

Examples of Bode Diagram in MATLAB:

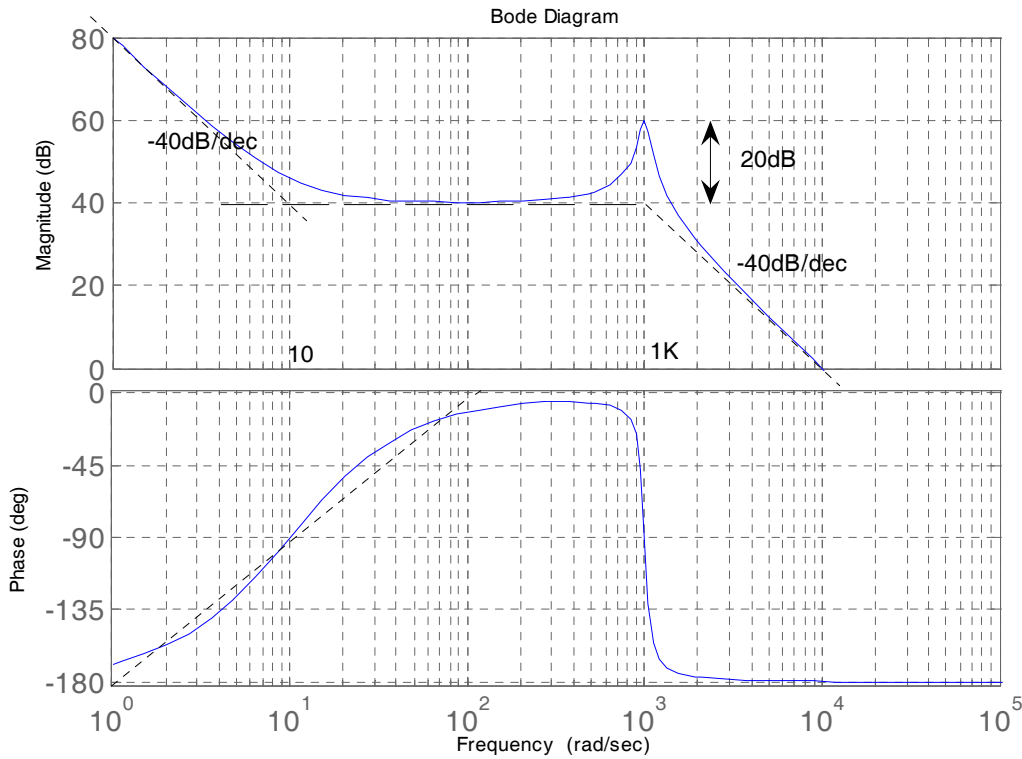
$$H(j\omega) = 100 \frac{(10 + j\omega)^2}{(j\omega)^2 [1 + 10^{-4} j\omega + 10^{-6} (j\omega)^2]}$$

with $j\omega = s$,

$$H(s) = 100 \frac{(10 + s)^2}{s^2 [1 + 10^{-4} s + 10^{-6} s^2]} = \frac{10^4 + 2 \times 10^3 s + 100 s^2}{10^{-6} s^4 + 10^{-4} s^3 + s^2} = \frac{N(s)}{D(s)}$$

Matlab:

```
>> N=[100 2e3 1e4];
>> D=[1e-6 1e-4 1 0 0];
>> bode(N,D)
```



Notice the added straight lines showing the asymptotic behavior corresponding to the hand drawn Bode plot.

Other Example

$$H(j\omega) = \frac{10(1+10j\omega)}{(1+j\omega)[1+0.04j\omega+0.01(j\omega)^2]}$$

use Matlab to find the polynomial of the denominator:

```
>> d1 = [1 1];  
>> d2 = [0.01 0.04 1];  
>> D = conv(d1,d2)
```

what gives for D = 0.0100 0.0500 1.0400 1.0000

Thus with $s=j\omega$

$$D = 0.01s^3 + 0.05s^2 + 1.04s + 1$$

$$\text{Thus, } H(s) = \frac{100s + 10}{0.01s^3 + 0.05s^2 + 1.04s + 1}$$

In Matlab:

```
>> N=[100 10];  
>> D=[0.01 0.05 1.04 1];  
>> bode(N,D)
```

