OLOWOYO OMOSHALEWA DANIEL
17/ENG05/1033
MECHATRONICS
~~EE~~ EEE 441 :- SERVO MECHANISM AND CONTROL
400 LEVEL
ASSIGNMENT:

Solution:

1 Root locus Technique:

In control theory and stability theory, root locus analysis is a graphical method for examining how the roots of a system change with variation of a certain system parameters, commonly gain within a feedback system. This is a technique used as a stability criterion on the field of classical control theory which can determine stability of the system. The root locus plots the poles of the closed loop transfer function in the complex S plane as a function of a gain parameter.

In addition to determining the stability of the system the root locus can be used to design the damping ratio and natural frequency of a feedback system.

2 All the element of any row of routh array are zero

When this happens we follow these steps

i Write the auxiliary equation, A(s) of the row, which is just above the row of zeros.

ii Differentiate the auxiliary equation, A(s) with respect to s. fill the row of zeros with the coefficients.

iii Replace the zero row with the coefficients of the resulting polynomial

iv Complete the routh table as usual.

v Evaluate the sign of the first-column entries

3 Determine the poles on the jw axis.

The system on has jw poles when a row of zero appears on the Routh table.

The presence of poles on the imaginary axis creates a situation of marginal stability. In this case the coefficients of the "routh array" in a whole polynomial for finding changes in sign is not possible. Then another approach comes into play. the row of polynomial which is just above the row containing the zeros is called "auxiliary polynomial"