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Lab: Discrete Fourier Transform and

<u>Course</u> > <u>Unit 1: Fourier Series</u> > <u>Signal Processing</u>

> 5. DFT in MATLAB

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5. DFT in MATLAB Discrete Fourier Transform

Discrete Fourier Transform MIT Differential Equations (Caption will be displayed when you start playing the video.) 2:21 / 2:21 X ▶ 2.0x HD

Plotting FFT for real signals (External resource) (1.0 points possible)

Finding the frequencies in a signal

In this problem, we'll apply the Fast Fourier Transform (FFT) to find and plot the frequencies in our guitar sound signal. The template code extracts the signal from 30% to 50% of the original data. Follow the procedure in the video to plot the single-sided frequency spectrum of the signal. In particular, you need to

- Find the Fourier Transform of signal and store the result in the variable y
- Calculate the single-sided magnitude spectrum as in the video in the variable vMag
- Create a vector, f, representing the frequencies of vMag

Script @

Save C Reset MATLAB Documentation (https://www.mathworks.com/help/)

```
1 [signal,Fs] = audioread('1803_musicdata_guitar1.wav');
2 signal = signal(:,1);
3 L = length(signal);
4 signal = signal(round(L*0.3):round(L*0.5));
6 % Copy the procedure in the video to get the single sided spectrum
7 y = fft(signal);
_8 | yMag = abs(y);
9 N = length(yMag);
   f = 0 : (Fs/N) : (Fs/2);
  yMag = yMag(1:length(f));
12
   % This code plots yMag as a function of f
   % You can comment out this code if necessary while building your solution
   figure
   plot(f,yMag,'-*');
   title('Single-Sided Amplitude Spectrum')
   xlabel('f (Hz)')
  ylabel('|c_n(f)|')
   set(gca, 'fontsize', 18)
   xlim([0,1000])
```

5. DFT in MATLAB Topic: Unit 1: Fourier Series / 5. DFT in MATLAB Add a Post Show all posts ▼ Why do we do abs(y)? 'To create amplitudes in the frequency domain' is the answer given in the video, but I'm not sure I understand what that means. Why is the maximum extractable frequency Fs/2? Learn About Verified Certificates

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