

| NonSymmetric      |           |          |          | GF 650 Ti/CPU |         | Symetric          |           |          |          |              |         |  |
|-------------------|-----------|----------|----------|---------------|---------|-------------------|-----------|----------|----------|--------------|---------|--|
|                   | tolerance | iterates | res_norm | duration, ms  | covered |                   | tolerance | iterates | res_norm | duration, ms | covered |  |
| CUSP_CG           | 1.00E-04  | 410      | 3.52E-05 | 1652          | yes     | CUSP_CG           | 1.00E-04  | 455      | 1.46E-07 | 1821         | yes     |  |
| CUSP_BICG         | 1.00E-04  | 410      | 3.51E-05 | 2281          | yes     | CUSP_BICG         | 1.00E-04  | 458      | 1.30E-07 | 2510         | yes     |  |
| CUSP_BiCGStab     | 1.00E-04  | 2000     | inf      | 14678         | no      | CUSP_BiCGStab     | 1.00E-04  | 5000     |          | 35458        | no      |  |
| CUSP_CR           | 1.00E-04  | 399      | 3.44E-05 | 1583          | yes     | CUSP_CR           | 1.00E-04  | 395      | 1.56E-07 | 1536         | yes     |  |
| CUSP_GmRes        | 1.00E-04  | 494      | 3.55E-05 | 9135          | yes     | CUSP_GmRes        | 1.00E-04  | 713      | 1.58E-07 | 12841        | yes     |  |
|                   |           |          |          |               |         |                   |           |          |          |              |         |  |
|                   |           |          |          |               |         |                   |           |          |          |              |         |  |
| CUDA_CG           | 1.00E-04  | 341      | 9.43E-05 | 540           | yes     | CUDA_CG           | 1.00E-04  | 99       | 9.10E-05 | 158          | yes     |  |
| CUDA_BiCGSTAB     | 1.00E-04  |          |          | 107000        | no      | CUDA_BiCGSTAB     | 1.00E-04  |          |          | 107000       | yes     |  |
|                   |           |          |          |               |         |                   |           |          |          |              |         |  |
| MKL_CG            | 1.00E-04  | 98       | 1.20E-05 | 549           | yes     | MKL_CG            | 1.00E-04  | 196      | 2.50E-10 | 528          | yes     |  |
| MKL_PCG           | 1.00E-04  | 1470     | 1.12E-08 | 8900          | yes     | MKL_PCG           | 1.00E-04  | 771      | 9.20E-10 | 4835         | yes     |  |
| MKL_GmRes         | 1.00E-04  | 294      | 5.94E-03 | 2797          | yes     | MKL_GmRes         | 1.00E-04  | 395      | 3.98E-04 | 3427         | yes     |  |
| MKL_PGMRes        | 1.00E-04  | 5000     |          |               | no      | MKL_PGMRes        | 1.00E-04  | 1950     | 4.00E-04 | 29962        | yes     |  |
| MKL_CG_likeCUSP   | 1.00E-04  | 410      | 3.50E-05 | 1246          | yes     | MKL_CG_likeCUSP   | 1.00E-04  | 453      | 1.59E-07 | 1353         | yes     |  |
| MKL_CG_likeDelfEM | 1.00E-04  | 409      | 3.51E-05 | 1218          | yes     | MKL_CG_likeDelfEM | 1.00E-04  | 452      | 1.59E-07 | 1314         | yes     |  |
|                   |           |          |          |               |         |                   |           |          |          |              |         |  |
| Eigen_CG          | 1.00E-04  | 5000     | 1.26E-02 | 16230         | no      | Eigen_CG          | 1.00E-04  | 4248     | 1.60E-07 | 13805        | yes     |  |
| Eigen_PCG         | 1.00E-04  | 1        | 2.45E-06 | 8806          | yes     | Eigen_PCG         | 1.00E-04  | 2        | 1.90E-08 | 9782         | yes     |  |
| Eigen_BiCGSTAB    | 1.00E-04  | 5000     | 6.70E+01 | 32630         | no      | Eigen_BiCGSTAB    | 1.00E-04  | 5000     | 3.60E-07 | 49000        | no      |  |
| Eigen_PBiCGSTAB   | 1.00E-04  | 1        | 1.29E-06 | 9076          | yes     | Eigen_PBiCGSTAB   | 1.00E-04  | 2        | 1.40E-09 | 10062        | yes     |  |
| Eigen_LSCG        | 1.00E-04  | 924      | 3.52E-05 | 6190          | yes     | Eigen_LSCG        | 1.00E-04  | 1094     | 1.60E-07 | 7317         | yes     |  |
| Eigen_LU          |           |          |          | 13179         | yes     | Eigen_LU          |           |          |          | 9886         | yes     |  |
| Eigen_LLT         |           |          |          |               | no      | Eigen_LLT         |           |          | 5.70E-14 | 5314         | yes     |  |
| Eigen_LDLT        |           |          | 9.00E-01 | 5086          | yes     | Eigen_LDLT        |           |          | 5.70E-14 | 5657         | yes     |  |
|                   |           |          |          |               |         |                   |           |          |          |              |         |  |
| Gmm_CG            | 1.00E-04  | 411      | 3.50E-05 | 991           | yes     | Gmm_CG            | 1.00E-04  | 459      | 1.40E-07 | 1092         | yes     |  |
| Gmm_BiCGSTAB      | 1.00E-04  | 5000     |          |               | no      | Gmm_BiCGSTAB      | 1.00E-04  | 5000     |          |              | no      |  |
| Gmm_GmRes         | 1.00E-04  | 494      | 3.56E-05 | 2662          | yes     | Gmm_GmRes         | 1.00E-04  | 713      | 1.59E-07 | 3493         | yes     |  |
| Gmm_QMR           | 1.00E-04  | 306      | 3.56E-05 | 1995          | yes     | Gmm_QMR           | 1.00E-04  | 391      | 1.54E-07 | 2393         | yes     |  |
| Gmm_LSCG          | 1.00E-04  | 28       | 3.51E-05 | 158           | yes     | Gmm_LSCG          | 1.00E-04  | 63       | 1.43E-07 | 336          | yes     |  |
| Gmm_PCG_ALL       | 1.00E-04  |          |          |               | no      | Gmm_PCG_Diag      | 1.00E-04  | 4235     | 1.60E-07 | 54805        | yes     |  |
| Gmm_PBiCGSTAB_All | 1.00E-04  |          |          |               | no      | Gmm_PCG_ILU       | 1.00E-04  |          |          |              | no      |  |
| Gmm_PGmRes_All    | 1.00E-04  |          |          |               | no      | Gmm_PCG_ILUit     | 1.00E-04  |          |          |              | no      |  |
| Gmm_PQMR_All      | 1.00E-04  |          |          |               | no      | Gmm_PCG_Ildit     | 1.00E-04  |          |          |              | no      |  |
|                   |           |          |          |               |         | Gmm_PBiCGSTAB_All | 1.00E-04  |          |          |              | no      |  |
|                   |           |          |          |               |         | Gmm_PGmRes_Diag   | 1.00E-04  | 99       | 2.74E-07 | 1627         | yes     |  |
|                   |           |          |          |               |         | Gmm_PGmRes_Other  | 1.00E-04  |          |          |              | no      |  |
|                   |           |          |          |               |         | Gmm_PQMR_Diag     | 1.00E-04  | 3454     | 1.60E-07 | 93611        | yes     |  |
|                   |           |          |          |               |         | Gmm_PQMR_Other    | 1.00E-04  |          |          |              | no      |  |
|                   |           |          |          |               |         |                   |           |          |          |              |         |  |
| MTL_CG            | 1.00E-04  | 410      | 3.52E-05 | 1725          | yes     | MTL_CG            | 1.00E-04  | 459      | 1.30E-07 | 2304         | yes     |  |
| MTL_BiCG          | 1.00E-04  | 389      | 3.09E-05 | 4018          | yes     | MTL_BiCG          | 1.00E-04  | 453      | 1.59E-07 | 5146         | yes     |  |
| MTL_BiCGSTAB      | 1.00E-04  | 5000     |          | 41628         | no      | MTL_BiCGSTAB      | 1.00E-04  | 5000     |          | 42000        | no      |  |

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|                         | tolerance | iterates | res_norm | duration, ms  | covered |  |                         | tolerance | iterates | res_norm | duration, ms | covered |
| MTL_BiCGSTAB2           | 1.00E-04  | 22       | 3.49E-06 | 376           | yes     |  | MTL_BiCGSTAB2           | 1.00E-04  | 30       | 1.96E-08 | 514          | yes     |
| MTL_BiCGSTAB_ELL        | 1.00E-04  | 22       | 3.49E-06 | 398           | yes     |  | MTL_BiCGSTAB_ELL        | 1.00E-04  | 30       | 1.96E-08 | 545          | yes     |
| MTL_CGS(like LSCG)      | 1.00E-04  | 450      | 1.50E-05 | 3933          | yes     |  | MTL_CGS(like LSCG)      | 1.00E-04  | 548      | 3.49E-08 | 4851         | yes     |
| MTL_GmRes               | 1.00E-04  | 5000     |          | 35893         | no      |  | MTL_GmRes               | 1.00E-04  | 5000     |          | 39516        | no      |
| MTL_QMR                 | 1.00E-04  | 967      | 7.92E-06 | 12521         | yes     |  | MTL_QMR                 | 1.00E-04  | 5000     |          | 66880        | no      |
| MTL_TFQMR               | 1.00E-04  | 474      | 2.72E-05 | 6686          | yes     |  | MTL_TFQMR               | 1.00E-04  | 416      | 1.54E-07 | 6119         | yes     |
| MTL_PCG_Diagonal        | 1.00E-04  | 5000     |          | 23517         | no      |  | MTL_PCG_Diagonal        | 1.00E-04  | 4232     | 1.60E-07 | 20620        | yes     |
| MTL_PCG_ILU0            | 1.00E-04  | 5000     |          | 43893         | no      |  | MTL_PCG_ILU0            | 1.00E-04  | 3084     | 1.58E-07 | 28355        | yes     |
| MTL_PCG_IC              | 1.00E-04  | 5000     |          | 41741         | no      |  | MTL_PCG_IC              | 1.00E-04  | 5000     |          | 46213        | no      |
| MTL_PBiCG_Diagonal      | 1.00E-04  | 5000     |          | 51953         | no      |  | MTL_PBiCG_Diagonal      | 1.00E-04  | 5000     |          | 58117        | no      |
| MTL_PBiCG_ILU0          | 1.00E-04  | 5000     |          | 104123        | no      |  | MTL_PBiCG_ILU0          | 1.00E-04  | 5000     |          | 114947       | no      |
| MTL_PBiCG_IC            | 1.00E-04  | 5000     |          | 90485         | no      |  | MTL_PBiCG_IC            | 1.00E-04  | 5000     |          | 97803        | no      |
| MTL_PBiCGStab_Diagonal  | 1.00E-04  | 5000     |          | 42090         | no      |  | MTL_PBiCGStab_Diagonal  | 1.00E-04  | 5000     |          | 46590        | no      |
| MTL_PBiCGStab_ILU0      | 1.00E-04  | 5000     |          | 79993         | no      |  | MTL_PBiCGStab_ILU0      | 1.00E-04  | 5000     |          | 86632        | no      |
| MTL_PBiCGStab_IC        | 1.00E-04  | 5000     |          | 81025         | no      |  | MTL_PBiCGStab_IC        | 1.00E-04  | 5000     |          | 85896        | no      |
| MTL_PBiCGStab2_Diagonal | 1.00E-04  | 142      | 3.23E-05 | 2441          | yes     |  | MTL_PBiCGStab2_Diagonal | 1.00E-04  | 97       | 1.56E-07 | 1749         | yes     |
| MTL_PBiCGStab2_ILU0     | 1.00E-04  | 5000     |          | 165199        | no      |  | MTL_PBiCGStab2_ILU0     | 1.00E-04  | 4662     | 1.38E-07 | 161969       | yes     |
| MTL_PBiCGStab2_IC       | 1.00E-04  | 5000     |          | 164640        | no      |  | MTL_PBiCGStab2_IC       | 1.00E-04  | 5000     |          | 178042       | no      |
| MTL_PCGS_Diagonal       | 1.00E-04  | 5000     |          | 42484         | no      |  | MTL_PCGS_Diagonal       | 1.00E-04  | 4947     | 5.00E-08 | 46717        | yes     |
| MTL_PCGS_ILU0           | 1.00E-04  | 5000     |          | 80815         | no      |  | MTL_PCGS_ILU0           | 1.00E-04  | 5000     |          | 89000        | no      |
| MTL_PCGS_IC             | 1.00E-04  | 5000     |          | 81391         | no      |  | MTL_PCGS_IC             | 1.00E-04  | 5000     |          | 87394        | no      |
| MTL_PGmRes_Diagonal     | 1.00E-04  | 5000     |          | 66495         | no      |  | MTL_PGmRes_Diagonal     | 1.00E-04  | 5000     |          | 70285        | no      |
| MTL_PGmRes_ILU0         | 1.00E-04  | 5000     |          | 86547         | no      |  | MTL_PGmRes_ILU0         | 1.00E-04  | 5000     |          | 92159        | no      |
| MTL_PGmRes_IC           | 1.00E-04  | 5000     |          | 88600         | no      |  | MTL_PGmRes_IC           | 1.00E-04  | 5000     |          | 93247        | no      |
| MTL_PQMR_Diagonal       | 1.00E-04  | 5000     |          | 63070         | no      |  | MTL_PQMR_Diagonal       | 1.00E-04  | 5000     |          | 65550        | no      |
| MTL_PQMR_ILU0           | 1.00E-04  | 5000     |          | 116860        | no      |  | MTL_PQMR_ILU0           | 1.00E-04  | 5000     |          | 122808       | no      |
| MTL_PQMR_IC             | 1.00E-04  | 5000     |          | 101235        | no      |  | MTL_PQMR_IC             | 1.00E-04  | 5000     |          | 108292       | no      |
| MTL_PTFQMR_Diagonal     | 1.00E-04  | 5000     |          | 70723         | no      |  | MTL_PTFQMR_Diagonal     | 1.00E-04  | 1801     | 5.73E-08 | 27424        | yes     |
| MTL_PTFQMR_ILU0         | 1.00E-04  | 5000     |          | 109936        | no      |  | MTL_PTFQMR_ILU0         | 1.00E-04  | 5000     |          | 115915       | no      |
| MTL_PTFQMR_IC           | 1.00E-04  | 5000     |          | 110936        | no      |  | MTL_PTFQMR_IC           | 1.00E-04  | 5000     |          | 108455       | no      |
| ViennaCL(VCL)           |           |          |          |               |         |  | ViennaCL(VCL)           |           |          |          |              |         |
| VCL_CG                  | 1.00E-04  | 547      | 3.54E-05 | 1523          | yes     |  | VCL_CG                  | 1.00E-04  | 458      | 1.57E-07 | 1282         | yes     |
| VCL_BiCGSTAB            | 1.00E-04  | 5000     |          | 28360         | no      |  | VCL_BiCGSTAB            | 1.00E-04  | 5000     |          | 27862        | no      |
| VCL_GmRes               | 1.00E-04  | 912      | 3.43E-05 | 4061          | yes     |  | VCL_GmRes               | 1.00E-04  | 1820     | 1.58E-07 | 7580         | yes     |
| VCL_PCG_ILU0            | 1.00E-04  | 5000     |          | 52801         | no      |  | VCL_PCG_ILU0            | 1.00E-04  | 300      | 1.45E-05 | 3914         | yes     |
| VCL_PCG_ILUt            | 1.00E-04  | 1        | 3.61E-01 | 10065         | yes     |  | VCL_PCG_ILUt            | 1.00E-04  | 1        | 1.61E-03 | 7113         | yes     |
| VCL_PCG_ICHOL0          | 1.00E-04  | 5000     |          | 59973         | no      |  | VCL_PCG_ICHOL0          | 1.00E-04  | 5000     |          | 59959        | no      |
| VCL_PCG_BLK_ILU0        | 1.00E-04  | 570      | 2.26E-02 | 3758          | yes     |  | VCL_PCG_BLK_ILU0        | 1.00E-04  | 3726     | 1.81E-04 | 21933        | yes     |
| VCL_PCG_Diag            | 1.00E-04  | 5000     |          | 17177         | no      |  | VCL_PCG_Diag            | 1.00E-04  | 1524     | 3.44E-06 | 5130         | yes     |
| VCL_PCG_Jacobi          | 1.00E-04  | 5000     |          | 16722         | no      |  | VCL_PCG_Jacobi          | 1.00E-04  | 1763     | 2.80E-06 | 5873         | yes     |
| VCL_PBiCGSTAB_ILU0      | 1.00E-04  | 5000     |          | 103540        | no      |  | VCL_PBiCGSTAB_ILU0      | 1.00E-04  | 5000     |          | 102780       | no      |
| VCL_PBiCGSTAB_ILUt      | 1.00E-04  | 5000     |          | 102683        | no      |  | VCL_PBiCGSTAB_ILUt      | 1.00E-04  | 5000     |          | 67478        | no      |
| VCL_PBiCGSTAB_ICHOL0    | 1.00E-04  | 5000     |          | 118687        | no      |  | VCL_PBiCGSTAB_ICHOL0    | 1.00E-04  | 5000     |          | 118275       | no      |
| VCL_PBiCGSTAB_BLK_ILU0  | 1.00E-04  | 5000     |          | 56922         | no      |  | VCL_PBiCGSTAB_BLK_ILU0  | 1.00E-04  | 5000     |          | 56641        | no      |

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|---------------------|-----------|----------|----------|---------------|---------|--|---------------------|-----------|----------|----------|--------------|---------|--|
|                     | tolerance | iterates | res_norm | duration, ms  | covered |  |                     | tolerance | iterates | res_norm | duration, ms | covered |  |
| VCL_PBiCGSTAB_Diag  | 1.00E-04  | 1102     | 3.66E-03 | 7280          | yes     |  | VCL_PBiCGSTAB_Diag  | 1.00E-04  | 1844     | 1.15E-06 | 12136        | yes     |  |
| VCL_PBiCGSTAB_Jacob | 1.00E-04  | 1304     | 2.76E-03 | 8635          | yes     |  | VCL_PBiCGSTAB_Jacob | 1.00E-04  | 1880     | 8.74E-07 | 12388        | yes     |  |
| VCL_PGmRes_ILU0     | 1.00E-04  | 5000     |          | 69217         | no      |  | VCL_PGmRes_ILU0     | 1.00E-04  | 5000     |          | 69942        | no      |  |
| VCL_PGmRes_ILUt     | 1.00E-04  | 1        | 3.67E-01 | 10122         | yes     |  | VCL_PGmRes_ILUt     | 1.00E-04  | 4        | 7.12E-03 | 7123         | yes     |  |
| VCL_PGmRes_ICHOL0   | 1.00E-04  | 5000     |          | 76543         | no      |  | VCL_PGmRes_ICHOL0   | 1.00E-04  | 5000     |          | 76879        | no      |  |
| VCL_PGmRes_BLK_ILU0 | 1.00E-04  | 5000     |          | 45870         | no      |  | VCL_PGmRes_BLK_ILU0 | 1.00E-04  | 5000     |          | 45273        | no      |  |
| VCL_PGmRes_Diag     | 1.00E-04  | 5000     |          | 32277         | no      |  | VCL_PGmRes_Diag     | 1.00E-04  | 5000     |          | 32291        | no      |  |
| VCL_PGmRes_Jacobi   | 1.00E-04  | 5000     |          | 32425         | no      |  | VCL_PGmRes_Jacobi   | 1.00E-04  | 5000     |          | 32343        | no      |  |
|                     |           |          |          |               |         |  |                     |           |          |          |              |         |  |
| DeIFEM_CG           | 1.00E-04  |          |          |               |         |  | DeIFEM_CG           | 1.00E-04  | 936      | 1.28E-07 | 1175         | yes     |  |
| DeIFEM_BiCGSTAB     | 1.00E-04  |          |          |               |         |  | DeIFEM_BiCGSTAB     | 1.00E-04  | 5000     |          | 24000        | no      |  |
| DeIFEM_PCG_ILUt     | 1.00E-04  | 18       | 1.85E-05 | 336           | yes     |  | DeIFEM_PCG_ILUt     | 1.00E-04  | 18       | 8.70E-08 | 329          | yes     |  |
| DeIFEM_PBiCGSTAB_IL | 1.00E-04  | 27       | 9.96E-06 | 728           | yes     |  | DeIFEM_PBiCGSTAB_IL | 1.00E-04  | 6        | 7.21E-06 | 230          | yes     |  |