Name: Okunu Christian U.
Dept: Elect/Elect Engr
Mat No: 17/Eng04/054
Course: EEE 441

QUESTION 1

Briefly explain the Root locus technique.

ANSWER

This technique is a graphical method for checking how the roots of a System changes with Variations of a Certain System parameter, Commonly a gain within a feedback System.

QUESTION 2

Describe the use of Routh Hurwitz to find the Stability of a Closed Loop System whe;
a) Entire rows Zero on the Routh table.
b) To determine the poles on the jw axis.

Question No.: 2

ANSWER

$$T(s) = \frac{4}{5^5 + 5s^4 + 11s^3 + 23s^2 + 28s + 12}$$

5	1	11	28
5^4	5	23	12
5^3	$\begin{vmatrix} 1 & 11 \\ 5 & 23 \end{vmatrix} = 6.4$	$\begin{vmatrix} 1 & 28 \\ 5 & 12 \end{vmatrix} = 25.6$	$\begin{vmatrix} 1 & 0 \\ 5 & 0 \end{vmatrix} = 0$
	5	5	5
5^2	$\begin{vmatrix} 5 & 23 \\ 6.4 & 25.6 \end{vmatrix} = \frac{3}{1}$	$\begin{vmatrix} 5 & 12 \\ 6.4 & 0 \end{vmatrix} = \frac{12}{4}$	$\begin{vmatrix} 5 & 0 \\ 6.4 & 0 \end{vmatrix} = \frac{0}{0}$
	6.4	6.4	6.4

You Divide the above by the Common factor "3"

5^1	$\begin{vmatrix} 6.4 & 25.6 \\ 1 & 4 \end{vmatrix} = 0$	$\begin{vmatrix} 6.4 & 0 \\ 1 & 0 \end{vmatrix} = 0$	$\begin{vmatrix} 6.4 & 0 \\ 1 & 0 \end{vmatrix} = 0$
	1	1	1
5^1	2	0	0
5^0	$\begin{vmatrix} 1 & 4 \\ 2 & 0 \end{vmatrix} = 4$	$\begin{vmatrix} 1 & 0 \\ 2 & 0 \end{vmatrix} = 0$	$\begin{vmatrix} 1 & 0 \\ 2 & 0 \end{vmatrix} = 0$
	2	2	2

By Using the auxiliary equation, we use the elements of the preceding row:

Since S^2 is even

$$S^2 + S$$

$$A = 5^2 + 4$$

We the diffrentiate

$$dA/ds = 5^2 + 4$$

$$dA/ds = 25 + 0 = \underline{\underline{25}}$$

We replace the auxiliary Eqn in 8'

2b

Since there are no Sign changes on the imaginary axis but there is a row of Zeros, we Can Say the System is "Marginally or limitedly Stable".