

(ECE3455, Q2A) Sketch the magnitude and phase of Bode plot of the following transfer function.

$$T(s) = \frac{10^6 (S + 100)(S + 10^4)}{S(S + 10)(S + 1000)^2 (S + 10^5)}$$

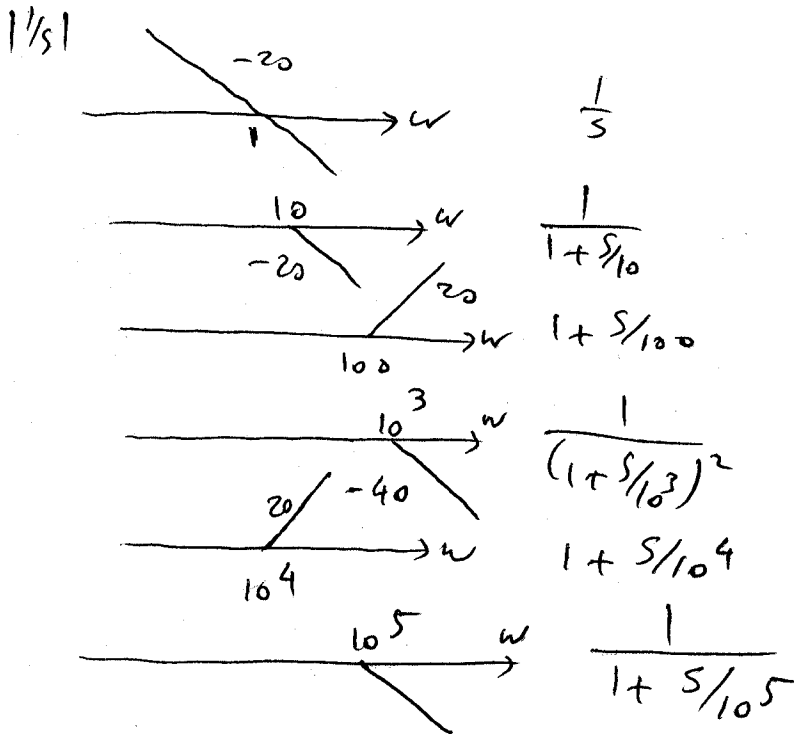
Solution:

$$T(s) = \frac{10^6 \times 10^2 (1 + S/100) 10^4 (1 + S/10^4)}{S(10)(1 + S/10) 10^6 (1 + S/10^3)^2 10^5 (1 + S/10^5)}$$

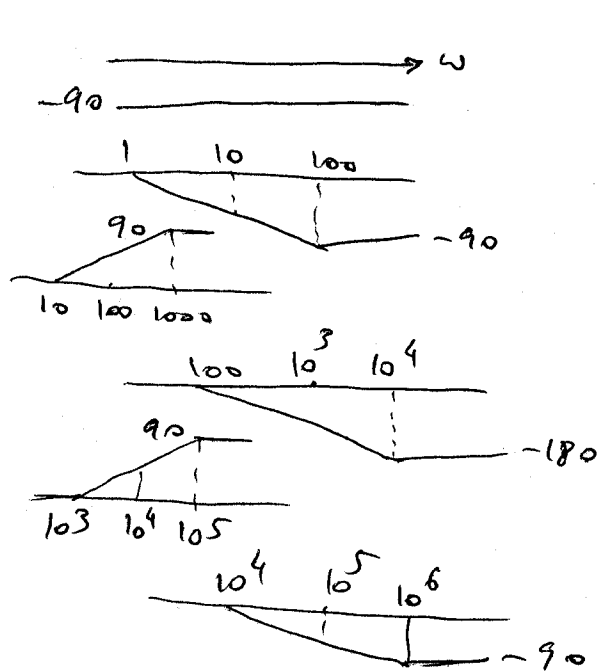
$$T(s) = \frac{(1 + S/100)(1 + S/10^4)}{S(1 + S/10)(1 + S/10^3)^2 (1 + S/10^5)}$$

$$|T|_{dB} = |1 + S/100| + |1 + S/10^4| + |1/s| + \left| \frac{1}{1 + S/10} \right| + 2 \left| \frac{1}{1 + S/10^3} \right| + \left| \frac{1}{1 + S/10^5} \right|$$

$$\angle T = \angle 1 + S/100 + \angle 1 + S/10^4 + \angle 1/s + \angle \frac{1}{1 + S/10} + 2 \angle \frac{1}{1 + S/10^3} + \angle \frac{1}{1 + S/10^5}$$



The Sum is shown in "magnitude" next page



The sum is shown in "Phase" next page

