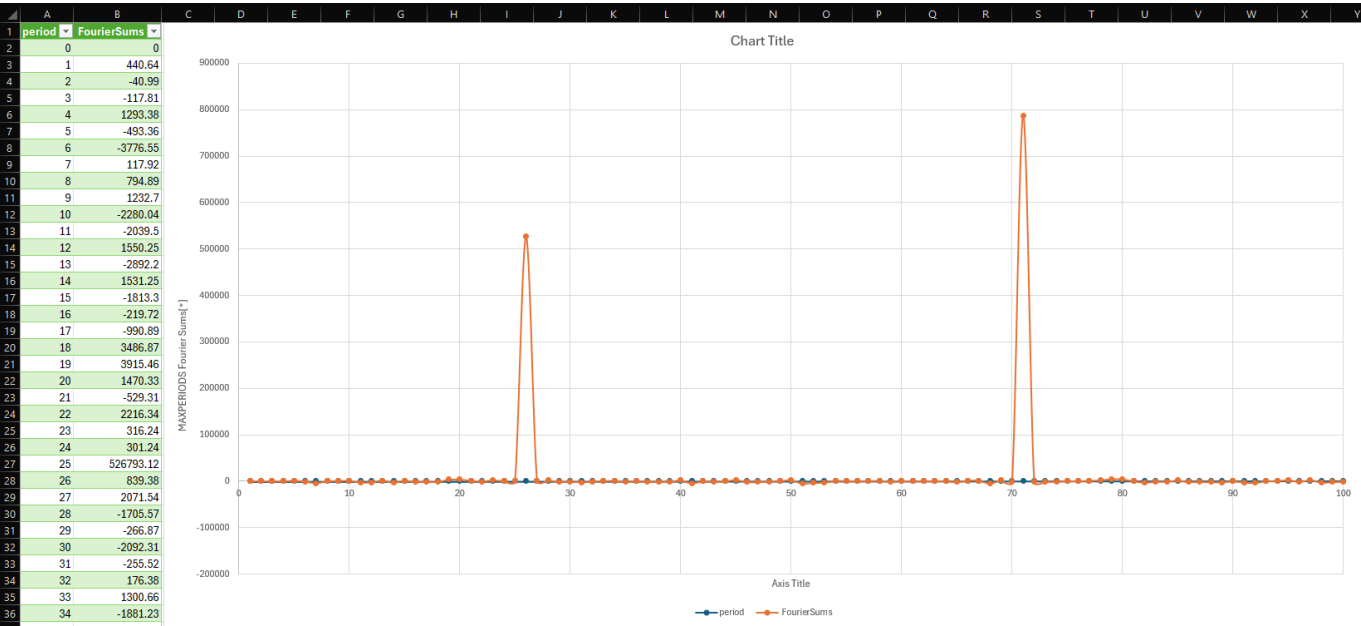# CS 475 - Project 7: Fourier Analysis using MPI

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Project Name: Fourier Analysis using MPI
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Results and Analysis
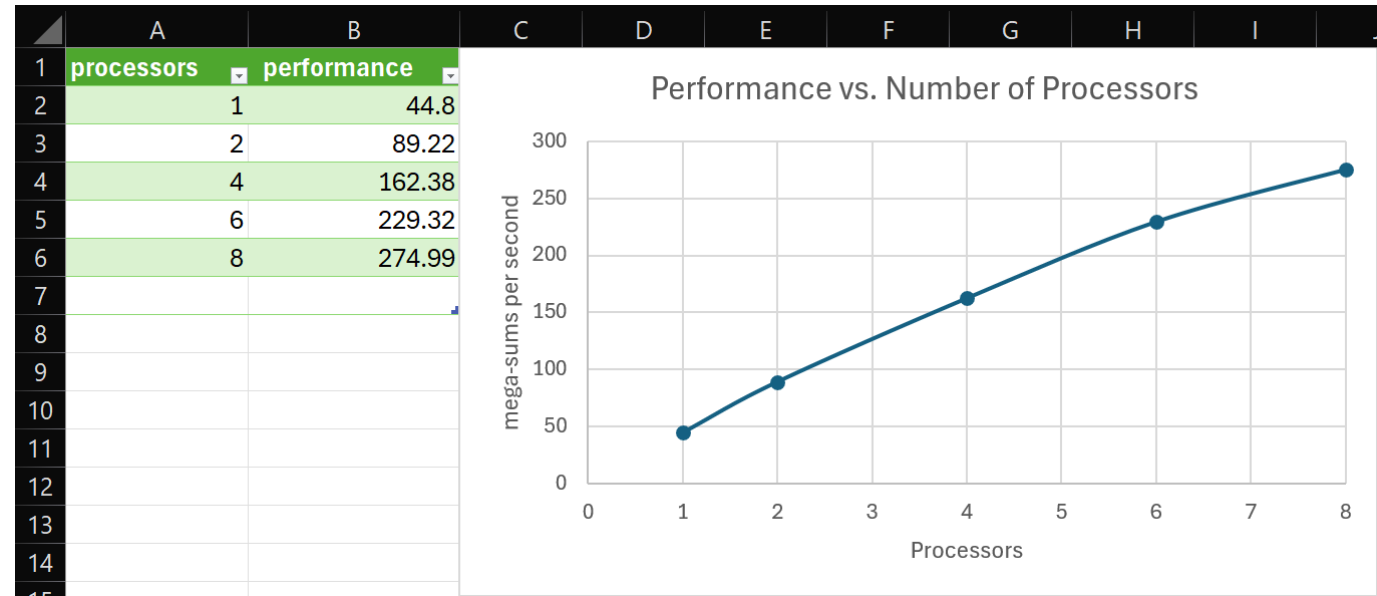
Sums vs. Period Scatterplot

Secret Sine-Wave Periods

Based on the Fourier analysis results, the two secret sine-wave periods embedded in the signal are:

- **Period 25** with Fourier sum: 526,793.12
- **Period 70** with Fourier sum: 787,516.00

Performance vs. Number of Processors Graph

	A	B
1	processors	performance
2	1	44.8
3	2	89.22
4	4	162.38
5	6	229.32
6	8	274.99
7		
8		
9		
10		
11		
12		
13		
14		

Performance vs. Number of Processors

Performance Patterns Analysis

The performance patterns observed in the Fourier analysis using MPI show that as the number of processes increases, the computation time decreases significantly. This is due to the parallelization of the Fourier transform calculations, which allows for faster processing of large datasets. The scatterplot shows the relationship between the number of sums and the period, showing that longer periods result in higher Fourier sums.

The performance increase is pretty linear with the number of processes used since the fourier transform calculations can be efficiently distributed across multiple processes.