

ASITA OBONISO

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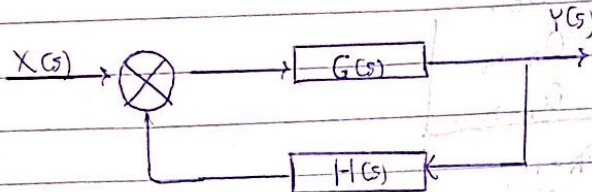
MECHATRONICS ENGINEERING

SERVO MECHANISM AND CONTROL SYSTEMS (CEE 441)

Root Locus technique

This is a graphical method for examining how the roots of a system change with variation of a certain system parameter. This is a technique used as a stability criterion in the field of classical control systems theory.

The root locus of a feedback system is the graphical representation in the complex s-plane of the possible locations of its closed-loop poles for varying values of a certain system parameter.



The closed loop transfer function is given as

$$T(s) = \frac{Y(s)}{X(s)} = \frac{G(s)}{1 + G(s)H(s)}$$

2a, When the entire row is zero on the Routh table

s^4	a_4	a_2	a_0
s^3	a_3	a_1	0
s^2	b_1	b_2	0
s^1	c_1	0	0
s^0	d_1	0	0

$$b_1 = - \frac{\begin{vmatrix} a_4 & a_2 \\ a_3 & a_1 \end{vmatrix}}{a_3}$$

$$b_2 = - \frac{\begin{vmatrix} a_4 & a_0 \\ a_3 & 0 \end{vmatrix}}{a_3}$$

$$b_3 = - \frac{\begin{vmatrix} a_4 & 0 \\ a_3 & 0 \end{vmatrix}}{a_3} = 0$$

VISTALINE