} \Rightarrow -ve$$

$s^5 = +ve$
$s^4 = +ve$
$s^3 = +ve$
$s^2 = +ve$
$s^1 = -ve$
$s^0 = +ve$

2 Sign changes.

Two poles Equal in the R.H.S of the S-plane.

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Practice with similar questions

Q: All steps please

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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Q: #19 is changed to (2/s)

A: See answer 100% (1 rating)

Q: 4. Determine whether the unity feedback system is stable if

A: See answer

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