**CS595. Homework 6**

1) Build PETSc in debug mode (configure with ‘--with-debugging=1 PETSC\_ARCH=arch-cs595’) and

 in optimized mode (configure with ‘--with-debugging=0 PETSC\_ARCH=arch-cs595-o’)

2) Run $PETSC\_DIR/src/ksp/ksp/examples/tutorials/ex2.c:

 mpiexec –n <np> ./ex2 –m 300 –n 300 –ksp\_type <ksp\_type> -pc\_type <pc\_type> -log\_summary <log\_file>

 Machine: ada.cs.iit.edu

 (SUSE Linux Enterprise Server on a Dell PowerEdge with 2 dual core 3GHz Intel Xeon processors and 4GB of RAM)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Methods | np | Norm ofError | No. of Iterations | Total Time(sec)g mode | Total Time(sec)O mode | Dominating Operation |
| 1 | -ksp\_type gmres -pc\_type none -ksp\_max\_it 1000 | 124 |  |  | 3.977e-03 | 1.503e-03 |  |
| 2 | -ksp\_type cg -pc\_type none-ksp\_max\_it 1000 | 124 |  |  |  |  |  |
| 3 | -ksp\_type gmres -pc\_type bjacobi -sub\_pc\_type ilu | 124 | 0.005694580.00610788 | 561743 |  | 1.341e+018.926e+00 |  |
| 4 | -ksp\_type gmres -pc\_type bjacobi -sub\_pc\_type lu | 124 | 1.73656e-100.00153372 | 178 |  | 2.819e+002.176e+00 |  |
| 5 | -ksp\_type cg-pc\_type bjacobi -sub\_pc\_type icc | 124 | 0.0002952130.000178647 | 166199 |  | 2.277e+001.027e+00 |  |
| 6 | -ksp\_type gmres-pc\_type asm-sub\_pc\_type lu | 124 | 6.91688e-05 | 35 |  | 1.248e+00 |  |
| 7 | -ksp\_type gmres-pc\_type asm-sub\_pc\_type lu-pc\_asm\_overlap 2 | 124 | 2.45535e-05 | 27 |  | 1.050e+00 |  |
| 8 | -ksp\_type cg -pc\_type sor -pc\_sor\_local\_symmetric | 124 |  |  |  |  |  |

3) $PETSC\_DIR/snes/examples/tutorials/ex19.c:

 First, run ‘./ex19 -dmmg\_nlevels 7 -ksp\_monitor -snes\_monitor -snes\_view’ to understand the algorithm

 Then run mpiexec –n <np> ./ex19 -dmmg\_nlevels 7 -log\_summary <log\_file>

 Machine: ada.cs.iit.edu/petsc.mcs.anl.gov

|  |  |  |  |
| --- | --- | --- | --- |
| np | Total Time(sec)g mode | Total Time(sec)O mode | Dominating Operation |
| 1246 | / 1.162e+019.633e+01/ 8.311e+00 | 2.048e+01/1.145e+011.117e+01/ 6.685e+001.322e+01/ 7.541e+00 |  |