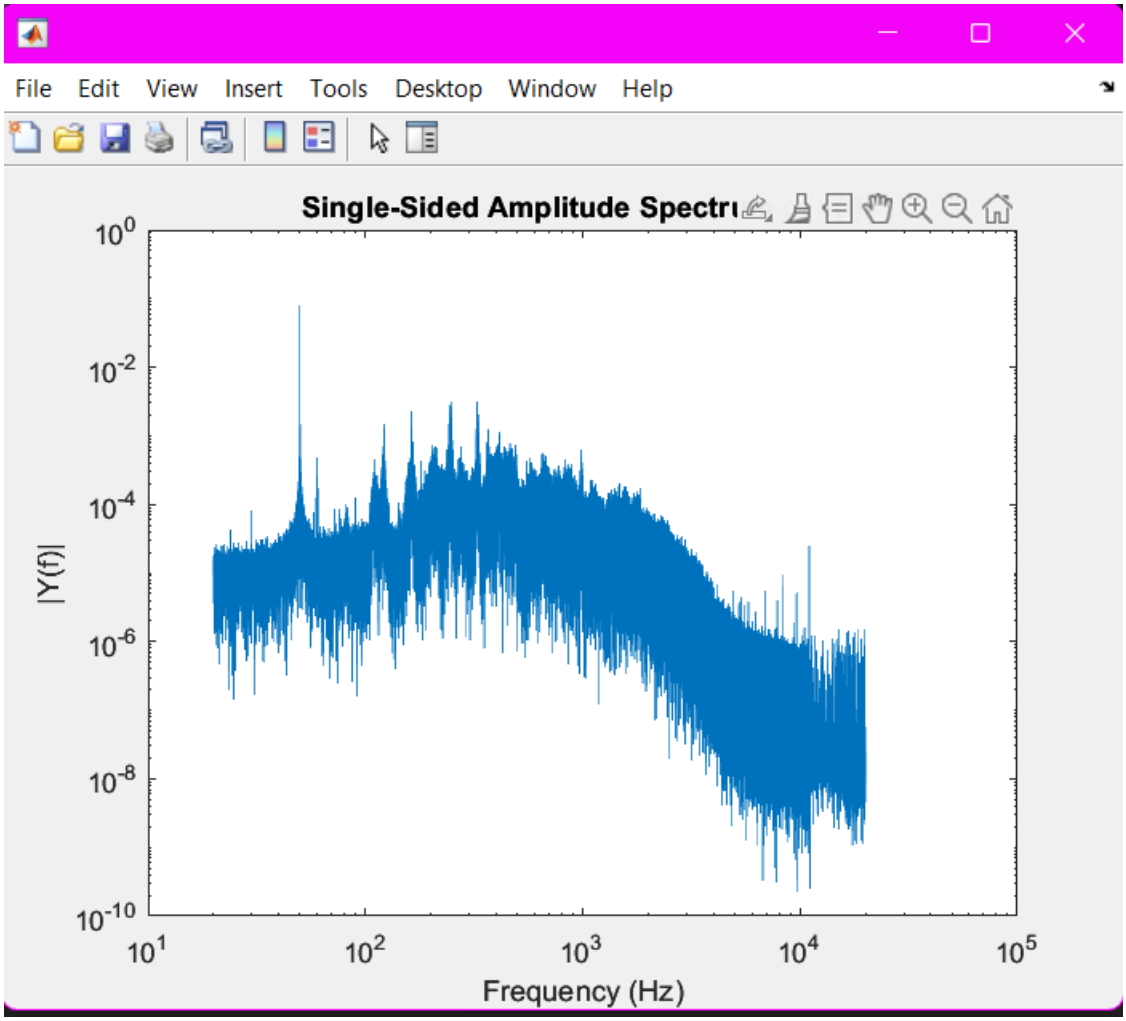
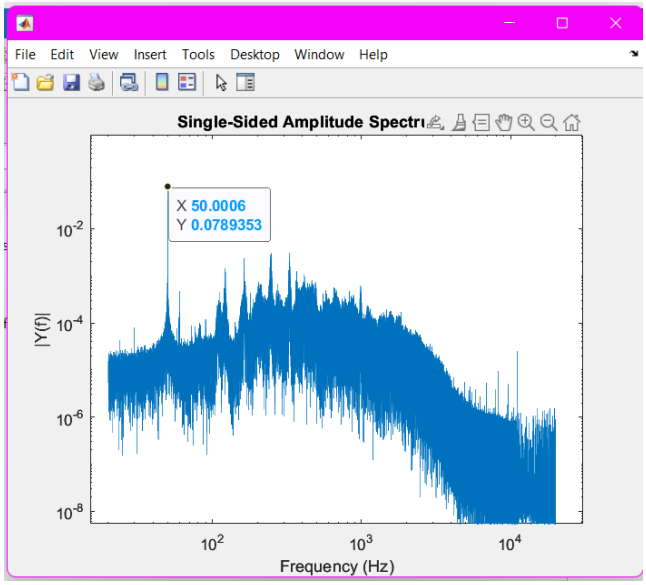
Task B and C ?????



Task D

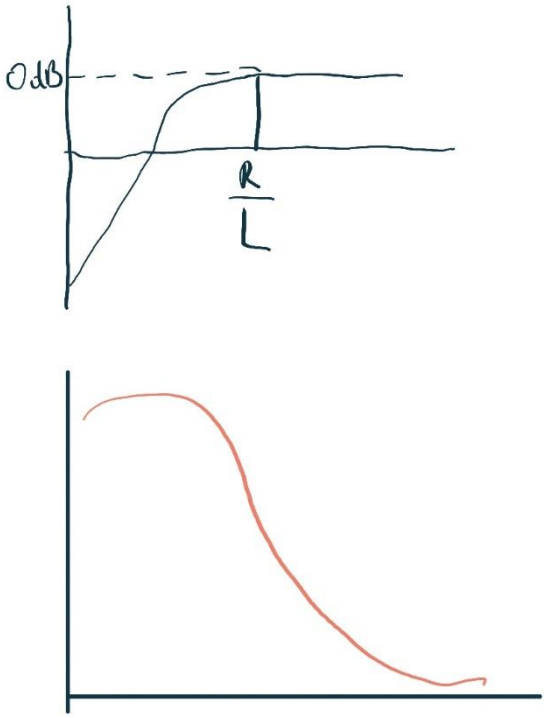


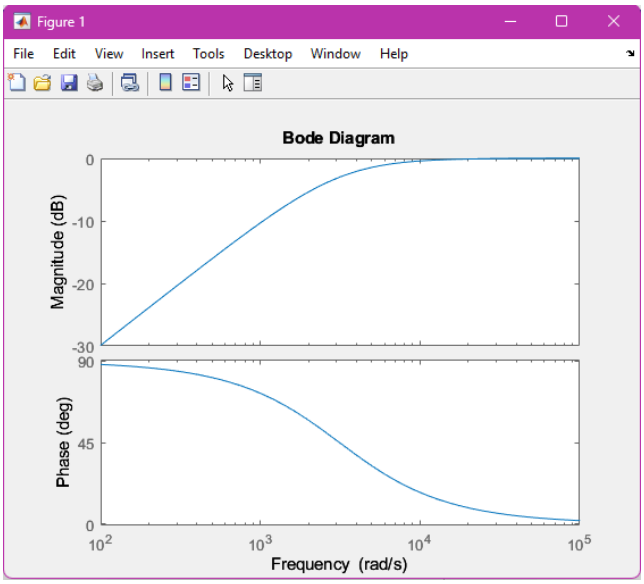
E

$$H(j\omega) = \frac{j\omega L}{R + j\omega L}$$

F

```
bode(tf([1 0],[1 3125.8]))
```





G

$$g)\ |H(j\omega)| = \frac{\sqrt{\omega^2}}{\sqrt{\left(\frac{R}{L}\right)^2 + j\omega}}$$

H

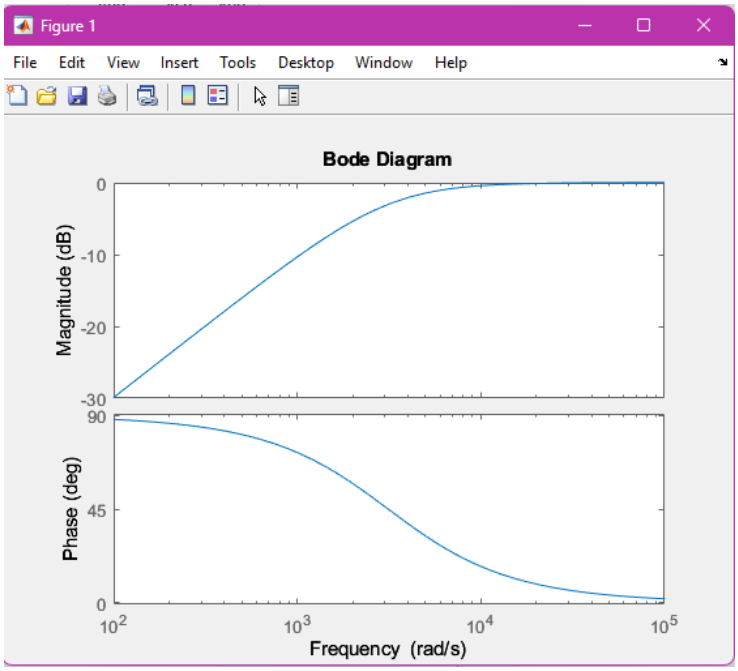
$$H)\ \omega = 2\pi f \Rightarrow \omega = 100\pi$$
$$f = 50\,Hz$$

$$|H(j\omega)| = \frac{\omega}{\sqrt{\left(\frac{R}{L}\right)^2 + \omega^2}} = 0,1$$

$$\frac{100\pi}{\sqrt{\left(\frac{R}{L}\right)^2 + (100\pi)^2}} = 0,1$$

$$\frac{R}{L} = \sqrt{9900000\pi^2} = 3175,8$$

I




```
s=tf('s');

RdivL=3125.8;
sys=(s/(RdivL+s));
bode(sys)
```

J

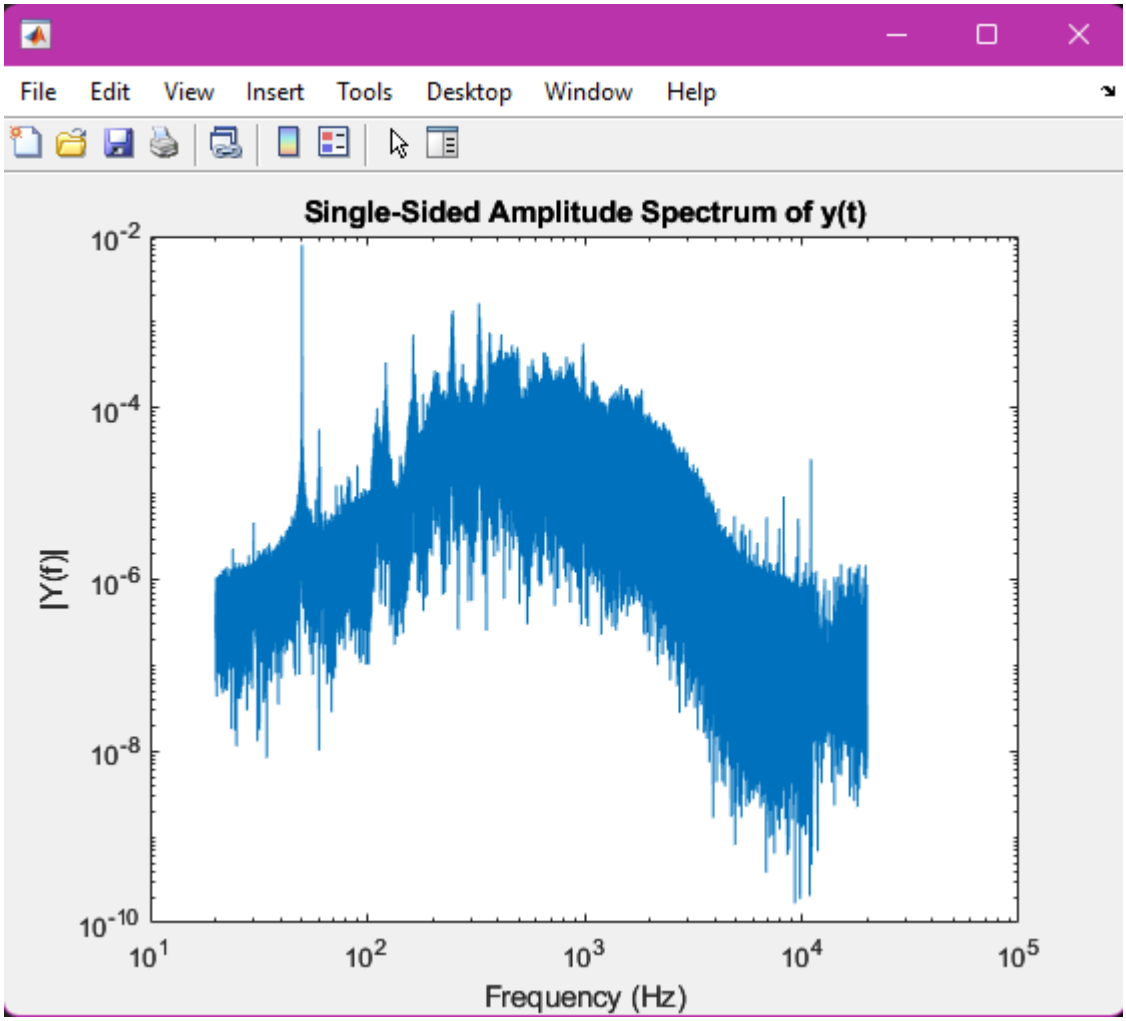
```
  [f1,Fs]  = audioread('radioSample.wav');
  [m,~]    = size(f1);
  t        = (0 : 1/Fs : (m-1)*1/Fs)';

  makeFft(f1,Fs,20,20e3); %People can only hear in a frequency range from 20 to 20
kHz...
  s=tf('s');
RdivL=3125.8;
sys=(s/(RdivL+s));
bode(sys)
f2=lsim(sys,f1,t);
```

L

```
  [f1,Fs]  = audioread('radioSample.wav');
  [m,~]    = size(f1);
  t        = (0 : 1/Fs : (m-1)*1/Fs)';

  %makeFft(f1,Fs,20,20e3); %People can only hear in a frequency range from 20 to
20 kHz...
  s=tf('s');
RdivL=3125.8;
sys=(s/(RdivL+s));
%bode(sys);
f2=lsim(sys,f1,t);
makeFft(f2,Fs,20,20e3);
```



The high pass filter adjusted the whole audio by reducing the lower frequencies by a factor of 10.

The notch filter would have been focusing on a specific frequency.