Tutorial - 8

In this tutorial, you will develop and test a few MPI programs as well as explore some new MPI fuctions that we did not discuss in the lectures.

1. Develop an MPI program that computes matrix-vector multiplication and produces the resulting vector using block-decomposition along rows. Convince yourself that you obtain the same answer as that of the serial program. Use collective communication functions as much as possible. Run the program on $p = 2,4$ and 8 processes.

2. Develop MPI programs to demonstrate collective functions such as MPI_Reduce, MPI_Allreduce, MPI_Scatter, MPI_Gather, MPI_Allgather. Convince yourself that these programs are producing the intended output by running them.

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

4. Learn about other MPI functions such as MPI_Gatherv, MPI_Scatterv, MPI_Dims_create, MPI_Cart_create, MPI_Cart_rank, MPI_Cart_coords. Ponder where they may be useful.