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```
clc; close all; clear;
```

```
% Setting up required functions
```

```
u = @(n)double(n>=0);
```

```
del = @(n)double(n==0);
```

## Question 1

```
w = linspace(0,10,1000);
```

```
H = 1+2*exp(-25i*w);
```

```
magnitude = abs(H);
```

```
wrapped_angles = angle(H);
```

```
unwrapped_angles_unwrap = unwrap(wrapped_angles);
```

```
unwrapped_angles_myfunc = my_unwrap(wrapped_angles);
```

```
figure;
```

```
subplot(2,2,1);
```

```
plot(w,magnitude);
```

```
xlabel("w");
```

```
title("|H(w)|");
```

```
ylabel("|H(w)|");
```

```
grid on;
```

```
subplot(2,2,2);
```

```
plot(w,wrapped_angles);
```

```
xlabel("w");
```

```
title("Wrapped Phase Angle of H(w)");
```

```
ylabel("Phase Angle of H(w)");
```

```
grid on;
```

```
subplot(2,2,3);
```

```
plot(w,unwrap(angle(H)));
```

```
xlabel("w");
```

```
title("Unwrapped phae angle using unwrap");
```

```
ylabel("Phase Angle of H(w)");
```

```
grid on;
```

```
subplot(2,2,4);
```

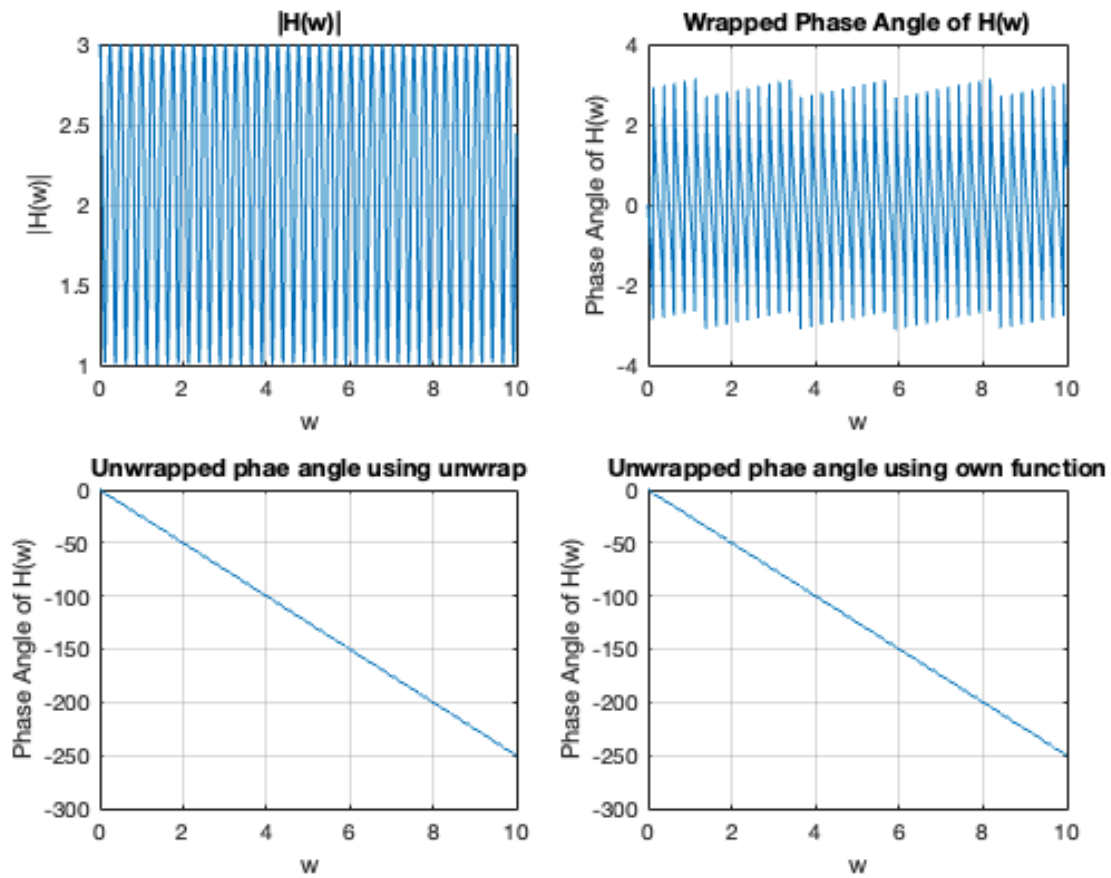
```
plot(w,unwrapped_angles_myfunc);
```

```
xlabel("w");
```

```
title("Unwrapped phae angle using own function");
```

```
ylabel("Phase Angle of H(w)");
```

```
grid on;
```



## Question 2:

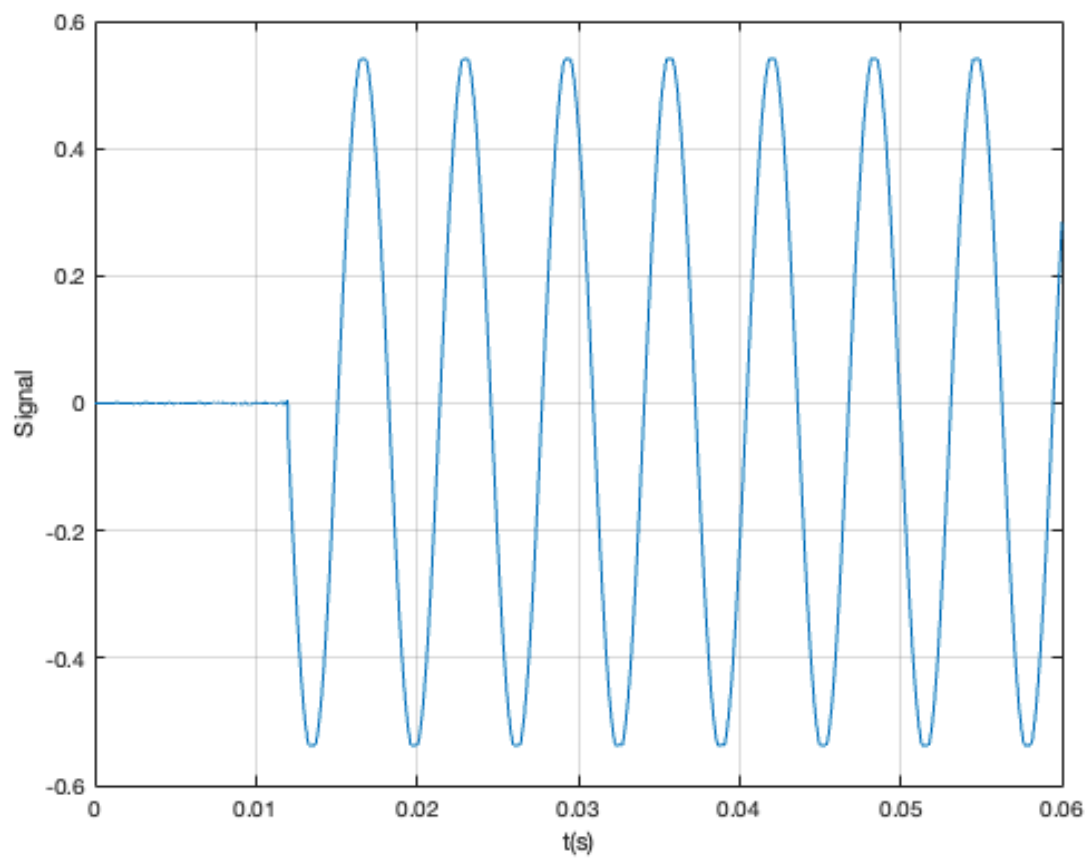
```
[x, Fs] = audioread('analog computer data.mp3');
x = x(:,1);
x = x';
figure;
T = 1/Fs;
t = 0:T:(length(x)-1)*T;
plot(t',x);
xlabel("t(s)");
ylabel("Signal");
xlim([0,0.06]);
grid on;

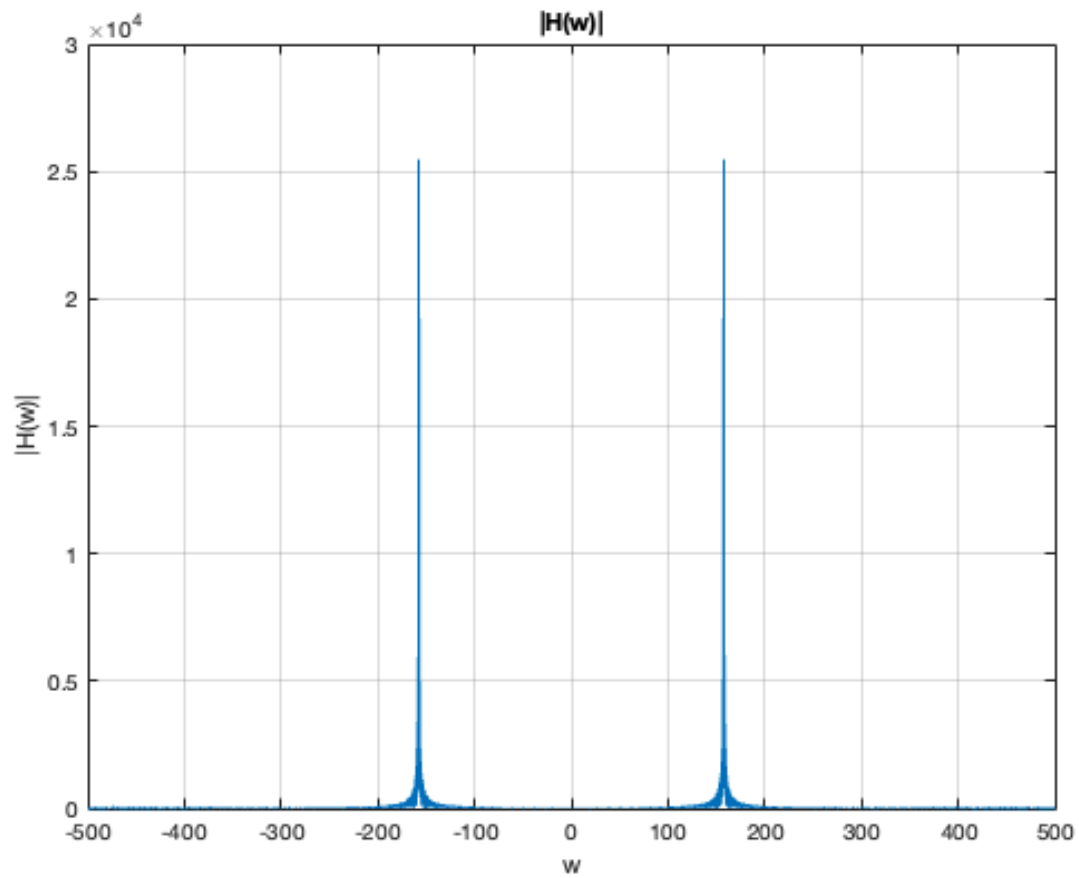
[X,f] = dtft(x,T);
magnitude = abs(X);

figure;
plot(f,magnitude);
xlabel("w");
title("|H(w)|");
ylabel("|H(w)|");
```

---

```
xlim([-500,500]);  
grid on;  
  
[yMax,locs] = max(X);  
for i = 1 : length(locs)  
    xValue = f(locs(i));  
    disp("Dominant Frequency: " + xValue);  
end  
  
% Dominant Frequencies: 157.654 and -157.654  
  
Dominant Frequency: 157.6538
```





## Functions

```
function new_angles = my_unwrap(angles)
    new_angles = angles;
    add = 0;
    for i = 2 : length(angles)
        if((angles(i)*angles(i-1))<0 && angles(i)>0)
            add = add - 2*pi;
        end
        new_angles(i) = new_angles(i) + add;
    end
end
```

*Published with MATLAB® R2023a*