(ECE3455, Q2B) Sketch the magnitude and phase of Bode plot of the following transfer function.

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

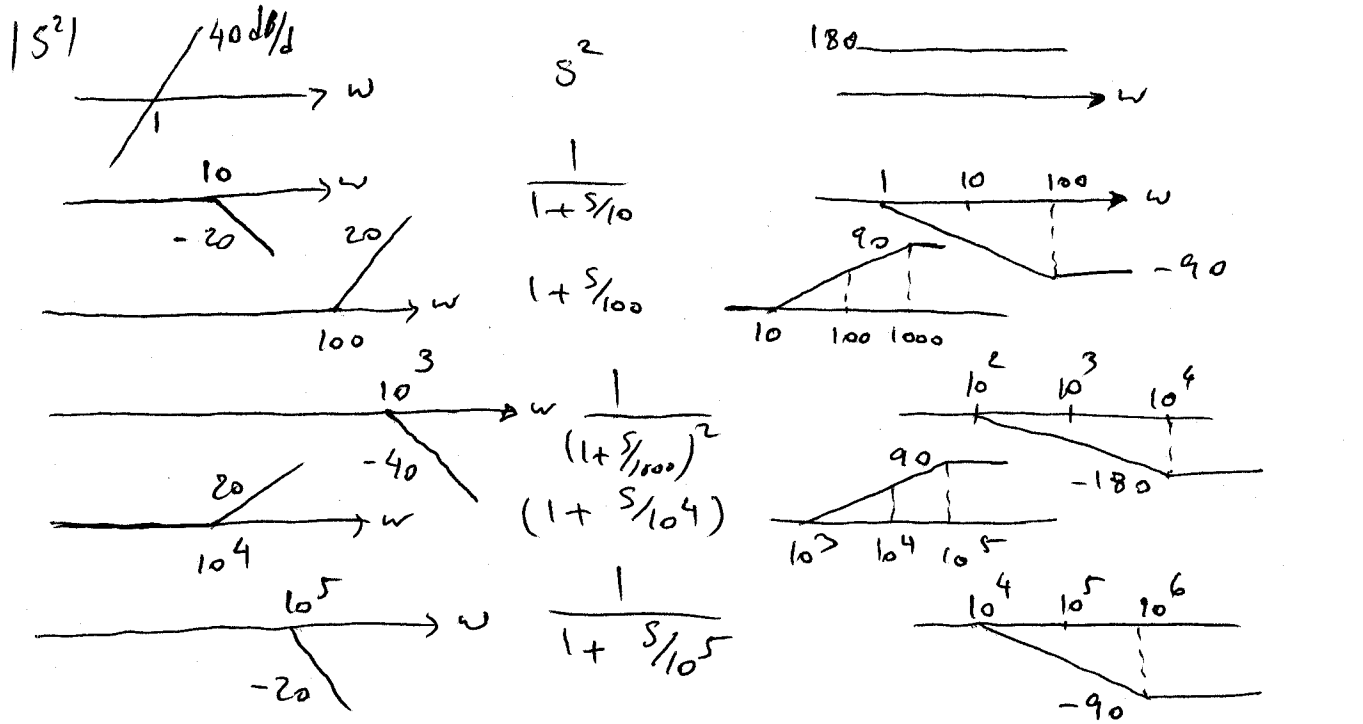
Solution:

after modification

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

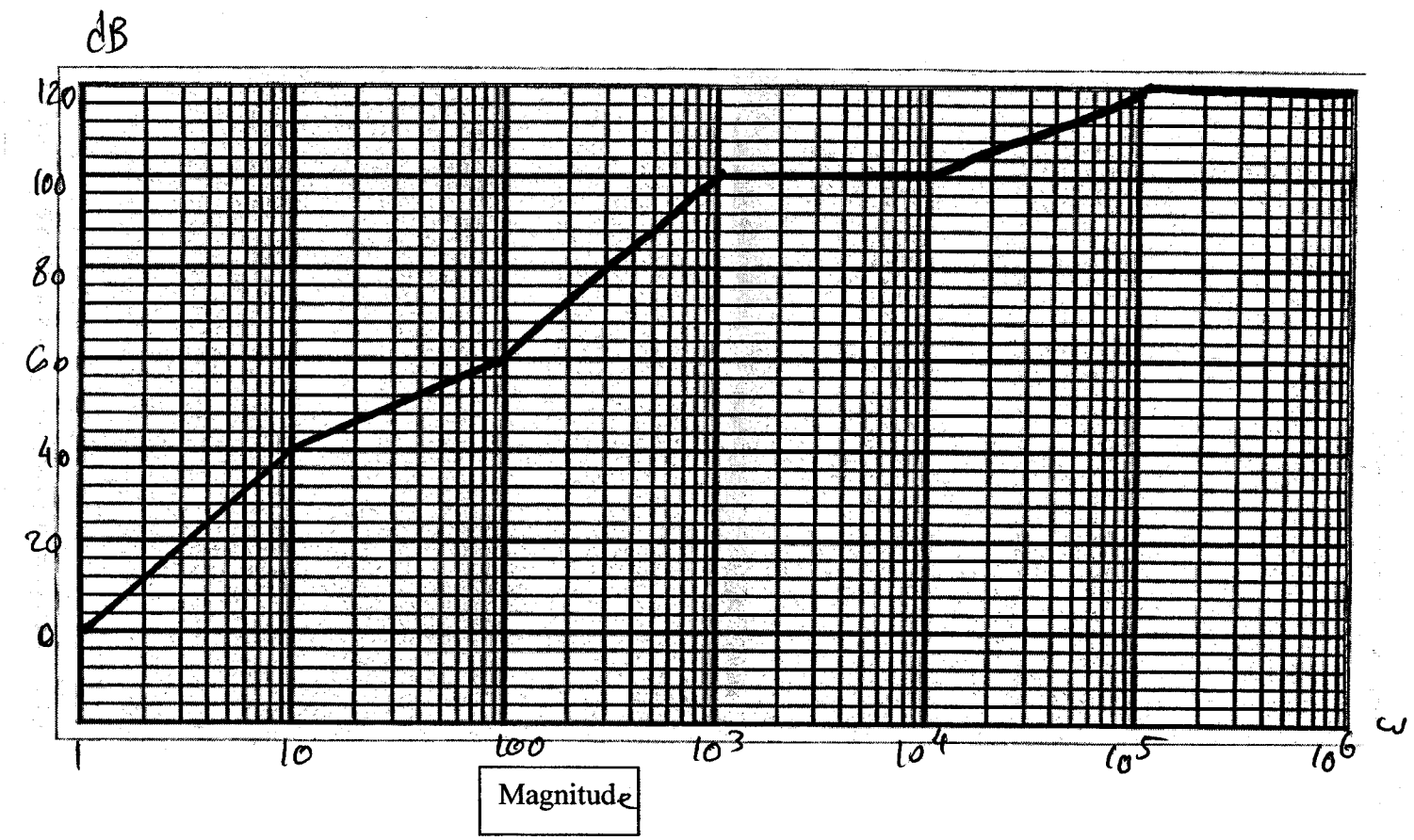
or 2|s|

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

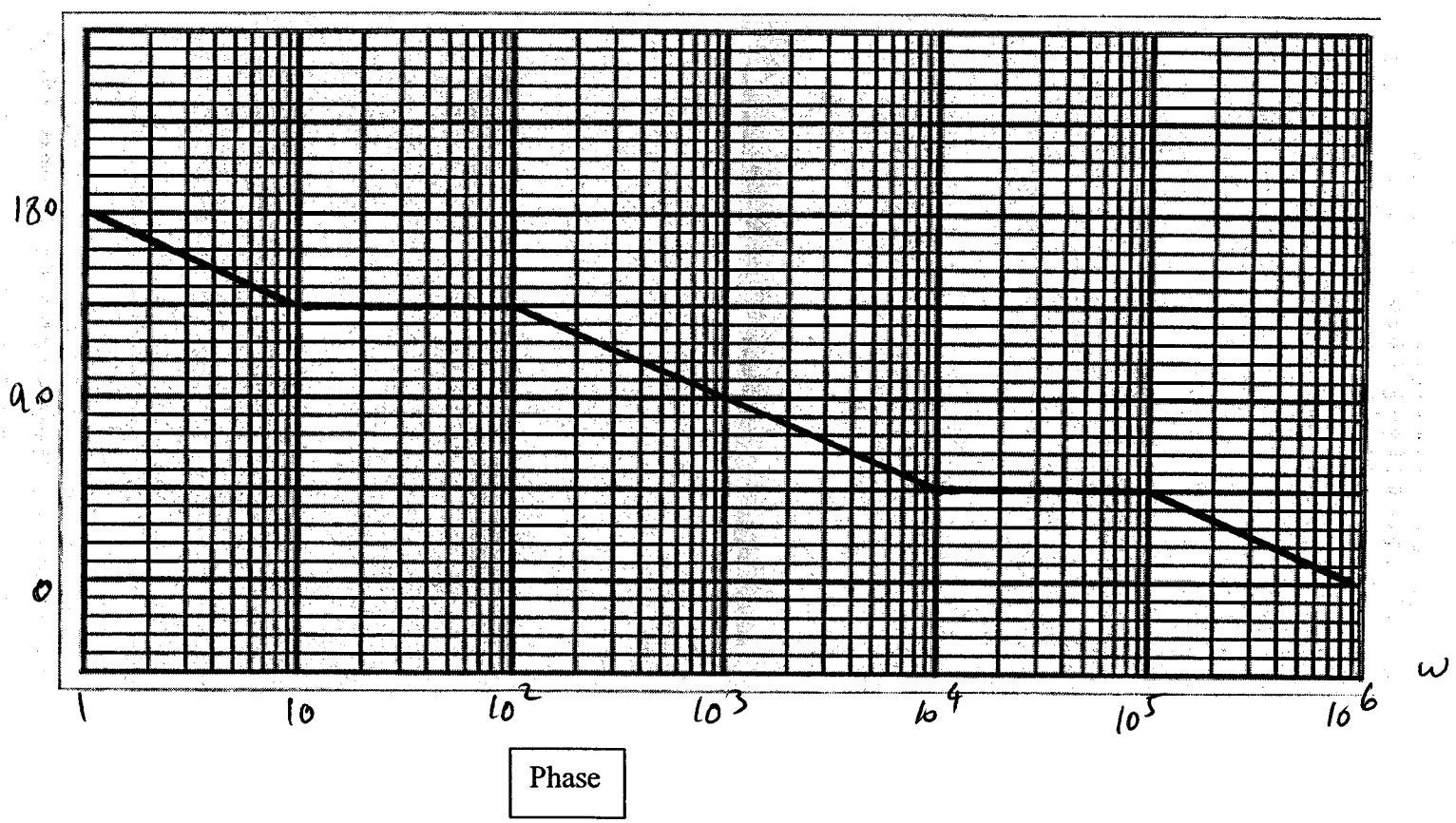



The sum is shown in Magnitude (next Page)

The sum is shown in Phase (next Page)




Magnitude




Phase