In Belos (Trilinos’ iterative linear solver package) there a few core solvers, with various flavors of each:

The cores: (http://trilinos.org/docs/r11.12/packages/belos/doc/html/index.html)

* Single-vector and block GMRES
* Single-vector and block CG
* Pseudo-block variants (perform single-vector algorithms simultaneously): pseudo-block CG, pseudo-block GMRES
* Recycling solvers: GCRO-DR and RCG
* Flexible variants: Flexible GMRES

All of the available variants: (http://trilinos.org/docs/r11.12/packages/belos/doc/html/BelosSolverFactory\_8hpp\_source.html#l00512)

* Block GMRES
* Pseudo-block GMRES
* Block CG
* Pseudo-block CG
* Pseudo-block Stochastic CG
* GCRODR
* RCG
* MINRES
* LSQR
* TFQMR
* Hybrid Block GMRES
* PCPG

PETSc

Summary of PETSc solvers: <http://www.mcs.anl.gov/petsc/petsc-as/documentation/linearsolvertable.html>

KSP: fgmres, lgmres, gmres, bcgs, bicg, tfqmr, tcqmr, lsqr

* Symmetric only: chebyshev, cg
* Parallel only: ibcgs

PC: sor, jacobi, bjacobi, asm(k) [k=0..3],

* Sequential only: ilu(k) [k=0..3],
  + Symmetric only: icc(k) instead of ilu
* Any matrix with (some) 0 diagonal entries:
  + -pc\_fieldsplit\_type schur in conjunction with -pc\_fieldsplit\_detect\_saddle\_point (Boyana will look into that)

89565283 , -ksp\_type lsqr -pc\_type jacobi

8793455 , -ksp\_type tfqmr -pc\_type icc -pc\_factor\_levels 3

90197667 , -ksp\_type lsqr -pc\_type icc -pc\_factor\_levels 2

49598909 , -ksp\_type gmres -pc\_type icc -pc\_factor\_levels 1

91036839 , -ksp\_type bcgs -pc\_type bjacobi

45869639 , -ksp\_type fgmres -pc\_type asm -pc\_asm\_overlap 0

45869638 , -ksp\_type fgmres -pc\_type asm -pc\_asm\_overlap 3

45869637 , -ksp\_type fgmres -pc\_type asm -pc\_asm\_overlap 2

47942867 , -ksp\_type chebyshev -pc\_type asm -pc\_asm\_overlap 0

89269802 , -ksp\_type lgmres -pc\_type asm -pc\_asm\_overlap 1

89269803 , -ksp\_type lgmres -pc\_type asm -pc\_asm\_overlap 2

89269801 , -ksp\_type lgmres -pc\_type asm -pc\_asm\_overlap 0

89269804 , -ksp\_type lgmres -pc\_type asm -pc\_asm\_overlap 3

59072883 , -ksp\_type bcgs -pc\_type icc -pc\_factor\_levels 3

59072882 , -ksp\_type bcgs -pc\_type icc -pc\_factor\_levels 0

59072881 , -ksp\_type bcgs -pc\_type icc -pc\_factor\_levels 1

7285381 , -ksp\_type cg -pc\_type ilu -pc\_factor\_levels 3

7285384 , -ksp\_type cg -pc\_type ilu -pc\_factor\_levels 0

59072884 , -ksp\_type bcgs -pc\_type icc -pc\_factor\_levels 2

49598911 , -ksp\_type gmres -pc\_type icc -pc\_factor\_levels 3

49598910 , -ksp\_type gmres -pc\_type icc -pc\_factor\_levels 0

49598912 , -ksp\_type gmres -pc\_type icc -pc\_factor\_levels 2

30870721 , -ksp\_type gmres -pc\_type asm -pc\_asm\_overlap 3

36025723 , -ksp\_type lgmres -pc\_type ilu -pc\_factor\_levels 1

36025722 , -ksp\_type lgmres -pc\_type ilu -pc\_factor\_levels 2

53302993 , -ksp\_type tfqmr -pc\_type bjacobi

30870720 , -ksp\_type gmres -pc\_type asm -pc\_asm\_overlap 2

64278029 , -ksp\_type lgmres -pc\_type jacobi

36025724 , -ksp\_type lgmres -pc\_type ilu -pc\_factor\_levels 0

44526267 , -ksp\_type fgmres -pc\_type jacobi

8793454 , -ksp\_type tfqmr -pc\_type icc -pc\_factor\_levels 0

8793456 , -ksp\_type tfqmr -pc\_type icc -pc\_factor\_levels 2

8793453 , -ksp\_type tfqmr -pc\_type icc -pc\_factor\_levels 1

17734818 , -ksp\_type chebyshev -pc\_type bjacobi

**32168839 , -ksp\_type gmres -pc\_type ilu -pc\_factor\_levels 0 (default)**

32168838 , -ksp\_type gmres -pc\_type ilu -pc\_factor\_levels 3

57331597 , -ksp\_type cg -pc\_type icc -pc\_factor\_levels 0

95762352 , -ksp\_type cg -pc\_type asm -pc\_asm\_overlap 3

57331599 , -ksp\_type cg -pc\_type icc -pc\_factor\_levels 2

57331598 , -ksp\_type cg -pc\_type icc -pc\_factor\_levels 1

32168837 , -ksp\_type gmres -pc\_type ilu -pc\_factor\_levels 2

88865078 , -ksp\_type fgmres -pc\_type ilu -pc\_factor\_levels 0

88865079 , -ksp\_type fgmres -pc\_type ilu -pc\_factor\_levels 1

49834417 , -ksp\_type tcqmr -pc\_type asm -pc\_asm\_overlap 0

49834419 , -ksp\_type tcqmr -pc\_type asm -pc\_asm\_overlap 2

49834418 , -ksp\_type tcqmr -pc\_type asm -pc\_asm\_overlap 1

88865076 , -ksp\_type fgmres -pc\_type ilu -pc\_factor\_levels 2

88865077 , -ksp\_type fgmres -pc\_type ilu -pc\_factor\_levels 3

11256942 , -ksp\_type tfqmr -pc\_type asm -pc\_asm\_overlap 0

11256943 , -ksp\_type tfqmr -pc\_type asm -pc\_asm\_overlap 3

11256941 , -ksp\_type tfqmr -pc\_type asm -pc\_asm\_overlap 1

**42851841 , -ksp\_type gmres -pc\_type bjacobi (default for parallel)**

11256944 , -ksp\_type tfqmr -pc\_type asm -pc\_asm\_overlap 2

31459546 , -ksp\_type tcqmr -pc\_type bjacobi

17887723 , -ksp\_type tcqmr -pc\_type jacobi

91845162 , -ksp\_type lgmres -pc\_type bjacobi

53362206 , -ksp\_type bicg -pc\_type jacobi

95762355 , -ksp\_type cg -pc\_type asm -pc\_asm\_overlap 0

12321508 , -ksp\_type fgmres -pc\_type bjacobi

75830644 , -ksp\_type ibcgs -pc\_type asm -pc\_asm\_overlap 2

57331600 , -ksp\_type cg -pc\_type icc -pc\_factor\_levels 3

43373444 , -ksp\_type tcqmr -pc\_type icc -pc\_factor\_levels 3

95762353 , -ksp\_type cg -pc\_type asm -pc\_asm\_overlap 2

43373441 , -ksp\_type tcqmr -pc\_type icc -pc\_factor\_levels 0

43373442 , -ksp\_type tcqmr -pc\_type icc -pc\_factor\_levels 1

43373443 , -ksp\_type tcqmr -pc\_type icc -pc\_factor\_levels 2

91068411 , -ksp\_type chebyshev -pc\_type icc -pc\_factor\_levels 0

91068410 , -ksp\_type chebyshev -pc\_type icc -pc\_factor\_levels 1

5890861 , -ksp\_type ibcgs -pc\_type icc -pc\_factor\_levels 3

85483012 , -ksp\_type lsqr -pc\_type bjacobi

5890863 , -ksp\_type ibcgs -pc\_type icc -pc\_factor\_levels 1

5890862 , -ksp\_type ibcgs -pc\_type icc -pc\_factor\_levels 0

18868444 , -ksp\_type ibcgs -pc\_type ilu -pc\_factor\_levels 1

18868441 , -ksp\_type ibcgs -pc\_type ilu -pc\_factor\_levels 2

18868443 , -ksp\_type ibcgs -pc\_type ilu -pc\_factor\_levels 0

18868442 , -ksp\_type ibcgs -pc\_type ilu -pc\_factor\_levels 3

91068408 , -ksp\_type chebyshev -pc\_type icc -pc\_factor\_levels 3

47942864 , -ksp\_type chebyshev -pc\_type asm -pc\_asm\_overlap 3

47942865 , -ksp\_type chebyshev -pc\_type asm -pc\_asm\_overlap 2

47942866 , -ksp\_type chebyshev -pc\_type asm -pc\_asm\_overlap 1

91068409 , -ksp\_type chebyshev -pc\_type icc -pc\_factor\_levels 2

8520536 , -ksp\_type bcgs -pc\_type jacobi

5890860 , -ksp\_type ibcgs -pc\_type icc -pc\_factor\_levels 2

82456576 , -ksp\_type tfqmr -pc\_type jacobi

29030069 , -ksp\_type lsqr -pc\_type ilu -pc\_factor\_levels 1

95762354 , -ksp\_type cg -pc\_type asm -pc\_asm\_overlap 1

**90783920 , -ksp\_type gmres -pc\_type jacobi**

99720138 , -ksp\_type cg -pc\_type bjacobi

29030071 , -ksp\_type lsqr -pc\_type ilu -pc\_factor\_levels 3

29030070 , -ksp\_type lsqr -pc\_type ilu -pc\_factor\_levels 0

29030072 , -ksp\_type lsqr -pc\_type ilu -pc\_factor\_levels 2

85490469 , -ksp\_type chebyshev -pc\_type ilu -pc\_factor\_levels 3

30870723 , -ksp\_type gmres -pc\_type asm -pc\_asm\_overlap 1

30870722 , -ksp\_type gmres -pc\_type asm -pc\_asm\_overlap 0

26415435 , -ksp\_type fgmres -pc\_type icc -pc\_factor\_levels 2

26415434 , -ksp\_type fgmres -pc\_type icc -pc\_factor\_levels 3

26415433 , -ksp\_type fgmres -pc\_type icc -pc\_factor\_levels 0

26415432 , -ksp\_type fgmres -pc\_type icc -pc\_factor\_levels 1

13323659 , -ksp\_type bicg -pc\_type bjacobi

45869640 , -ksp\_type fgmres -pc\_type asm -pc\_asm\_overlap 1

36564233 , -ksp\_type bicg -pc\_type asm -pc\_asm\_overlap 1

68908713 , -ksp\_type chebyshev -pc\_type jacobi

7285382 , -ksp\_type cg -pc\_type ilu -pc\_factor\_levels 2

36564232 , -ksp\_type bicg -pc\_type asm -pc\_asm\_overlap 0

7285383 , -ksp\_type cg -pc\_type ilu -pc\_factor\_levels 1

75830645 , -ksp\_type ibcgs -pc\_type asm -pc\_asm\_overlap 3

36564234 , -ksp\_type bicg -pc\_type asm -pc\_asm\_overlap 2

**81986705 , -ksp\_type cg -pc\_type jacobi**

29553941 , -ksp\_type bcgs -pc\_type ilu -pc\_factor\_levels 2

29553943 , -ksp\_type bcgs -pc\_type ilu -pc\_factor\_levels 0

29553942 , -ksp\_type bcgs -pc\_type ilu -pc\_factor\_levels 3

69654761 , -ksp\_type tfqmr -pc\_type ilu -pc\_factor\_levels 0

29553944 , -ksp\_type bcgs -pc\_type ilu -pc\_factor\_levels 1

69654763 , -ksp\_type tfqmr -pc\_type ilu -pc\_factor\_levels 2

69654762 , -ksp\_type tfqmr -pc\_type ilu -pc\_factor\_levels 3

32874609 , -ksp\_type lgmres -pc\_type icc -pc\_factor\_levels 0

32168840 , -ksp\_type gmres -pc\_type ilu -pc\_factor\_levels 1

90197664 , -ksp\_type lsqr -pc\_type icc -pc\_factor\_levels 1

90197665 , -ksp\_type lsqr -pc\_type icc -pc\_factor\_levels 0

90197666 , -ksp\_type lsqr -pc\_type icc -pc\_factor\_levels 3

69654760 , -ksp\_type tfqmr -pc\_type ilu -pc\_factor\_levels 1

37052870 , -ksp\_type lsqr -pc\_type asm -pc\_asm\_overlap 3

37052871 , -ksp\_type lsqr -pc\_type asm -pc\_asm\_overlap 2

19932321 , -ksp\_type tcqmr -pc\_type ilu -pc\_factor\_levels 3

19932323 , -ksp\_type tcqmr -pc\_type ilu -pc\_factor\_levels 1

19932322 , -ksp\_type tcqmr -pc\_type ilu -pc\_factor\_levels 2

19932324 , -ksp\_type tcqmr -pc\_type ilu -pc\_factor\_levels 0

80361466 , -ksp\_type bcgs -pc\_type asm -pc\_asm\_overlap 0

80361467 , -ksp\_type bcgs -pc\_type asm -pc\_asm\_overlap 1

80361464 , -ksp\_type bcgs -pc\_type asm -pc\_asm\_overlap 2

80361465 , -ksp\_type bcgs -pc\_type asm -pc\_asm\_overlap 3

49834420 , -ksp\_type tcqmr -pc\_type asm -pc\_asm\_overlap 3

1216556 , -ksp\_type ibcgs -pc\_type jacobi

38678404 , -ksp\_type bicg -pc\_type ilu -pc\_factor\_levels 3

38678401 , -ksp\_type bicg -pc\_type ilu -pc\_factor\_levels 0

38678402 , -ksp\_type bicg -pc\_type ilu -pc\_factor\_levels 1

38678403 , -ksp\_type bicg -pc\_type ilu -pc\_factor\_levels 2

32874611 , -ksp\_type lgmres -pc\_type icc -pc\_factor\_levels 2

32874610 , -ksp\_type lgmres -pc\_type icc -pc\_factor\_levels 1

32874612 , -ksp\_type lgmres -pc\_type icc -pc\_factor\_levels 3

44114477 , -ksp\_type bicg -pc\_type icc -pc\_factor\_levels 1

44114476 , -ksp\_type bicg -pc\_type icc -pc\_factor\_levels 0

44114479 , -ksp\_type bicg -pc\_type icc -pc\_factor\_levels 3

44114478 , -ksp\_type bicg -pc\_type icc -pc\_factor\_levels 2

36564235 , -ksp\_type bicg -pc\_type asm -pc\_asm\_overlap 3

36025721 , -ksp\_type lgmres -pc\_type ilu -pc\_factor\_levels 3

75830647 , -ksp\_type ibcgs -pc\_type asm -pc\_asm\_overlap 1

75830646 , -ksp\_type ibcgs -pc\_type asm -pc\_asm\_overlap 0

85490471 , -ksp\_type chebyshev -pc\_type ilu -pc\_factor\_levels 1

85490470 , -ksp\_type chebyshev -pc\_type ilu -pc\_factor\_levels 2

85490472 , -ksp\_type chebyshev -pc\_type ilu -pc\_factor\_levels 0

18524981 , -ksp\_type ibcgs -pc\_type bjacobi

37052869 , -ksp\_type lsqr -pc\_type asm -pc\_asm\_overlap 0

37052868 , -ksp\_type lsqr -pc\_type asm -pc\_asm\_overlap 1

Total number of combinations: 154

49542066, bcgs none

44673503, fgmres none

7481378, tfqmr none

19481960, bicg none

25185158, ibcgs none

69323954, gmres none

96689089, cg none

28187355, lgmres none

61996489, lsqr none

83579741, tcqmr none

88304927, chebyshev none

None hashes

49542066,44673503,7481378,19481960,25185158,69323954,96689089,28187355,61996489,83579741,88304927

All:

{89565283,8793455,90197667,49598909,91036839,45869639,45869638,45869637,47942867,89269802,89269803,89269801,89269804,59072883,59072882,59072881,7285381,7285384,59072884,49598911,49598910,49598912,30870721,36025723,36025722,53302993,30870720,64278029,36025724,44526267,8793454,8793456,8793453,17734818,32168839,32168838,57331597,95762352,57331599,57331598,32168837,88865078,88865079,49834417,49834419,49834418,88865076,88865077,11256942,11256943,11256941,42851841,11256944,31459546,17887723,91845162,53362206,95762355,12321508,75830644,57331600,43373444,95762353,43373441,43373442,43373443,91068411,91068410,5890861,85483012,5890863,5890862,18868444,18868441,18868443,18868442,91068408,47942864,47942865,47942866,91068409,8520536,5890860,82456576,29030069,95762354,90783920,99720138,29030071,29030070,29030072,85490469,30870723,30870722,26415435,26415434,26415433,26415432,13323659,45869640,36564233,68908713,7285382,36564232,7285383,75830645,36564234,81986705,29553941,29553943,29553942,69654761,29553944,69654763,69654762,32874609,32168840,90197664,90197665,90197666,69654760,37052870,37052871,19932321,19932323,19932322,19932324,80361466,80361467,80361464,80361465,49834420,1216556,38678404,38678401,38678402,38678403,32874611,32874610,32874612,44114477,44114476,44114479,44114478,36564235,36025721,75830647,75830646,85490471,85490470,85490472,18524981,37052869,37052868,49542066,44673503,7481378,19481960,25185158,69323954,96689089,28187355,61996489,83579741,88304927}