

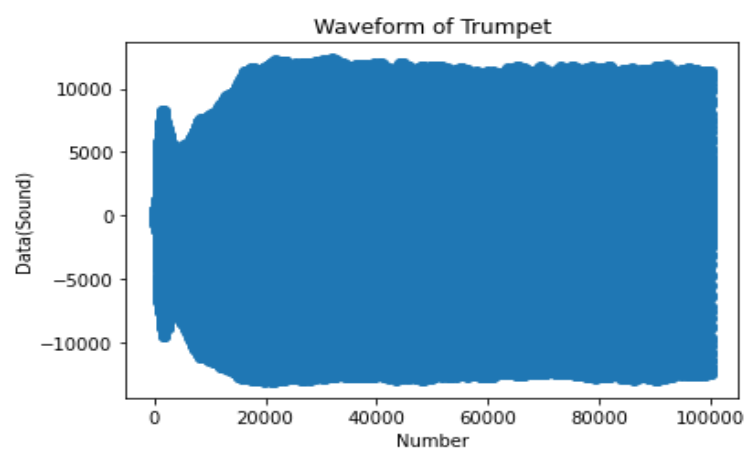
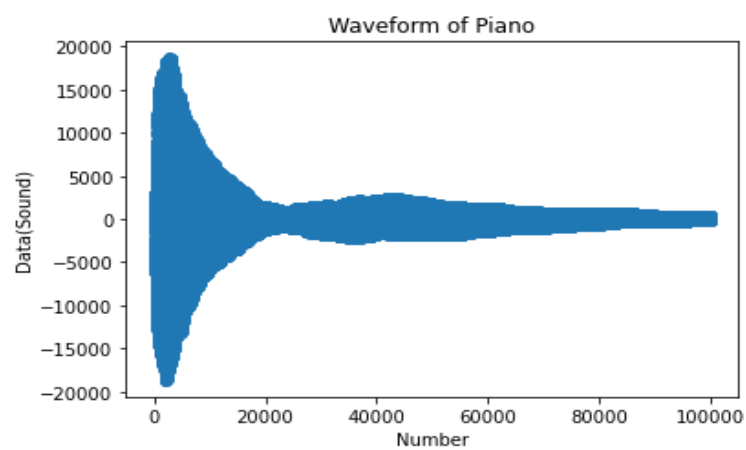
PHYA-UA 210 HW8

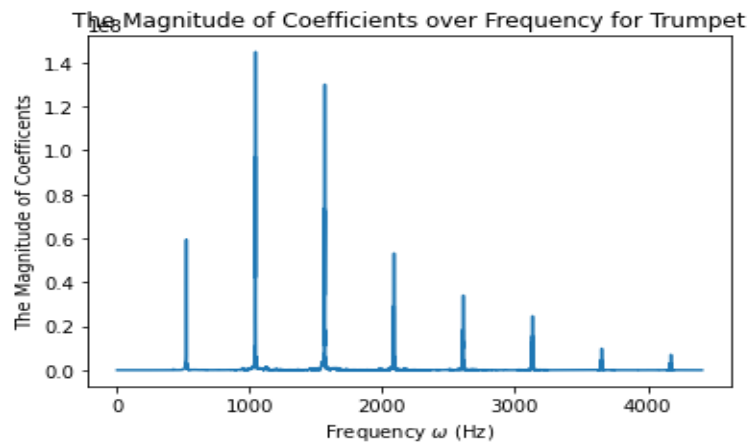
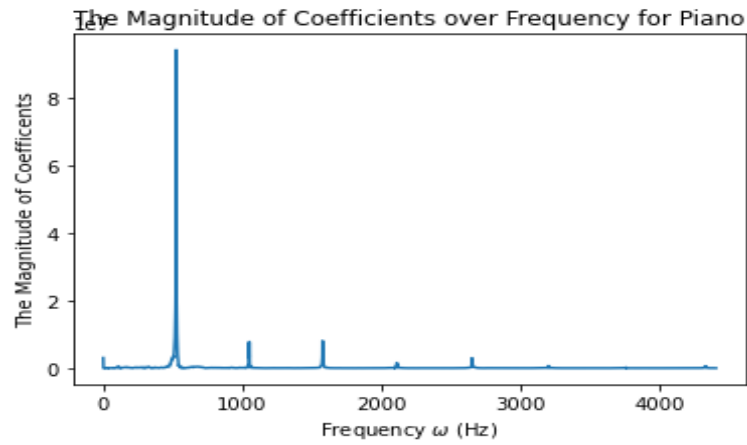
Robert Zhao

December 2, 2023

Q1)

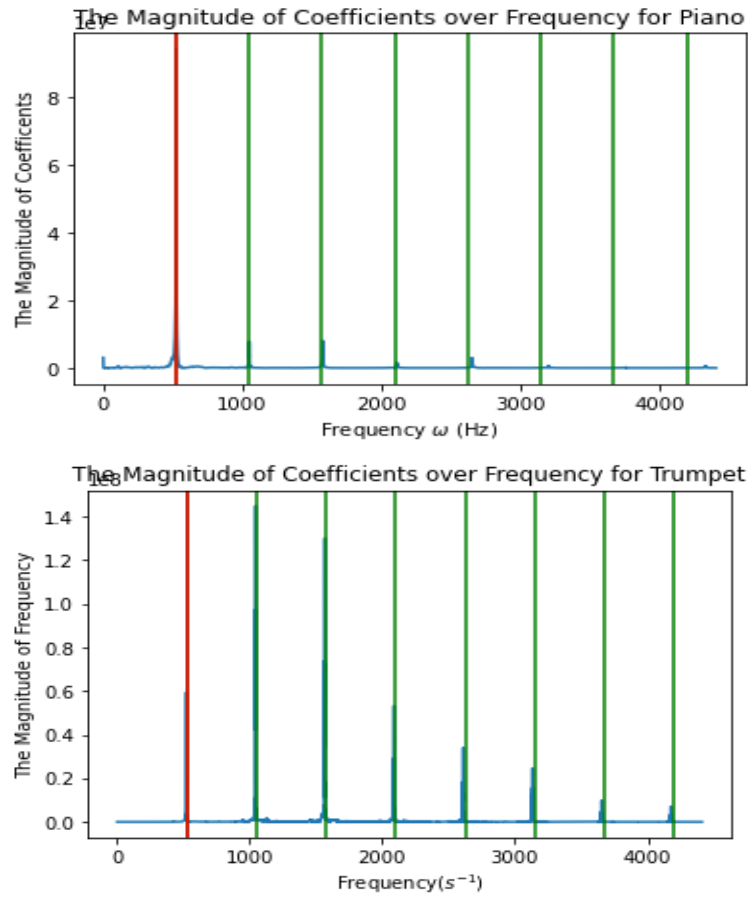
(a)





After applying the discrete Fourier transform to the wave of the piano and trumpet sounds, we can find that the plot is composed of a few peaks of magnitude of coefficients. The magnitudes of coefficients are either at peak or zero. The sound of piano and trumpet is composed of waves at these certain frequencies.

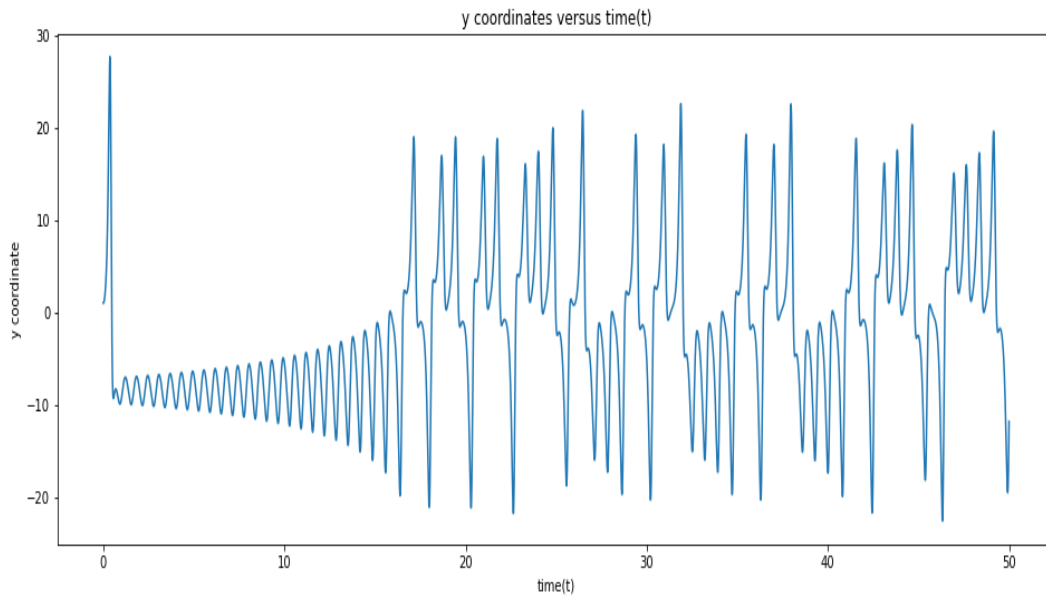
(b)



The dominant frequency is 524.79 Hz. The music note is C^5 . From the two plots above we can find that all the peaks are at $frequency = 524.79Hz$ or are integer multiples of it.

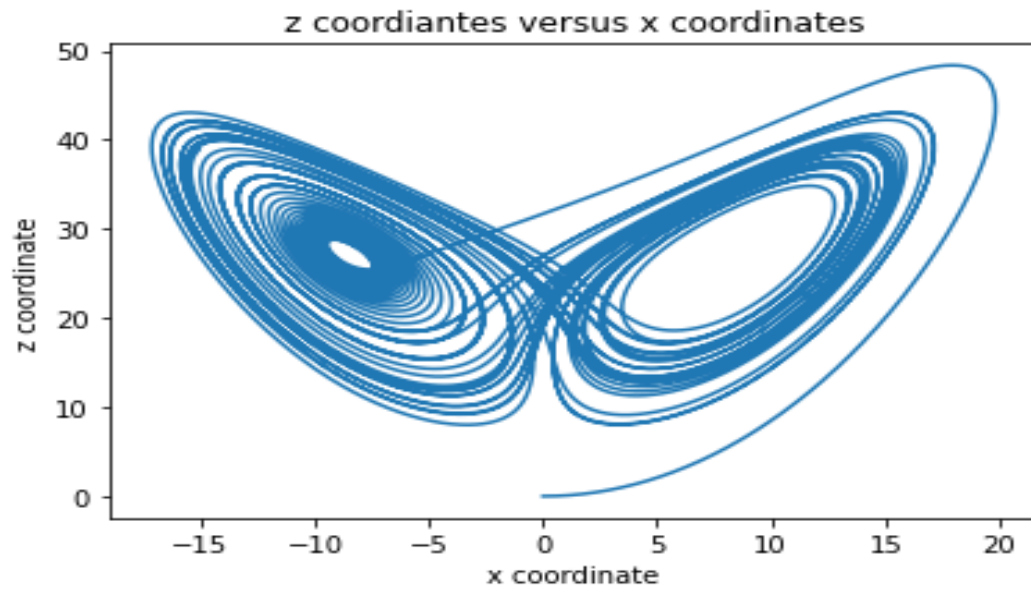
Q2)

(a)



I set the time to be 50s and time interval to be 0.001s. I used the 4th-order Runge Kutta method to solve the Lorentz equations. From the plot above, we can find that the function of y versus time is unpredictable.

0.1 (b)



I set the time to be 50s and time interval to be 0.001s. The function of z versus x forms a plot like a butterfly.

Link for GitHub: <https://github.com/LagrangePointL3/phys-ua210>