

Course > Unit 1: Fourier Series > Part B Homework 1 > 5. Decode the message

5. Decode the message

Decode the message

0 points possible (ungraded)

This problem is just for fun, and is worth zero points. It requires that you really get into using MATLAB to process the signal. Note that if you play it, it will sound like noise! Your job is to filter out the noise to decode the message.

Audio file containing a secret message

0:00 / 0:09

Download

Download this into MATLAB Online using the following commands. (Use short cut commands for copy and paste: ctrl-c and ctrl-v on windows, and cmd-c, cmd-v on a MAC.)

```
url = 'https://courses.edx.org/asset-v1:MITx+18.03Fx+3T2018+type@asset+block@audio_secret_message.wav';
websave('secret_message.wav', url);
```

Process the sound file (using methods learned to recitation) to hear the message, and enter the answer suggested by the message into box below. (Hint: you may have to rescale the signal to hear the message.)

5031 **✓ Answer:** 5031

Salution.

Plotting the symmetric shift of the FFT of the audio file shows a small range of frequencies in low frequency range and a lot of high frequency noise. Clipping off the high frequency noise, and taking the inverse FFT gives us a secret message telling us to enter a number into the answer box.

To see a beautiful live script solution walking through a way to do this using filters in MATLAB, try downloading the following script created by a student VanessaV999 the last time we ran this course.

(Use short cut commands for copy and paste: ctrl-c and ctrl-v on windows, and cmd-c, cmd-v on a MAC.)

url = 'https://courses.edx.org/asset-v1:MITx+18.03Fx+3T2018+type@asset+block@winners_VanessaV999.mlx';
websave('VanessaV999.mlx',url)

Submit

You have used 1 of 4 attempts

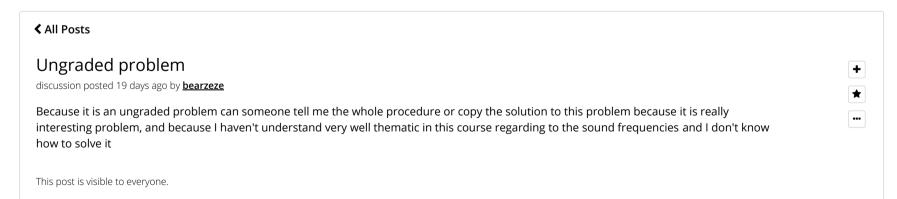
• Answers are displayed within the problem

5. Decode the message

Hide Discussion

Topic: Unit 1: Fourier Series / 5. Decode the message

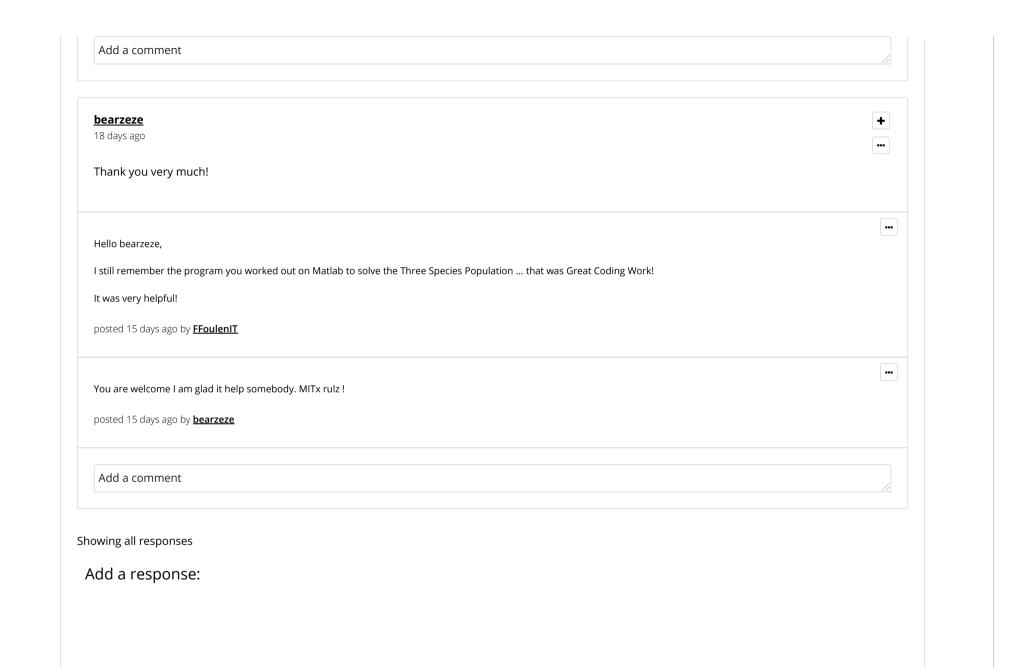
Add a Post



Add a Response

2 responses

minhnhannguyendo + 18 days ago - endorsed 14 days ago by **jfrench** (Staff) %first fft to see the pattern then we can edit to see signal and inverse %back to a better sound [y,Fs] = audioread('secret.wav'); %The audio file is already loaded for you y = y(:,1); %Take first channel of signal n = length(y); %length of signal t = (0:n-1)*(1/Fs); %time series vector figure(2) %plot(t, y); %plot the sound signal %NOTE we do not take the one sided signal here because we need both sides to %recreate the sound signal using ifft command Y = fftshift(fft(y)); %Take the Fourier series and take a symmetric shift fshift = (-n/2:n/2-1)*(Fs/n); %Determine the frequency vector (shifted) L = length(fshift); %Find the length of frequency values Yfilt = Y.*150; %Take the absolute value %YOU MODIFY Yfilt here to remove the frequencies between -300hz and 300hz % You may find plotting fshift vs abs(Yfilt) helpful here %plot(fshift, abs(Yfilt)); indexes = find(abs(fshift)>0.4796.*10.^4); %MODIFY THIS %index2 = max(find(fshift<800)); %MODIFY THIS % Sets frequencies between index1 and index2 to 0 Yfilt(indexes) = 0; plot(fshift, abs(Yfilt)); %Take the inverse FFT to create a filtered sound signal soundFilt = ifft(ifftshift(Yfilt),'symmetric'); %Uncomment the command below to listen to your filtered sound signal in MATLAB online %sound(y,Fs) % uncomment this command in MATLAB online to hear the sound sound(soundFilt,Fs); %after filter Many Thanks! I was completely at a loss with this question. I have to review this topic more in depth. posted 14 days ago by **FFoulenIT**



| | | // |
|---------|--|----|
| Preview | | |
| Submit | | |

© All Rights Reserved