

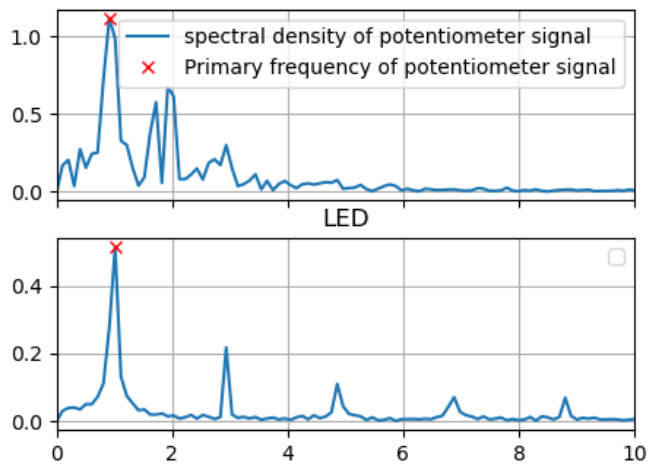
## Lab 5

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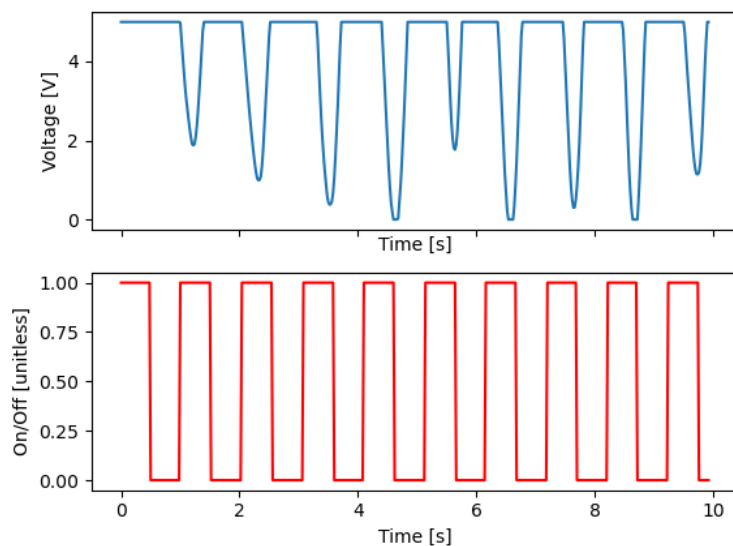
1. The frequency created by oscillating the potentiometer lines up with the LED period very close, with only an error of  $1/10^{\text{th}}$  of a second. For how bad the data is (looking at the voltage and spectral density plot), this is surprisingly close. The secondary frequency of the LED of about  $\sim 3$  Hz also lines up quite well between the two along with the first one at about 1 Hz.

Fast Fourier Transforms of Potentiometer and LED signals

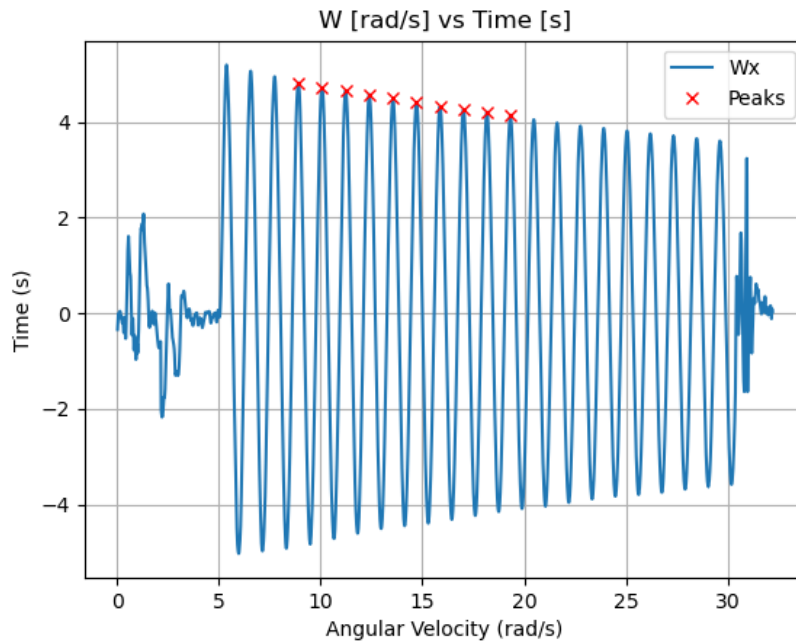
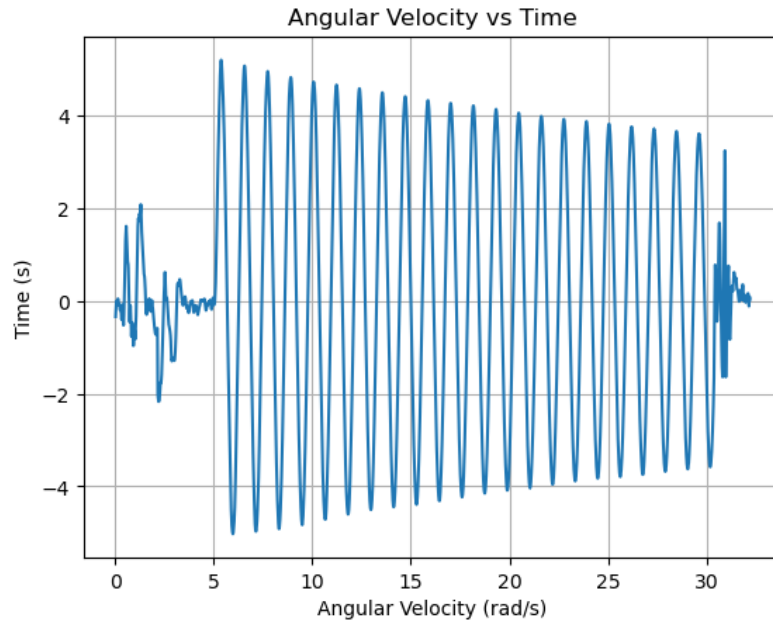


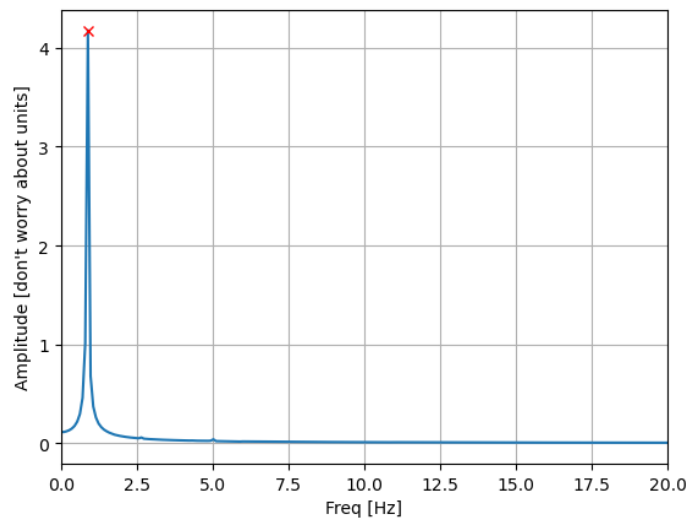
```
# python 17 Arduino_Exp_Analysis_Student.py  
Experimental period of potentiometer data is: 1.0978 seconds  
Experimental period of LED Data is is: 0.9880 seconds
```

Potentiometer Voltage and LED On/Off Signal



2. The frequency given from the FFT to the peak-to-peak measurements is about 2% different, which can be negligible. The FFT frequency analysis is much more important when there is more than one signal, as the peak-to-peak signal analysis only works because it only has one frequency





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Pk to Pk Frequency is: 0.8641 Hz  
Pk to Pk period is: 1.1573 seconds  
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Dominant FFT Frequency is: 0.8807 Hz  
Experimental FFT period is: 1.1355 seconds  
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```