

Homework

parallel programming

Name: Li Shibo Student ID: 119033910046 Email: ShiboLi@sjtu.edu.cn

8.6 We can transpose the matrix first, and store it to a array. Then we can send the columns to corresponding processes using *MPI_Scatterv* function. After computing, we can gather all the result to processor 0 using *MPI_Gatherv* function. The experiment result is as follows:

```
D:\并行作业\HW4\8_6\x64\Debug>mpiexec.exe -n 5 8_6.exe  
Final Result: [189, 202, 199, 169, 255, 278, 233, 216, 168, 189, ]
```

图 1: The running results of matrix vector multiplication with block-column stripe

9.7 The same with 8.6 problem, but we will use slave-master mode to solve this problem. The master process will read the vector from a file and broadcast it to all of the slaves. Next, the master will read the matrix from a file and distribute rows of the matrix to the slave processes on demand. For each row the master sends a slave, it should receive in return an element of the solution vector. After all of the results have been received, the master should print the product vector to standard output. The experiment result is as follows:

```
D:\并行作业\HW4\9_7\x64\Debug>mpiexec.exe -n 5 9_7.exe  
Final Result: [ 189 202 199 169 255 278 233 216 168 189]
```

图 2: The running results of matrix vector multiplication with master-slave mode

9.10 We use the prime programme for this problem. The experiment result is as follows:

```
D:\并行作业\HW4\9_10\x64\Debug>mpiexec.exe -n 10 9_10.exe  
6  
28  
496  
8128  
2096128  
33550336  
8589869056  
137438691328
```

图 3: The running results of matrix vector multiplication with master-slave mode