Introdution to Parallel Scientific Computing

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Parallel numerical approximation of π

The value of π can be approximated by the following numerical integration:

$$\pi = 4\int_0^1 \frac{1}{x^2+1}dx \quad \approx \quad 4\Delta x \sum_{i=1}^{n-1} \frac{1}{x_i^2+1} \qquad \text{with} \qquad n\Delta x = 1$$

The interval $0 \ldots 1$ is divided into n segments of width Δx.

Write a parallel program to solve this problem!

Each processor should

1. Read in Δx or n
2. Determine which rectangles are assigned to it
3. Compute their total area.

Then the subtotals should be collected, summed and printed by processor 1. Measure the computation times for various values of n and p!