Problem Set 5
ENGN/PHYS 225—Winter 2021
Due Date: Monday, 05 Apr, 4pm

Foreword

This assignment explores the world the frequency of oscillating things (most physical systems in the universe). We can synthesize signals by superposing sines and cosines; or we can analyze (decompose) a complicated looking signal into its underlying oscillating components. Note these problems are essentially taken straight from our class workshop time (thus, a it is a "light" assignment). Lastly, if you understand the graphic on this page (Figure 1), you have really understood the essence (mathemagic) of Fourier Series!

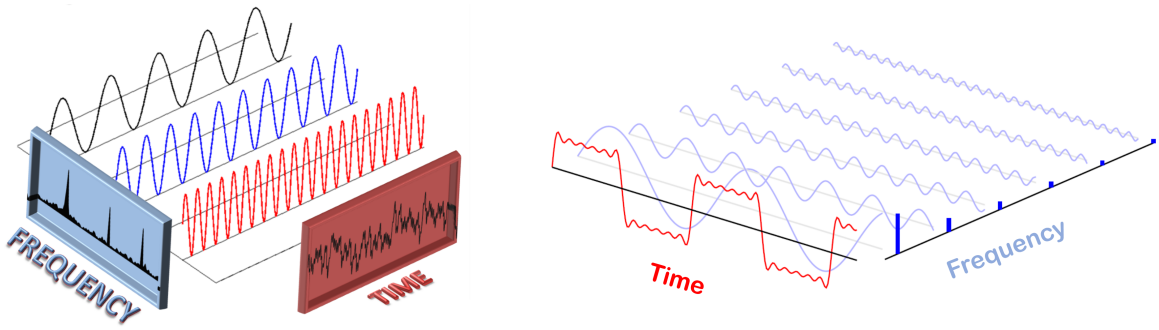

Figure 1: Fourier Series Summary. Time domain and frequency domain representations are two sides of the same math coin. Images are not originals; they were found via google image search.

Problems

1. Complete 3 total problems rooted in Fourier Series and the Discrete (Fast) Fourier Transform (DFT/FFT).

2. 2 or more of these can be drawn from the in-class **Fourier Series worksheet** and **Discrete Fourier Transforms Matlab workshop** we mostly tackled started in class.

3. Select at least 1 problem from column A (Fourier Series) and one from column B (DFT/FFT).

4. Optionally, you may write and solve 1 of your own problems (+2 others from the workshops = 3 problems total...that's the hardest math we've done all year right there, haha). If you go this route, your problem statement should briefly summarize the real-world application as well as the math problem to be solved.