

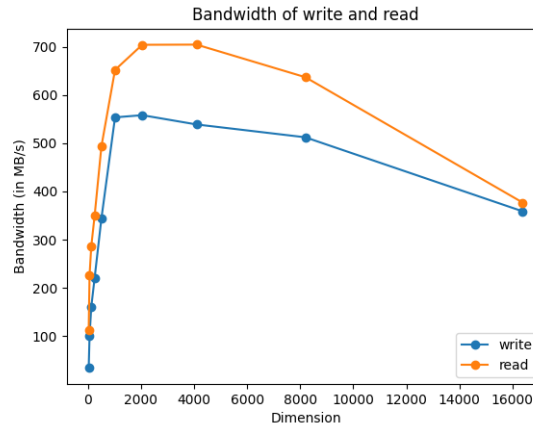
AMATH 583: HW 4

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Problem 1

For the bandwidth graph, we have:



Problem 2

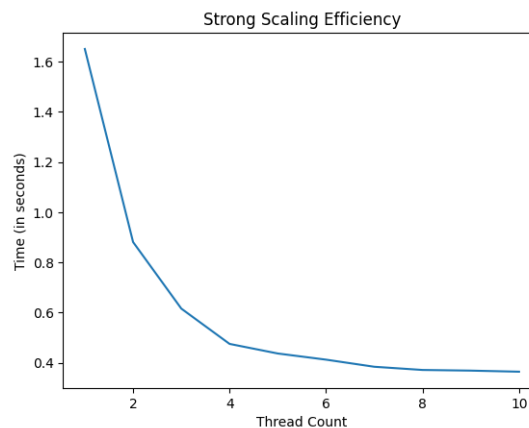
To find the exact value of L , we first compute:

$$f'(x) = \frac{1}{x} - \frac{x}{4}$$

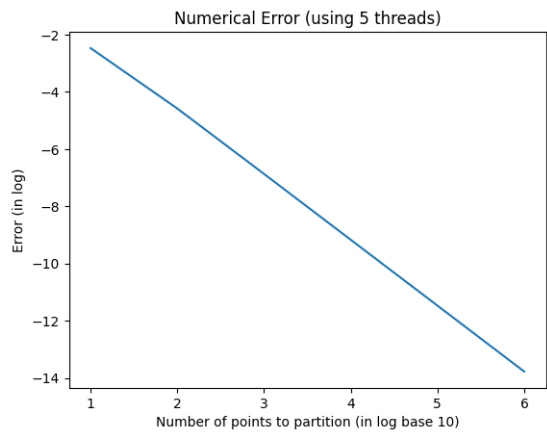
Then, we have:

$$\begin{aligned} L &= \int_1^6 \sqrt{1 + (f'(x))^2} \, dx = \int_1^6 \sqrt{1 + \left(\frac{1}{x} - \frac{x}{4}\right)^2} \, dx = \int_1^6 \sqrt{1 + \frac{1}{x^2} - \frac{1}{2} + \frac{x^2}{16}} \, dx \\ &= \int_1^6 \sqrt{\left(\frac{1}{x} + \frac{x}{4}\right)^2} \, dx = \int_1^6 \left(\frac{1}{x} + \frac{x}{4}\right) \, dx = \left(\ln x + \frac{x^2}{8} \Big|_1^6\right) = \ln 6 + \frac{36}{8} - \frac{1}{8} \\ &= \ln 6 + \frac{35}{8} \approx 6.16676 \end{aligned}$$

For the strong scale efficiency graph, we have:

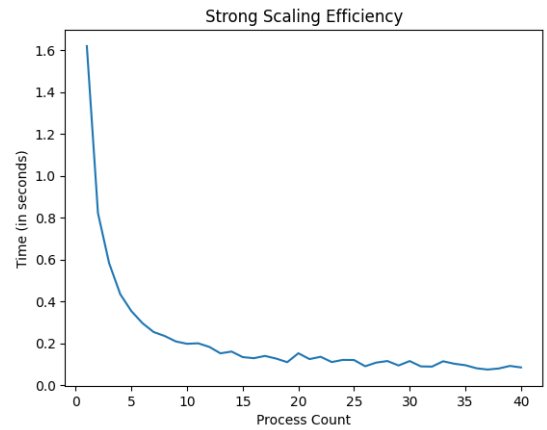


For the numerical error graph, we have:

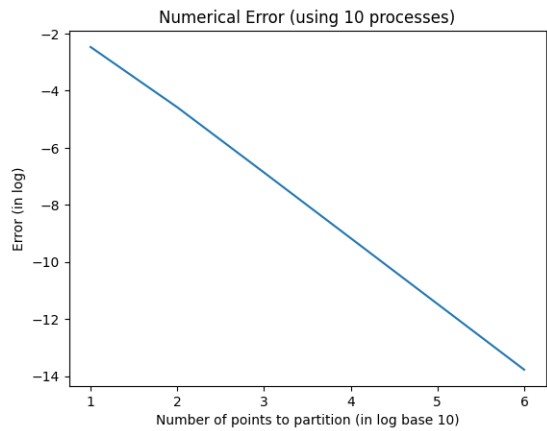


Problem 3

For the strong scale efficiency graph, we have:



For the numerical error graph, we have:



Problem 4

For the bandwidth graph, we have:

