1. Find out the amplitude and the phase angle of the following equations:

f(t)= 64+26cos(2 *pi*k*t/N)+13 sin(2 *pi*k*t/N)

If N=200 then what is the frequency for k=1. Use the above equation to find out the frequency.

Attached in 1_2.pdf

2. What would be the transformed formula, F(w), to calculate the frequency of the series?
   f(t)= -1 for 0<t<a

   f(t)= 0 elsewhere
   **Either type or use legible handwriting to find the integrated function.

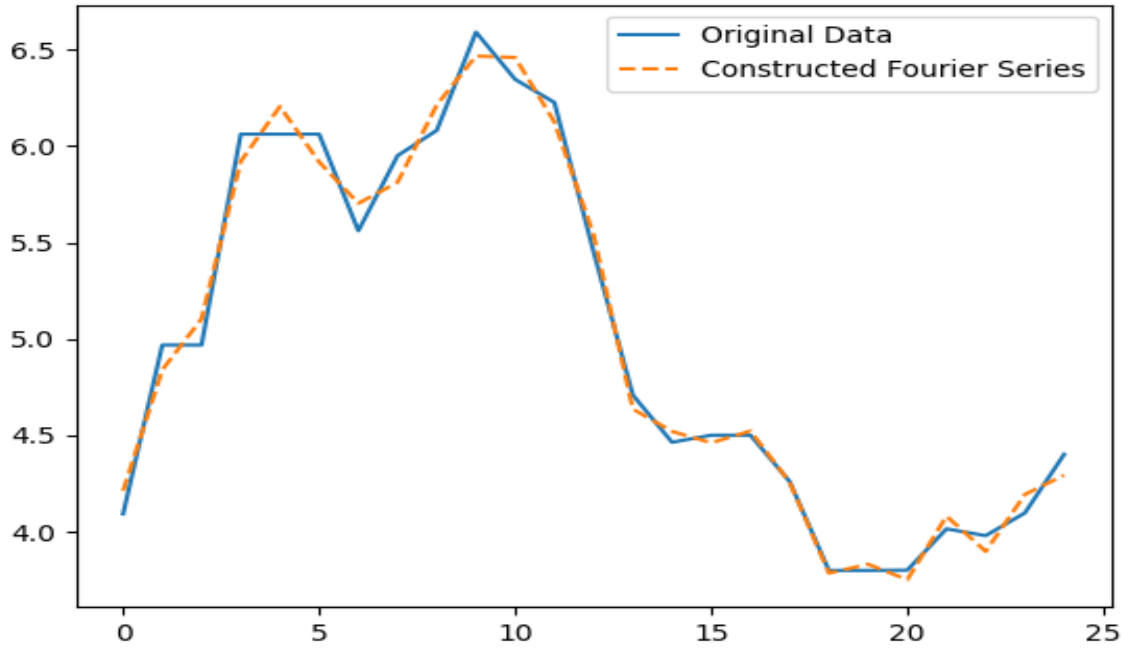
Attached in 1_2.pdf

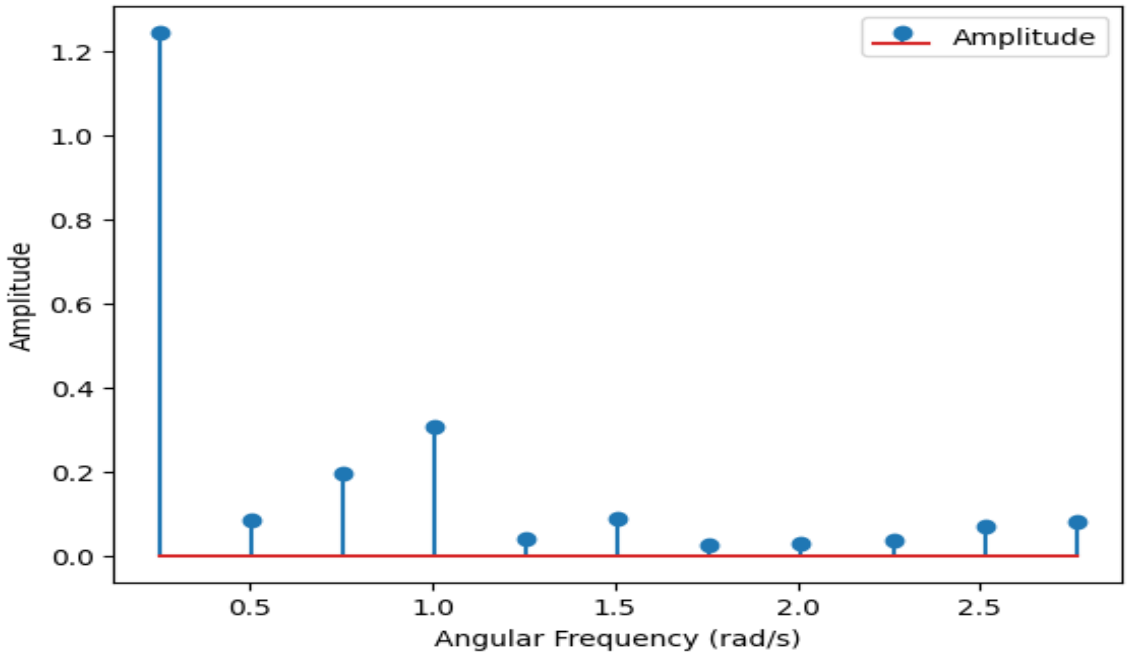
3. Construct the entire Fourier series of the "DIS" data using:
   K=1 between 0-25
   K=2 between 25-140
   K=3 between 140-220
   K=4 between 220-250
   K=5 between 250-310
   K=6 between 310-350
   K=7 between 350-506

   Compute the frequencies and amplitudes for each of the individual series. Also, compute the same for the entire time series (0-506). Do you see any differences?

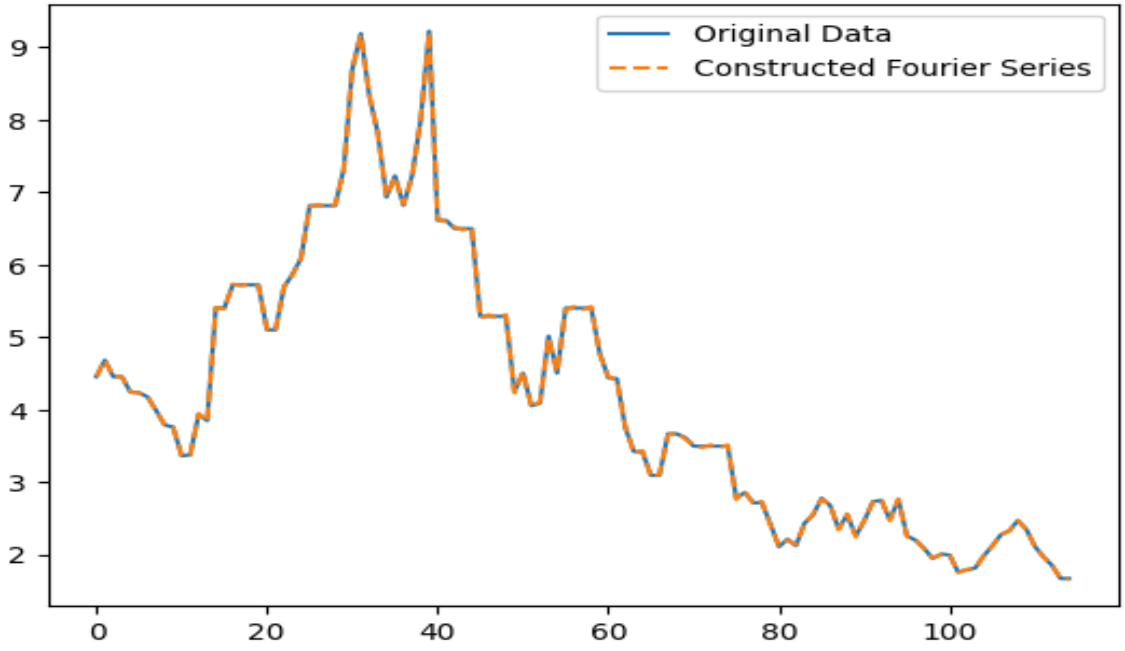
The time series (0-506) exhibits a greater variety of amplitudes and frequencies in comparison to others. The corresponding codes and outputs can be found in the attached fourier_series.ipynb file. I have attached the outputs below also.

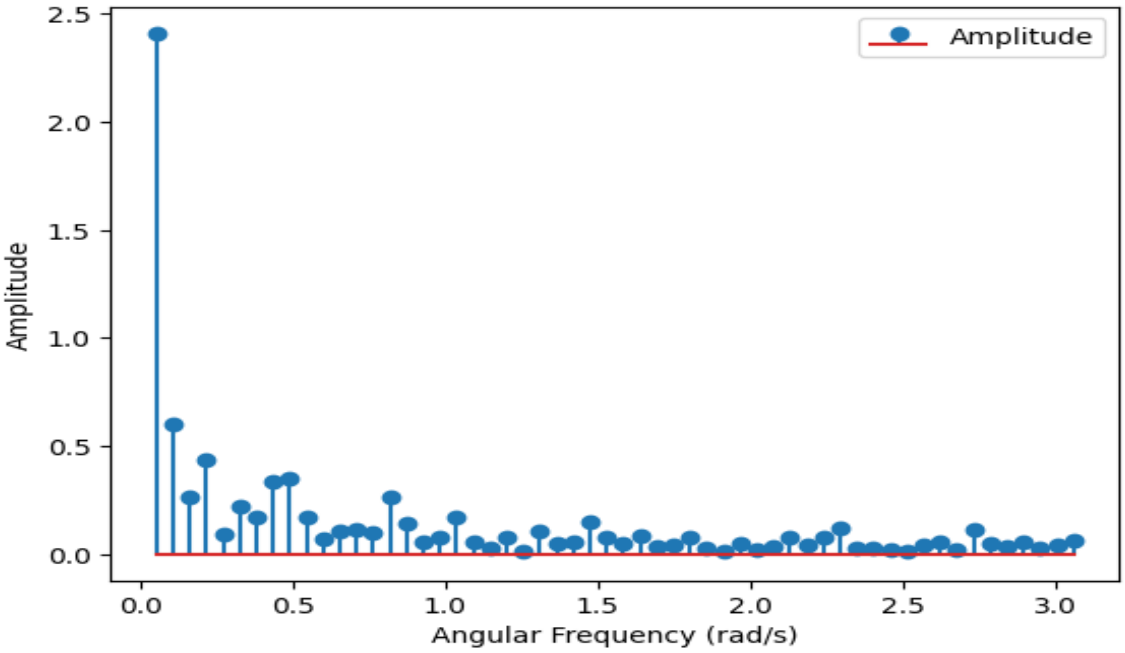
K=1 between 0-25



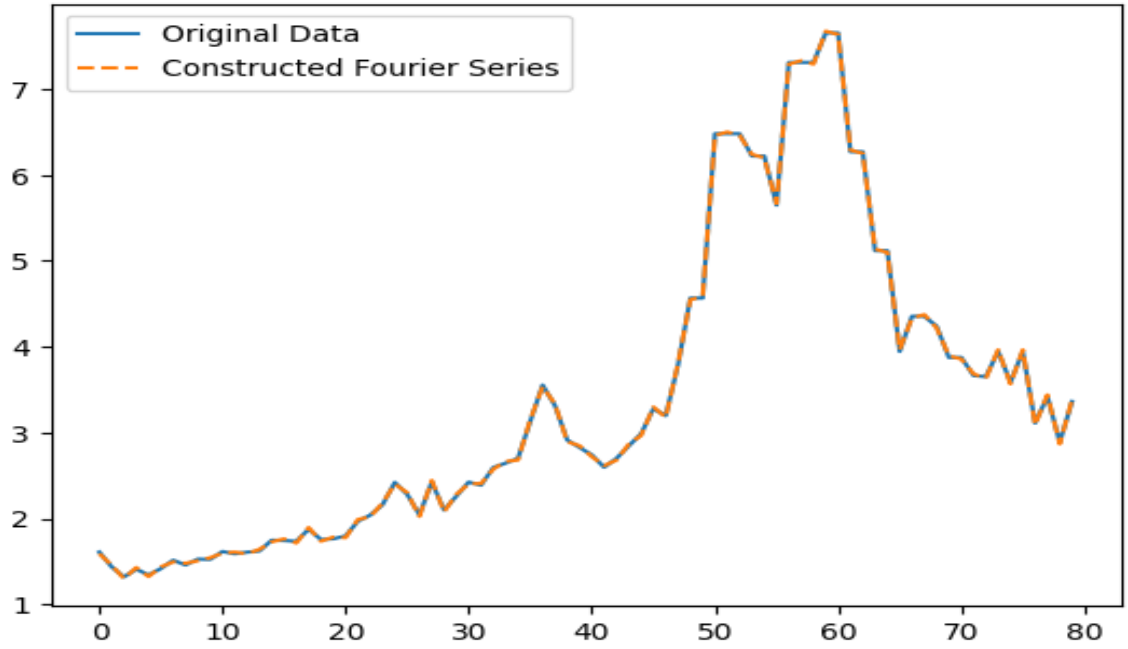


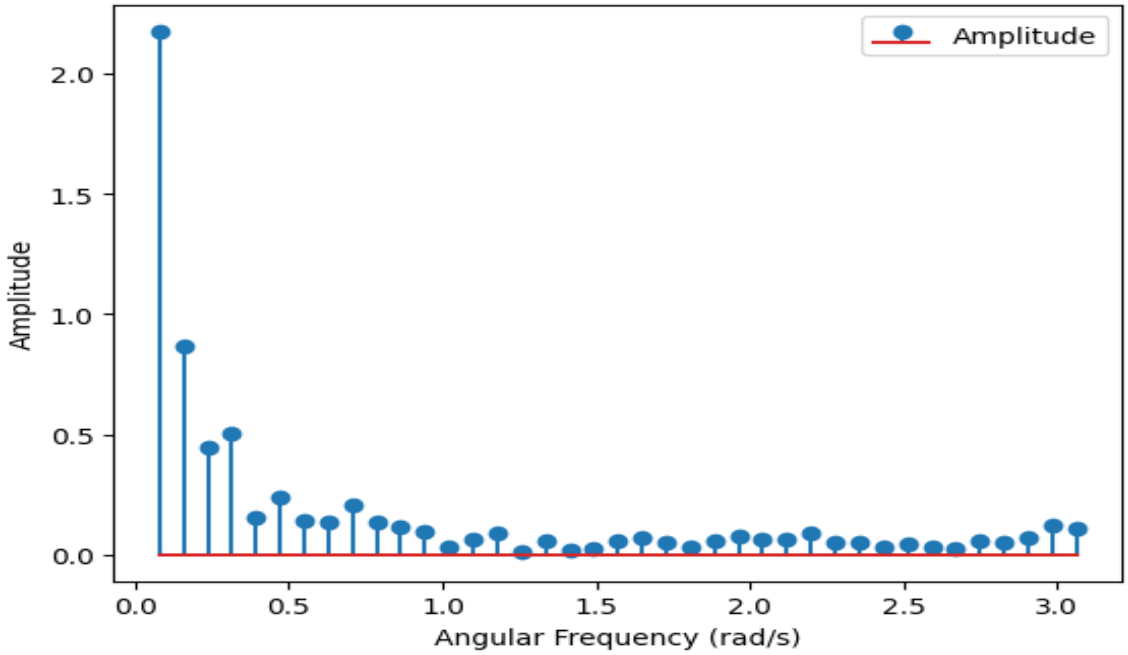
K=2 between 25-140


Original Data
Constructed Fourier Series
9
8
7
6
5
4
3
2
0
20
40
60
80
100

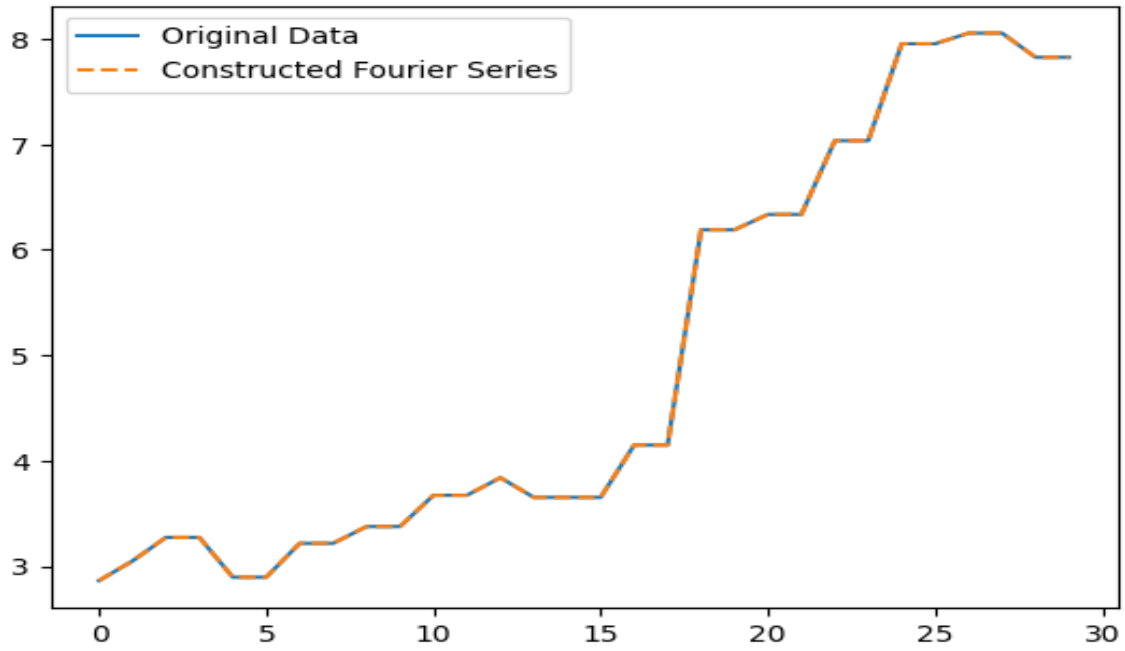

Amplitude
2.5
2.0
1.5
1.0
0.5
0.0
Amplitude
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Angular Frequency (rad/s)

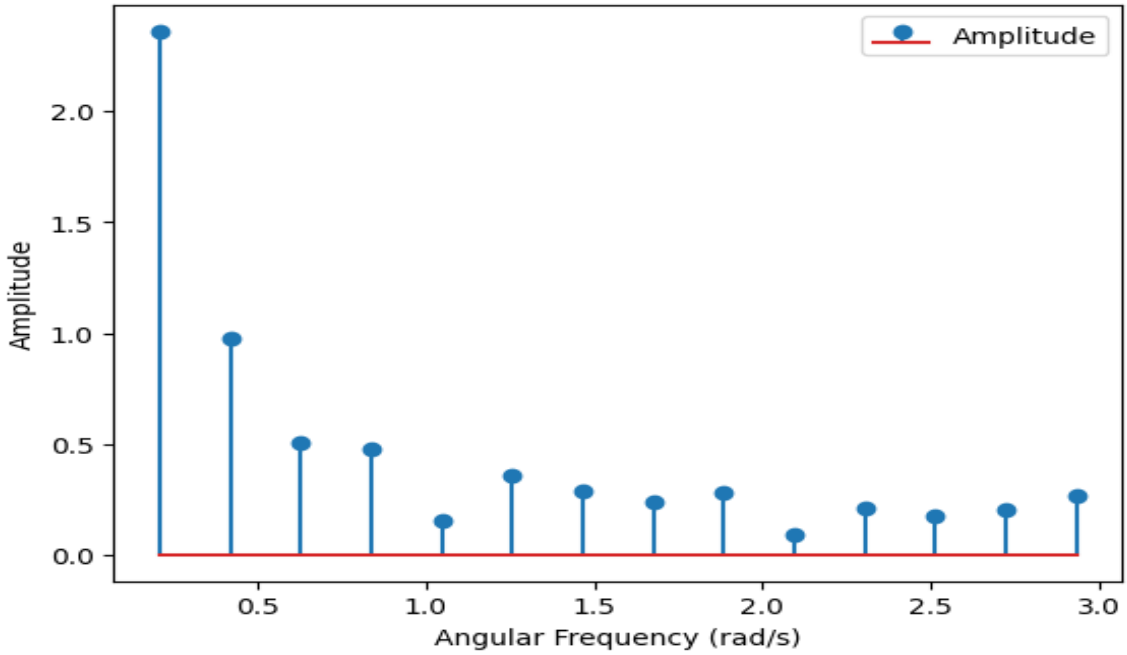
K=3 between 140-220



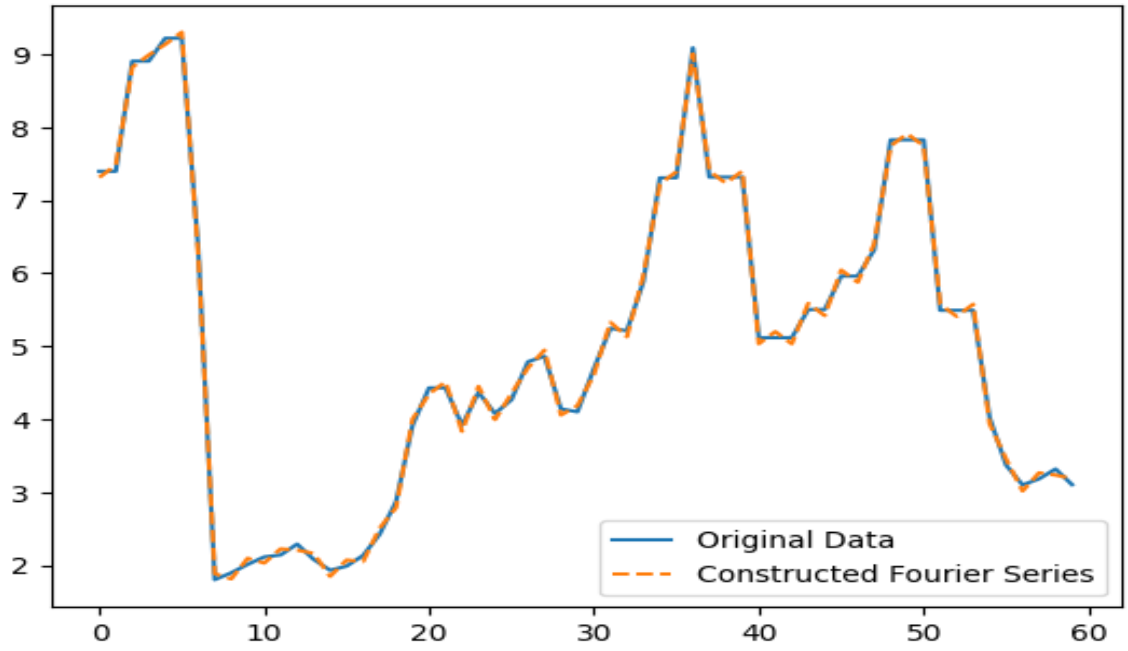


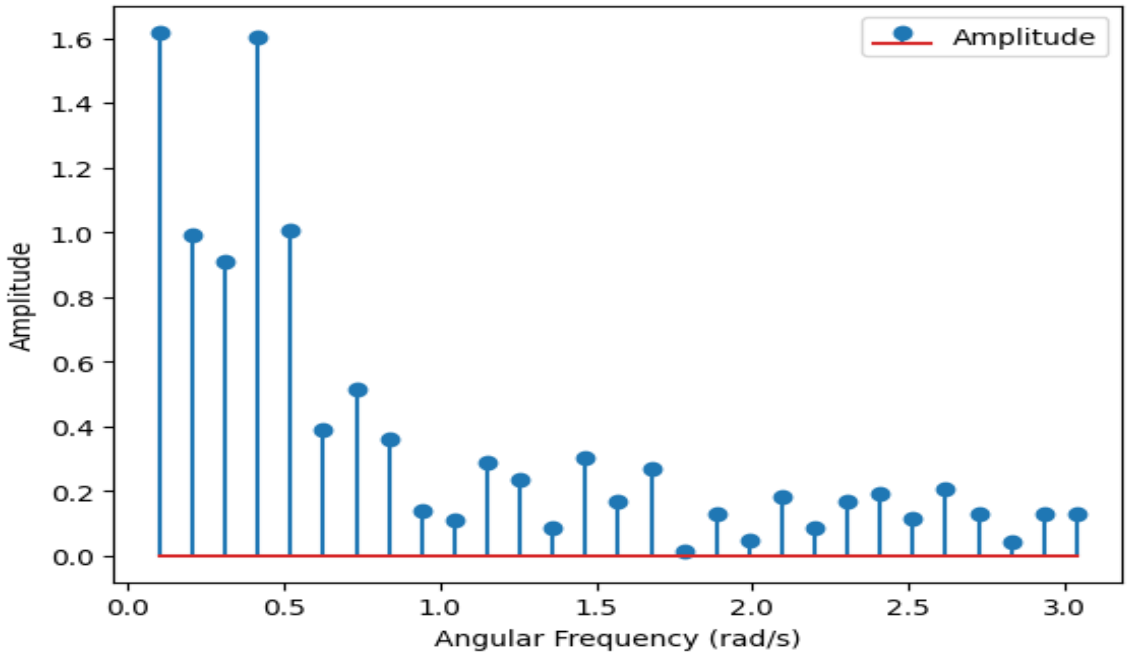
K=4 between 220-250



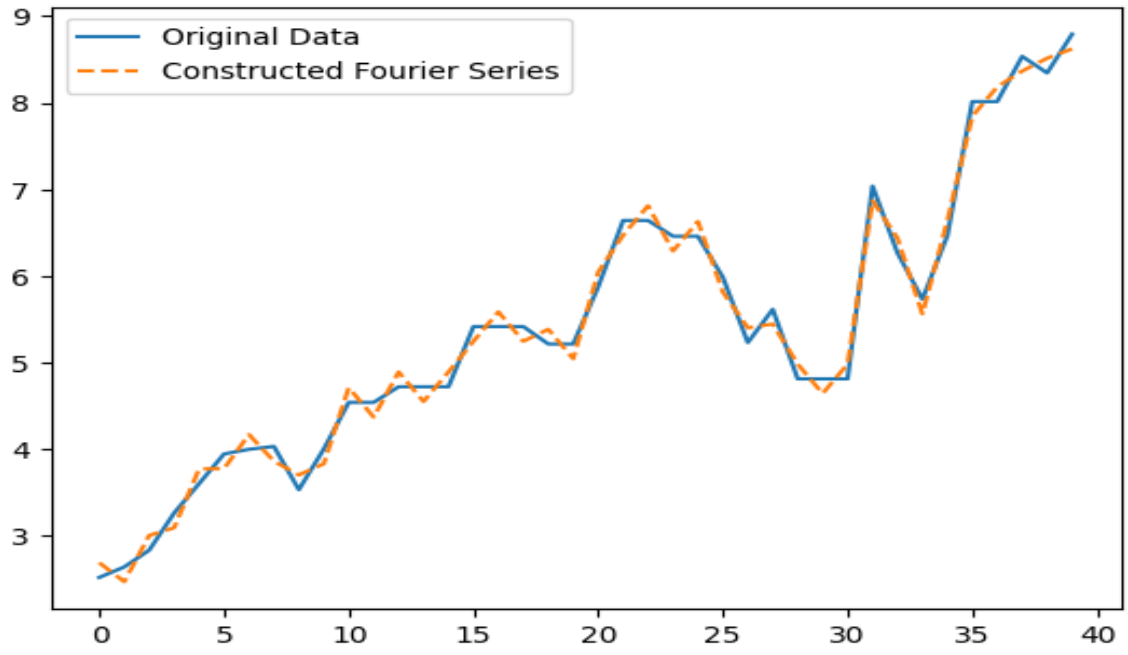


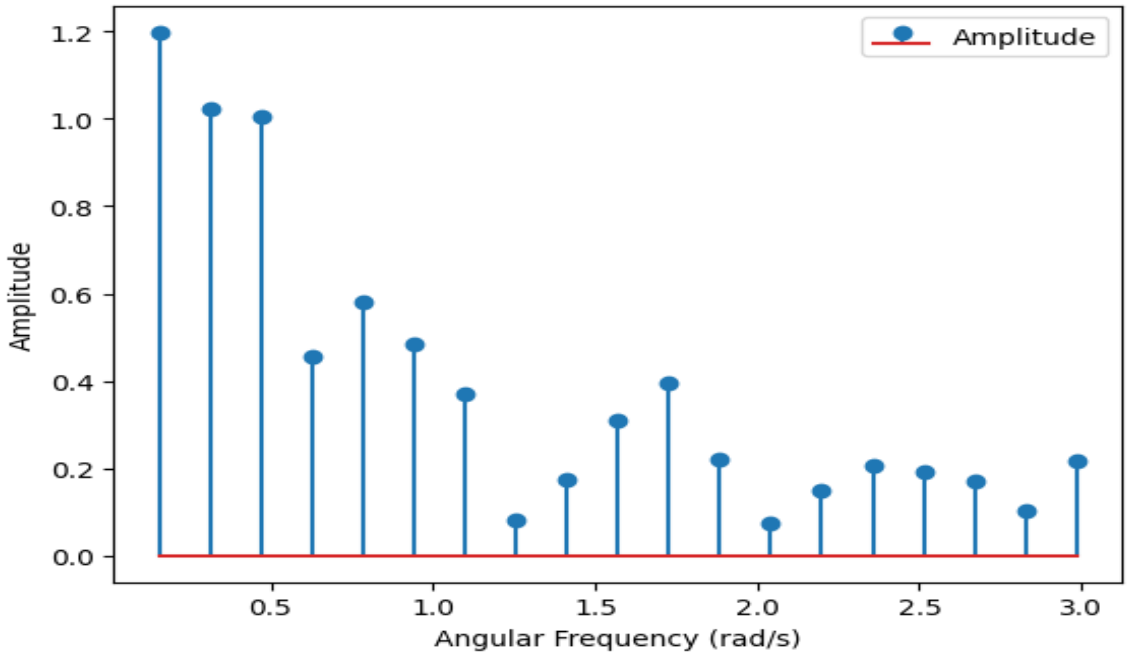
K=5 between 250-310



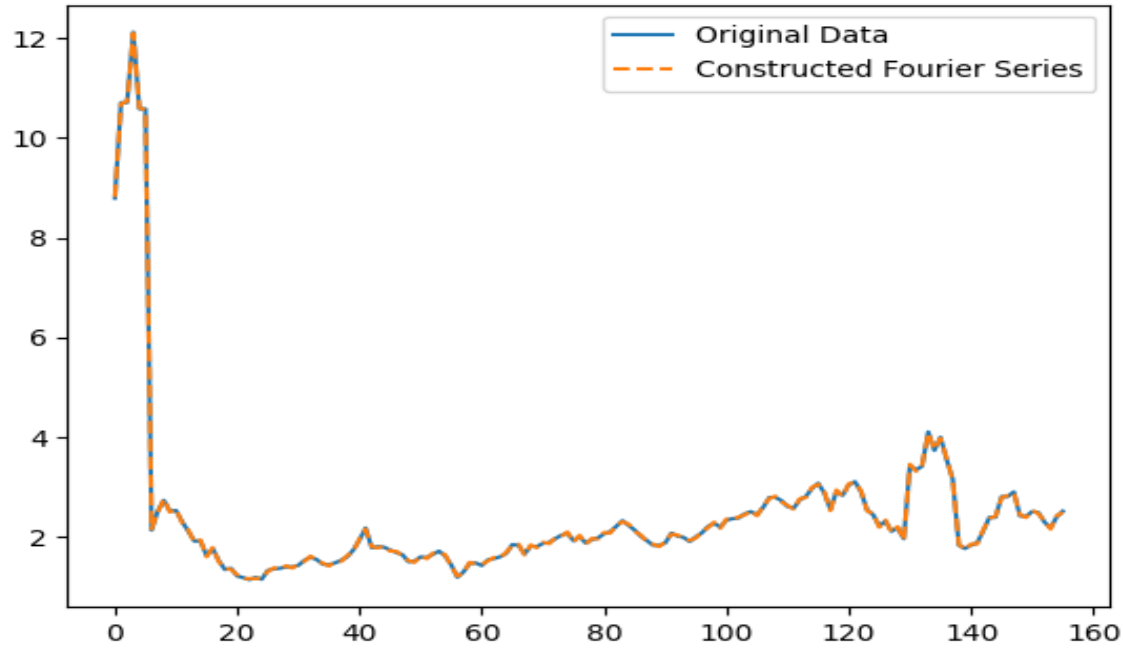


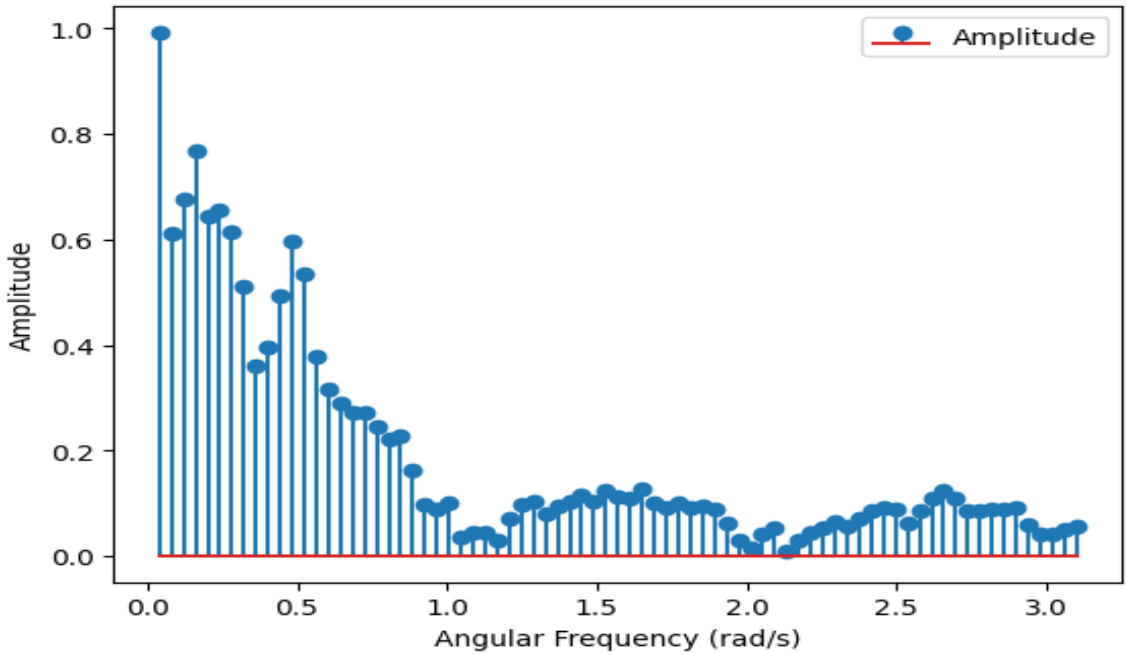
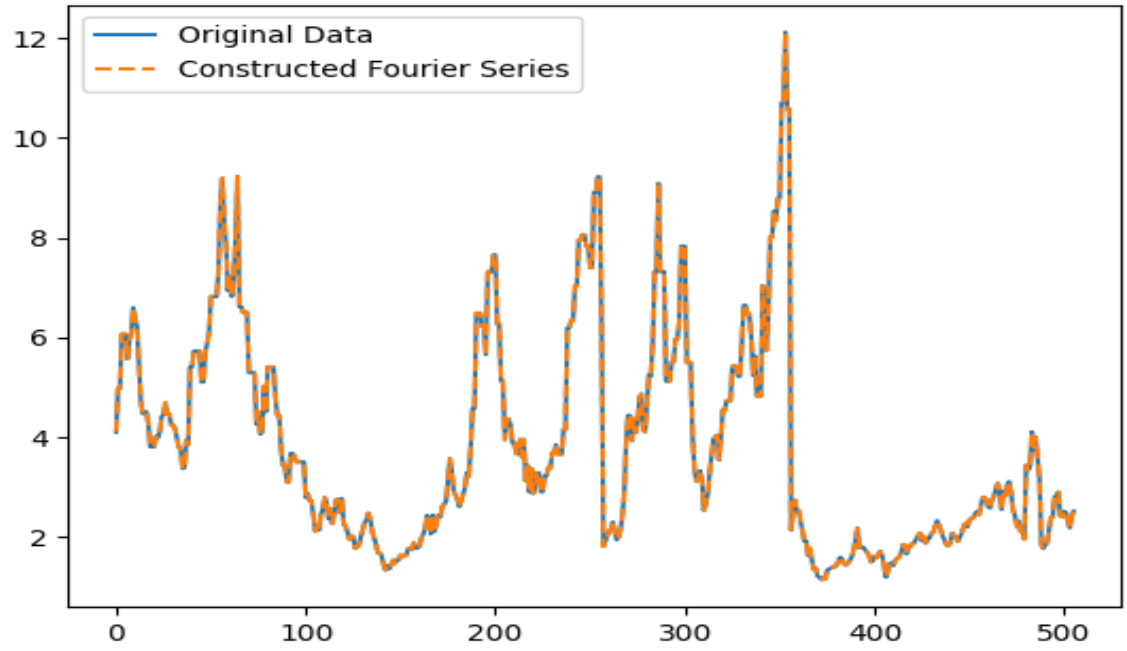
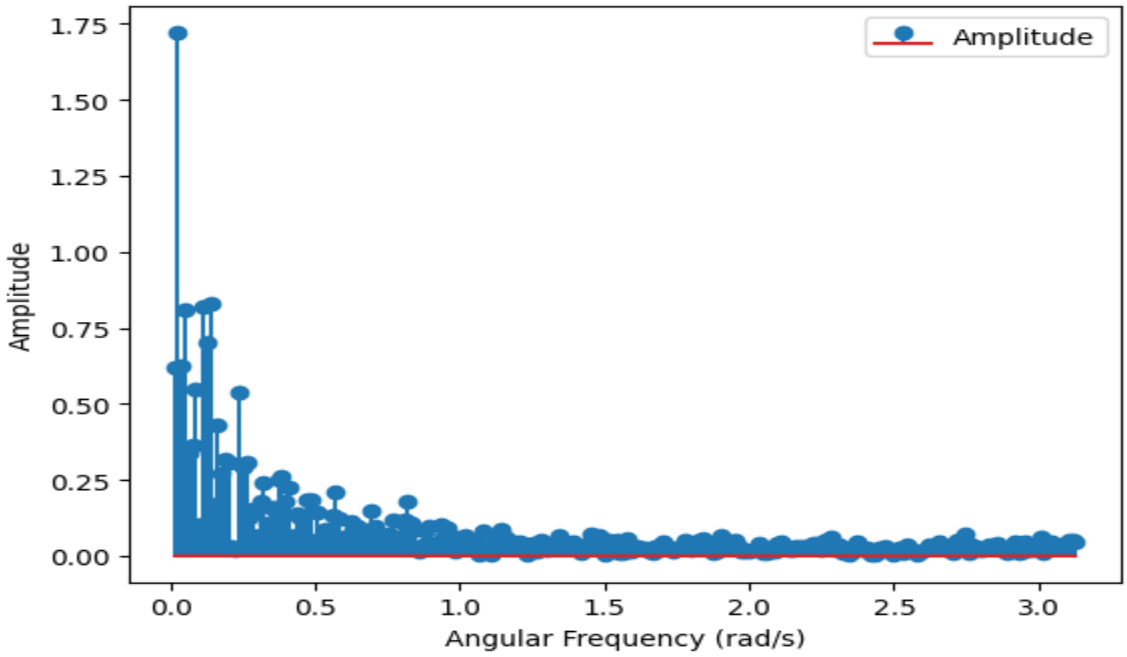
K=6 between 310-350





K=7 between 350-506





Overall series (0 -506)