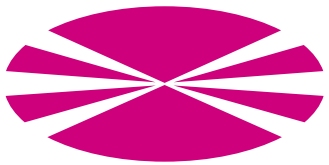
Concurrency and Parallelism. Block II Parallelism

Assignment 3: Domain decomposition: matrix-vector product

Spring 2024

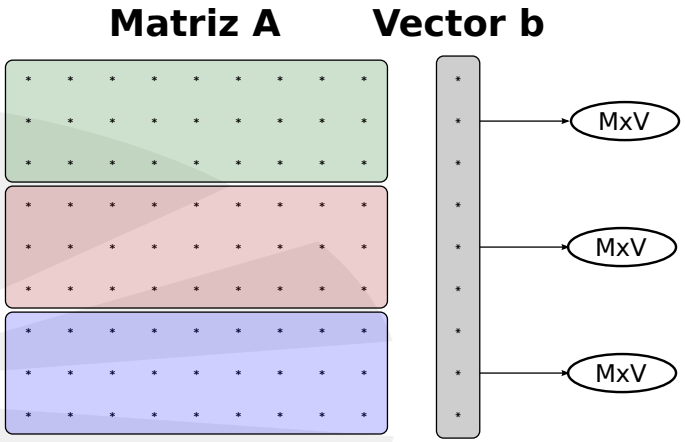


Domain decomposition: matrix-vector product

Código secuencial: `matvec.c`

Domain decomposition

- Divide the matrix among p processes, each one with $m = N/p$ rows (for simplicity, start with the scenario where the number of processes is multiple of N: $N \mod p = 0$).
- Each task will be in charge of calculating $\frac{N}{p}$ rows of the result vector.
- Later, modify the code to consider the general case, not only multiples of N.



Domain decomposition: matrix-vector product

Parallel approach

- SPMD implementation.
- Matrix initialization must be performed by process 0.
- Distribute the data to the processes with collective operations.
- Gather the vector result using collective operations.
- I/O (printf) is performed by process 0.
- Print separately the communication time and the computation time of each process.

Domain decomposition: matrix-vector product

- Assigned points: 0.75
- It must be done in couples
- Defended in the laboratory lectures: May 6th