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18 / Eng 04 / 080
Electrical / Electronics Engineering
EE 441

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Assignment:

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In Control & Stability theory, the root locus technique is a graphical method for examining how the roots of a system change with variation of a certain system parameter, ^{the gain} within a feedback system.

It is represented in the s -domain & is symmetrical about the real axis. The characteristic equation when $G(s)$ varied from zero to infinity is called root locus.

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The use of Routh Hurwitz 2 to find the stability of a closed loop system when:

a) Entire row is zero on the Routh table;

If there's an entire row of zeros, this indicates the possibility of $j\omega$ roots i.e., the presence of pairs of poles, that are mirrored about the imaginary axis.

If this happens, it can be resolved using the Routh Hurwitz 2 Criterion by;

- Creating an auxiliary polynomial from the row above

- the row of zero, skipping every other power of s .
- Differentiate the auxiliary polynomial with respect to s .
- Replace the zero row with the coefficients of the resulting polynomial.
- Complete the Routh table.
- Evaluate the sign of the first column's entries.

b) To determine the poles on the $j\omega$ axis.

Forcing a row of zeros in the Routh table will yield the gain, going back one row to the even polynomial equation & solving for the roots, yields the frequency at the imaginary axis.

$$\sigma \pm j\omega \quad - \text{Poles}$$

Determines the system's poles for the under-damped system.