ECE 141 Homework 2

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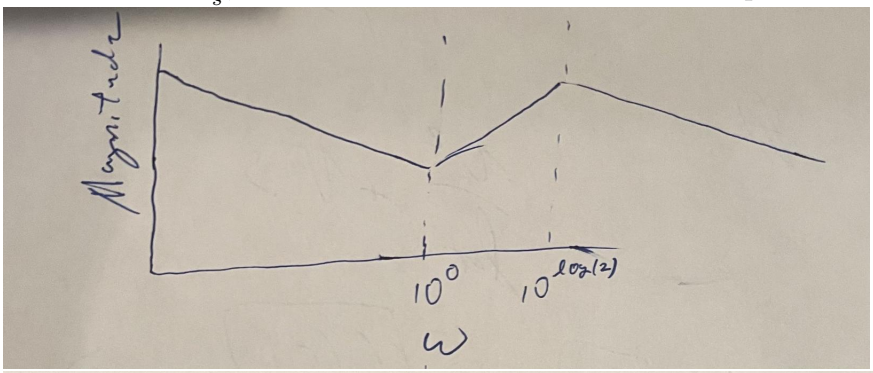
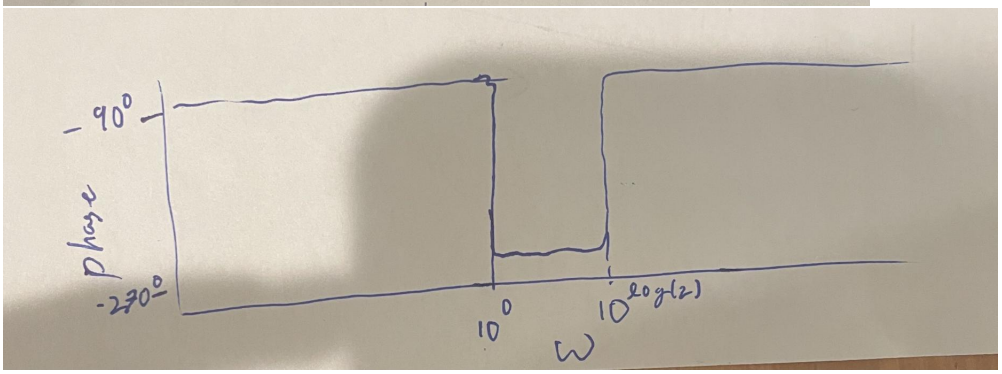
Problem 6.5

This has two break points, one at $\omega = 1$ and another at $\omega = 2$. Furthermore because of the $\frac{1}{s}$, we have that the sketch of the bode plots look like.

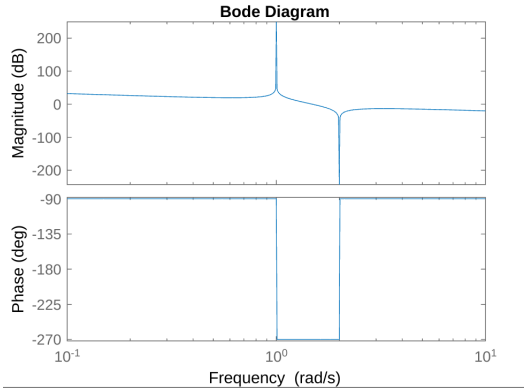




We can confirm this with the following matlab code

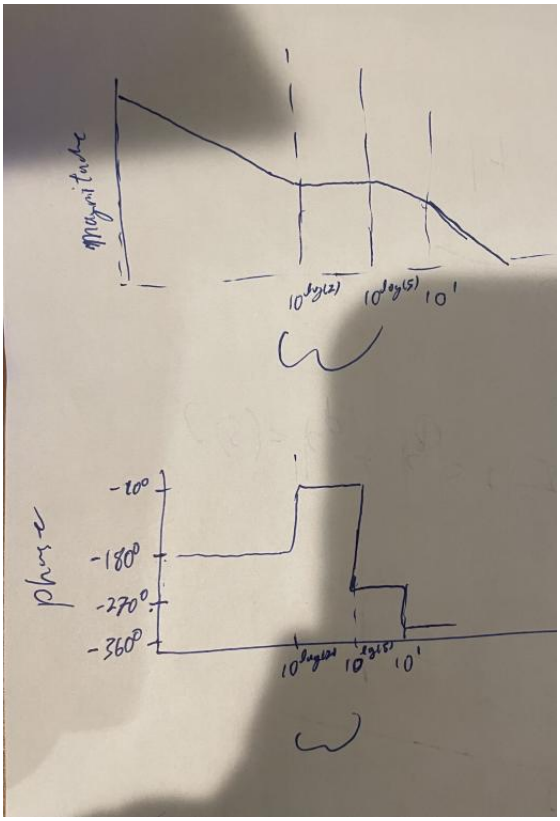
```
sys = tf([1 0 4], [1 0 1 0]);
bode(sys)
```

Which outputs the following plot



Problem 6.7

There are 3 break points, one first order one at $\omega = 2$ in the numerator, one second order one at $\omega = 5$ in the denominator and a first order one at $\omega = 10$ in the denominator. Furthermore since there also exists a s^2 in the denominator, we start of initially with a slope of -2. Therefore, we can the sketch of the bode plot looks like.



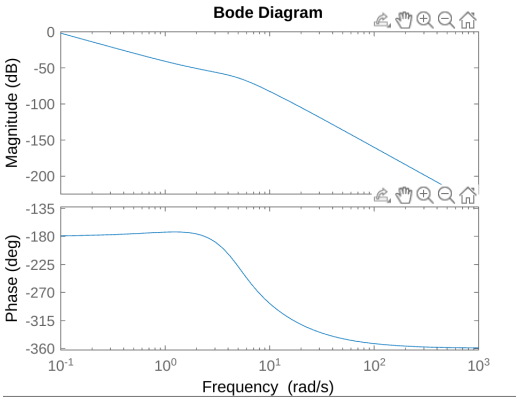
We can confirm this with the following matlab code

```
u = [1 10];
v = [1 0 0];
y=[1 6 25];

conv(conv(u,v),y)

sys = tf([1 2], conv(conv(u,v),y));
bode(sys)
```

Which outputs the following plot


Bode Diagram
Magnitude (dB)
0
-50
-100
-150
-200
Phase (deg)
-135
-180
-225
-270
-315
-360
10^-1
10^0
10^1
10^2
10^3
Frequency (rad/s)