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Mechatronics Engineering

400 Level

EEE 441

Servo mechanics

1. root locus technique is a graphical method for monitoring the root changes of a system when there is variation in a certain system parameter.

2. Considering the following,

$$T(s) = \frac{20}{s^8 + s^7 + 12s^6 + 22s^5 + 39s^4 + 59s^3 + 48s^2 + 38s + 20}$$

the row s^6 is multiplied by $1/10$

the row s^5 is multiplied by $1/20$

at row s^3 on the routh array, we obtain a row of zeros, then on row s^4 from there,

we get $P(s)$ as $s^4 + 3s^2 + 2$

differentiating $P(s)$

$$\frac{dP(s)}{d(s)} = 4s^3 + 6s + 0$$

Substituting the row of zeros (s^3) in the routh array with the differential of $P(s)$, then multiplying by $1/2$ (for simplicity), no sign changes from row to row. The even polynomials has 4 poles on the $j\omega$ axis and 0 poles of the odd polynomials.

The system is unstable as it has 2 poles in the right half plane