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

Solution:

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)
```

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Answers are displayed within the problem

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Ungraded problem

discussion posted 19 days ago by **bearzeze**

Because it is an ungraded problem can someone tell me the whole procedure or copy the solution to this problem because it is really interesting problem, and because I haven't understand very well thematic in this course regarding to the sound frequencies and I don't know how to solve it

This post is visible to everyone.

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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**

Add a comment

bearzeze
18 days ago

Thank you very much!

Hello bearzeze,

I still remember the program you worked out on Matlab to solve the Three Species Population ... that was Great Coding Work!

It was very helpful!

posted 15 days ago by **FFoulenIT**

You are welcome I am glad it help somebody. MITx rulz !

posted 15 days ago by **bearzeze**

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