*University of California, Riverside*

*CS 21: High Performance Computing - Project 2*

*Yuanhang Luo*

*Oct 21st, 2017*

**Part 1.**

Verify the solution of MATLAB program with MATLAB build in solver.

Execution in MATLAB:

|  |
| --- |
| >> mylu(5)  myfactorization =  1.5651 0.8412 -1.1424 -0.5936 0.1203  0.3499 -2.2864 0.8089 1.5096 1.1542  -0.6225 -0.0325 1.2273 -1.4892 -0.3920  0.1642 0.8010 -0.7130 -2.7984 -0.7874  -0.7325 -0.2326 -0.8470 0.3403 0.3947  mypivoting =  5 4 2 1 3  Matlab\_L =  1.0000 0 0 0 0  0.3499 1.0000 0 0 0  -0.6225 -0.0325 1.0000 0 0  0.1642 0.8010 -0.7130 1.0000 0  -0.7325 -0.2326 -0.8470 0.3403 1.0000  Matlab\_U =  1.5651 0.8412 -1.1424 -0.5936 0.1203  0 -2.2864 0.8089 1.5096 1.1542  0 0 1.2273 -1.4892 -0.3920  0 0 0 -2.7984 -0.7874  0 0 0 0 0.3947  Matlab\_P =  0 0 0 0 1  0 0 0 1 0  0 1 0 0 0  1 0 0 0 0  0 0 1 0 0  Solution\_Difference\_from\_Matlab =  5.5023e-16 |

Performance compassions in matrix size = 1000. (TODO)

|  |  |  |
| --- | --- | --- |
|  | Running time(ms) | Gflops |
| My Method | 7421.881 |  |
| LAPACK | 388736.032 |  |

Performance compassions in matrix size = 2000. (TODO)

|  |  |  |
| --- | --- | --- |
|  | Running time(ms) | Gflops |
| My Method | 29021.073 |  |
| LAPACK | 3321139.705 |  |

Performance compassions in matrix size = 3000. (TODO)

|  |  |  |
| --- | --- | --- |
|  | Running time(ms) | Gflops |
| My Method | 65417.925 |  |
| LAPACK | 11404346.154 |  |

Performance compassions in matrix size = 4000. (TODO)

|  |  |  |
| --- | --- | --- |
|  | Running time(ms) | Gflops |
| My Method | 116781.677 |  |
| LAPACK | 27204392.489 |  |

Performance compassions in matrix size = 5000. (TODO)

|  |  |  |
| --- | --- | --- |
|  | Running time(ms) | Gflops |
| My Method | 183158.075 |  |
| LAPACK | 59666708.067 |  |

**Part 2.**

Performance Comparison of un-optimized version and optimized version. (TODO)