Tutorial - 11

In this tutorial, you will develop and test matrix multiplication using MPI. Further, you will explore a few MPI functions that are not discussed in the lectures.

1. Develop an MPI program that performs matrix multiplication using row-wise block decomposition. Test your program using $p = 2$ and $p = 4$ processes for matrices of appropriate size. Convince yourself that the result of multiplication is the same when using either the serial or the parallel code that you developed.

2. Explore and learn about the MPI functions MPI_Wtime, MPI_Wtick, and MPI_Barrier. Use these functions to time the matrix-vector multiplication program.

3. Learn about the collective communication function MPI_Alltoall. Ponder how this can be used in the context of solution of implicit finite difference schemes. Can you avoid calling functions like parallel cyclic reduction using this collective communication function?