

Name :	First Semester	Section :
	Roll No. :	Problem No. :

③ Given Transfer function is $\frac{K(s+3)(s+4)}{(s+1)(s+2)}$

Poles of the Given transfer function is $-1, -2$
 Zeros of Given transfer function is $-3, -4$

No. of poles = No. of zeros

No. of asymptotes equals to zero.

All the poles and zeros are real, and hence, there is no Angle of departure or angle of arrival.

for Breakaway (a) Break in points we can use characteristic equation,

$$(s+1)(s+2) + K(s+3)(s+4) = 0$$

$$\Rightarrow K = \frac{-(s+1)(s+2)}{(s+3)(s+4)}$$

$$\frac{dK}{ds} = 0 \Rightarrow (s+3)(s+4)(2s+3) - (s+1)(s+2)(2s+7) = 0$$

$$\Rightarrow (s+3)(s+4)(2s+3) = (s+1)(s+2)(2s+7)$$

$$(s^2+7s+12)(2s+3) = (s^2+3s+2)(2s+7)$$

$$2s^3 + 14s^2 + 24s + 36 = 2s^3 + 6s^2 + 4s + 7s^2 + 21s + 14$$

$$17s^2 + 45s + 36 = 13s^2 + 25s + 14$$

$$\Rightarrow 4s^2 + 20s + 22 = 0$$

$$\Rightarrow 2s^2 + 10s + 11 = 0$$

$$-1.63397$$

$$-3.36603$$

Breakaway point

Break in point

for zeros

root locus graph will be:

