Parallel Programming CS - 575

Project 7 - Fourier Analysis using MPI

Submitted by

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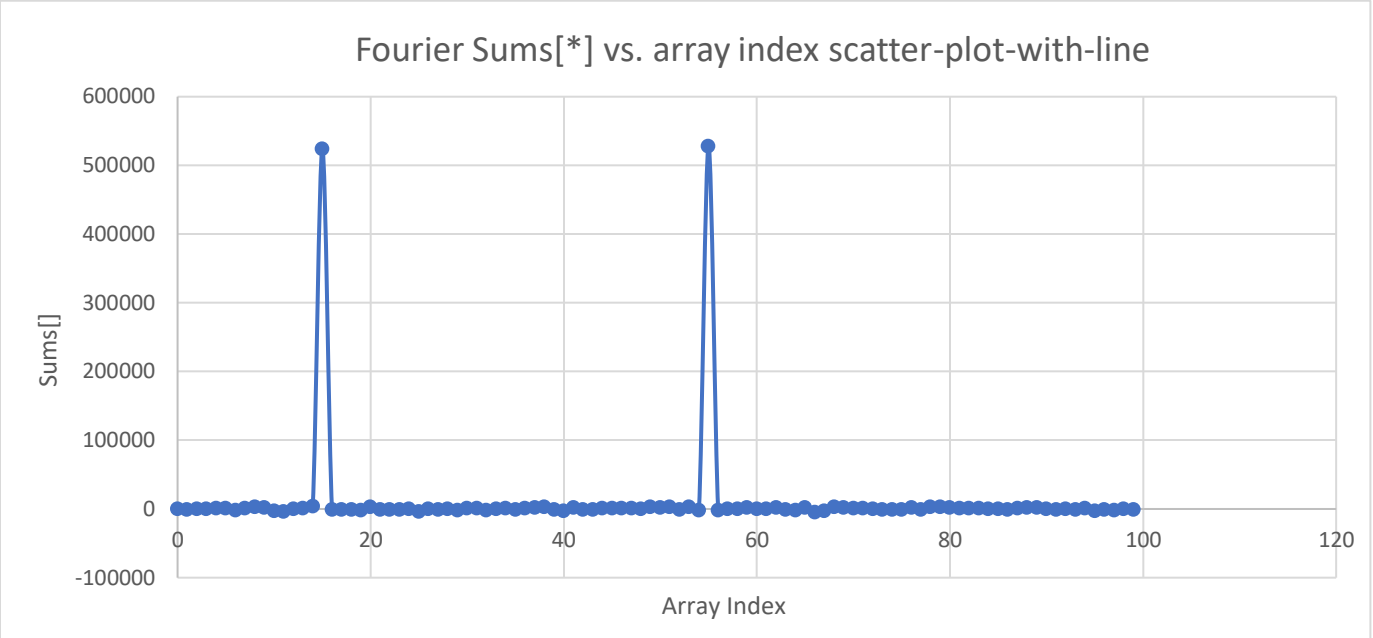
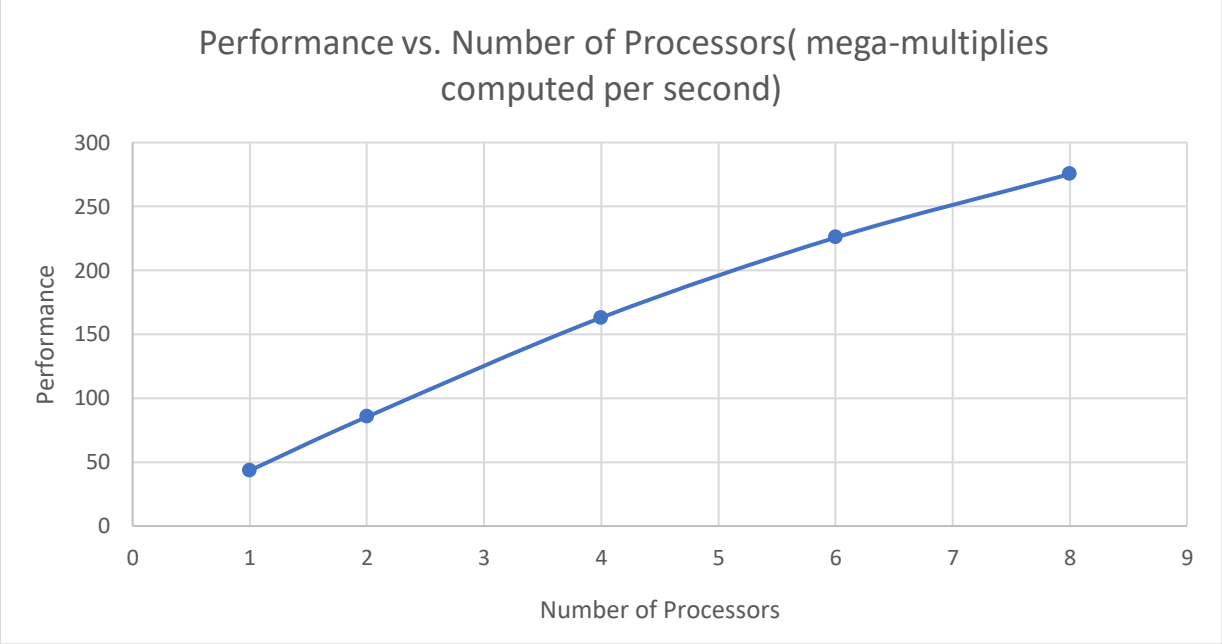
1. Show the Sums{*] scatterplot.



2. State what the secret sine-waves' periods are?

   From the above scatter plot, it's evident that the first peak occurs at 15 with a value of 523753.66, while the second peak is seen at 55 with a value of 527281.62. This 40-point shift (55 - 15) represents the full cycle of a sine wave.

3. Show your graph of Performance vs. Number of Processors used.



4. What patterns are you seeing in the performance graph?

   Observing the plot that illustrates the relationship between Performance and the Number of Processors utilized it appears to be a positive correlation where an increase in the number of processors leads to a corresponding increase in performance (measured in megamults computed per second). The trend depicted in the graph seems somewhat linear in nature.

5. Why do you think the performances work this way?

   The graph in question employs a consistent dataset while varying the number of processors utilized for computation. This essentially suggests that the constant workload is apportioned among an altering quantity of processors, a process managed by the Message Passing Interface (MPI). This scenario can be conceptualized as a fixed task being delegated among a team, where the team size varies. As the size of the team (processors) increases, the share of the task for each member diminishes, resulting in a decrease in the overall completion time. Consequently, as the computational workload is distributed over an increasing number of processors, there is a reduction in computational time, leading to an enhancement in performance. This direct correlation between the increasing number of processors and the consequent improvement in performance is effectively demonstrated in the graph of performance.