# Full tables for "On efficiently solving the subproblems of a level-set method for fused lasso problems"

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We present statistics of the tested biomedical data in Table 1.

Table 1: Statistics of the biomedical data sets.

| probname | $m; n$ | $\lambda_{\max}(AA^T)$ |
|---|---|---|
| DLBCLH | 160;7399 | 8.38e+02 |
| DLBCLN | 160;7399 | 8.38e+02 |
| DLBCLS | 47;4026 | 6.23e+02 |
| lungH1 | 203;12600 | 6.64e+03 |
| lungH2 | 149;12533 | 6.96e+03 |
| lungM | 96;7129 | 4.46e+03 |
| lungO | 39;2880 | 2.30e+03 |
| NervousSystem | 60;7129 | 3.34e+03 |
| ovarianP | 253;15153 | 1.30e+04 |
| ovarianS | 216;373401 | 2.90e+05 |

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Table 2 reports the detailed numerical results for SSNAL, SLEP, ADMM, iADMM and LADMM in solving all the instances in the biomedical datasets.

Table 2: The performance of various algorithms on fused lasso regularized least squares problems on high-dimensional biomedical datasets (accuracy $\eta \leq 10^{-6}$). $m$ is the sample size and $n$ is the dimension of features. In the table, "a" = SSNAL, "b" = SLEP, "c" = ADMM, "d" = iADMM, and "e" = LADMM. "nnz" denotes the number of nonzeros in the solution obtained by SSNAL.

| | | | $\eta$ | time (hours:minutes:seconds) |
|---|---|---|---|---|
| probname $m;n$ | $\alpha_1;\alpha_2$ | nnz($x$) ; nnz($Bx$) | a \| b \| c \| d \| e | a \| b \| c \| d \| e |
| | $10^{-3}$ ; 10 | 1966 ; 235 | 1.3-7 \| 7.8-6 \| 9.9-7 \| 7.6-7 \| 9.9-7 | 01 \| 16 \| 06 \| 13 \| 10 |
| DLBCLH | $10^{-3}$ ; 2 | 818 ; 261 | 3.6-7 \| 1.2-5 \| 9.9-7 \| 9.9-7 \| 9.9-7 | 01 \| 16 \| 11 \| 22 \| 18 |
| 160;7399 | $10^{-3}$ ; 0.2 | 211 ; 291 | 7.0-8 \| 2.9-5 \| 9.9-7 \| 6.6-7 \| 2.4-6 | 01 \| 16 \| 16 \| 39 \| 19 |
| | $10^{-3}$ ; 0.01 | 157 ; 306 | 9.1-8 \| 4.7-5 \| 9.8-7 \| 6.5-7 \| 3.7-6 | 01 \| 14 \| 17 \| 37 \| 18 |
| | $10^{-4}$ ; 10 | 1995 ; 240 | 2.9-7 \| 2.1-5 \| 8.5-7 \| 9.8-7 \| 1.3-6 | 01 \| 16 \| 14 \| 36 \| 19 |
| | $10^{-4}$ ; 2 | 848 ; 275 | 3.6-7 \| 3.4-5 \| 9.1-7 \| 8.7-7 \| 3.4-6 | 01 \| 16 \| 20 \| 43 \| 20 |
| | $10^{-4}$ ; 0.2 | 213 ; 292 | 4.9-9 \| 7.6-5 \| 8.7-7 \| 9.1-7 \| 2.0-5 | 01 \| 16 \| 26 \| 1:09 \| 20 |
| | $10^{-4}$ ; 0.01 | 158 ; 306 | 1.5-7 \| 1.0-4 \| 4.3-6 \| 9.9-7 \| 5.8-5 | 01 \| 14 \| 30 \| 1:24 \| 18 |
| | $10^{-3}$ ; 10 | 1966 ; 235 | 1.3-7 \| 7.8-6 \| 9.9-7 \| 7.6-7 \| 9.9-7 | 01 \| 16 \| 06 \| 13 \| 10 |
| DLBCLN | $10^{-3}$ ; 2 | 818 ; 261 | 3.6-7 \| 1.2-5 \| 9.9-7 \| 9.9-7 \| 9.9-7 | 01 \| 16 \| 10 \| 22 \| 18 |
| 160;7399 | $10^{-3}$ ; 0.2 | 211 ; 291 | 7.0-8 \| 2.9-5 \| 9.9-7 \| 6.6-7 \| 2.4-6 | 00 \| 16 \| 16 \| 39 \| 19 |
| | $10^{-3}$ ; 0.01 | 157 ; 306 | 9.1-8 \| 4.7-5 \| 9.8-7 \| 6.5-7 \| 3.7-6 | 00 \| 14 \| 17 \| 37 \| 18 |
| | $10^{-4}$ ; 10 | 1995 ; 240 | 2.9-7 \| 2.1-5 \| 8.5-7 \| 9.8-7 \| 1.3-6 | 01 \| 16 \| 14 \| 36 \| 19 |
| | $10^{-4}$ ; 2 | 848 ; 275 | 3.6-7 \| 3.4-5 \| 9.1-7 \| 8.7-7 \| 3.4-6 | 01 \| 16 \| 20 \| 43 \| 20 |
| | $10^{-4}$ ; 0.2 | 213 ; 292 | 4.9-9 \| 7.6-5 \| 8.7-7 \| 9.1-7 \| 2.0-5 | 01 \| 16 \| 26 \| 1:09 \| 20 |
| | $10^{-4}$ ; 0.01 | 158 ; 306 | 1.5-7 \| 1.0-4 \| 4.3-6 \| 9.9-7 \| 5.8-5 | 01 \| 14 \| 30 \| 1:25 \| 18 |
| | $10^{-3}$ ; 10 | 685 ; 69 | 2.2-7 \| 4.6-6 \| 9.9-7 \| 5.3-8 \| 9.9-7 | 00 \| 09 \| 02 \| 04 \| 03 |
| DLBCLS | $10^{-3}$ ; 2 | 264 ; 79 | 8.5-7 \| 2.0-6 \| 8.7-7 \| 7.4-7 \| 9.9-7 | 00 \| 10 \| 02 \| 04 \| 04 |
| 47;4026 | $10^{-3}$ ; 0.2 | 76 ; 90 | 2.6-7 \| 6.1-6 \| 7.1-7 \| 9.9-7 \| 9.9-7 | 00 \| 09 \| 04 \| 09 \| 08 |
| | $10^{-3}$ ; 0.01 | 44 ; 84 | 4.2-7 \| 2.0-5 \| 5.9-7 \| 6.9-7 \| 9.9-7 | 00 \| 07 \| 06 \| 12 \| 10 |
| | $10^{-4}$ ; 10 | 676 ; 70 | 3.3-7 \| 1.6-5 \| 6.9-7 \| 2.6-7 \| 9.9-7 | 00 \| 08 \| 05 \| 09 \| 09 |
| | $10^{-4}$ ; 2 | 274 ; 83 | 5.7-7 \| 1.3-5 \| 4.7-7 \| 9.9-7 \| 9.9-7 | 00 \| 09 \| 06 \| 11 \| 09 |
| | $10^{-4}$ ; 0.2 | 76 ; 90 | 6.6-7 \| 1.8-5 \| 3.2-7 \| 5.1-7 \| 2.4-6 | 00 \| 08 \| 09 \| 20 \| 11 |
| | $10^{-4}$ ; 0.01 | 44 ; 84 | 4.5-8 \| 4.2-5 \| 6.2-7 \| 9.7-7 \| 2.5-5 | 00 \| 07 \| 14 \| 33 \| 10 |
| | $10^{-3}$ ; 10 | 1556 ; 244 | 9.0-8 \| 1.2-4 \| 7.2-7 \| 9.9-7 \| 9.9-7 | 01 \| 28 \| 07 \| 11 \| 25 |
| lungH1 | $10^{-3}$ ; 2 | 514 ; 325 | 4.9-7 \| 1.1-4 \| 8.7-7 \| 9.3-7 \| 3.9-5 | 01 \| 28 \| 13 \| 22 \| 33 |
| 203;12600 | $10^{-3}$ ; 0.2 | 199 ; 357 | 2.6-7 \| 1.8-4 \| 9.9-7 \| 9.4-7 \| 9.8-2 | 01 \| 27 \| 18 \| 32 \| 32 |
| | $10^{-3}$ ; 0.01 | 188 ; 365 | 2.1-7 \| 5.7-4 \| 9.9-7 \| 8.3-7 \| 2.9-2 | 01 \| 24 \| 16 \| 38 \| 29 |
| | $10^{-4}$ ; 10 | 1856 ; 301 | 4.4-8 \| 4.4-4 \| 9.8-7 \| 9.4-7 \| 9.9-3 | 01 \| 27 \| 15 \| 35 \| 33 |
| | $10^{-4}$ ; 2 | 551 ; 344 | 9.2-8 \| 7.2-4 \| 9.9-7 \| 6.5-7 \| 6.7-2 | 01 \| 28 \| 28 \| 1:02 \| 34 |
| | $10^{-4}$ ; 0.2 | 206 ; 373 | 1.5-8 \| 1.4-3 \| 9.9-7 \| 9.5-7 \| 7.6-2 | 01 \| 27 \| 45 \| 1:28 \| 34 |
| | $10^{-4}$ ; 0.01 | 195 ; 375 | 5.6-8 \| 1.7-3 \| 9.9-7 \| 8.5-7 \| 4.2-2 | 01 \| 25 \| 37 \| 1:34 \| 31 |
| | $10^{-3}$ ; 10 | 1293 ; 136 | 3.5-7 \| 4.2-5 \| 8.5-7 \| 5.2-7 \| 9.9-7 | 00 \| 25 \| 03 \| 05 \| 07 |
| lungH2 | $10^{-3}$ ; 2 | 646 ; 186 | 6.6-8 \| 3.9-5 \| 9.9-7 \| 8.5-7 \| 9.9-7 | 00 \| 26 \| 06 \| 10 \| 19 |
| 149;12533 | $10^{-3}$ ; 0.2 | 261 ; 249 | 8.8-7 \| 2.2-4 \| 9.9-7 \| 9.8-7 \| 1.4-4 | 00 \| 25 \| 14 \| 27 \| 31 |
| | $10^{-3}$ ; 0.01 | 137 ; 268 | 4.6-7 \| 1.5-4 \| 9.9-7 \| 7.9-7 \| 2.2-5 | 00 \| 22 \| 24 \| 50 \| 29 |
| | $10^{-4}$ ; 10 | 1901 ; 202 | 1.8-7 \| 1.8-4 \| 7.5-7 \| 9.9-7 \| 4.9-3 | 01 \| 26 \| 07 \| 16 \| 31 |
| | $10^{-4}$ ; 2 | 775 ; 236 | 2.6-7 \| 1.3-4 \| 8.2-7 \| 9.9-7 \| 2.4-2 | 01 \| 27 \| 15 \| 36 \| 34 |
| | $10^{-4}$ ; 0.2 | 263 ; 266 | 1.1-7 \| 9.2-4 \| 9.9-7 \| 5.6-7 \| 2.3-3 | 01 \| 25 \| 42 \| 1:42 \| 32 |
| | $10^{-4}$ ; 0.01 | 146 ; 285 | 1.2-7 \| 9.9-4 \| 1.4-7 \| 8.3-7 \| 2.0-2 | 01 \| 23 \| 50 \| 1:46 \| 30 |
| | $10^{-3}$ ; 10 | 801 ; 125 | 5.3-7 \| 2.4-5 \| 9.9-7 \| 8.5-7 \| 9.9-7 | 00 \| 12 \| 03 \| 04 \| 08 |
| lungM | $10^{-3}$ ; 2 | 236 ; 144 | 1.4-7 \| 6.5-5 \| 9.9-7 \| 7.5-7 \| 9.9-7 | 00 \| 12 \| 04 \| 06 \| 13 |

Table 2: The performance of various algorithms on fused lasso regularized least squares problems on high-dimensional biomedical datasets (accuracy $\eta \leq 10^{-6}$). $m$ is the sample size and $n$ is the dimension of features. In the table, "a" = SSNAL, "b" = SLEP, "c" = ADMM, "d" = iADMM, and "e" = LADMM. "nnz" denotes the number of nonzeros in the solution obtained by SSNAL.

| | | | $\eta$ | time (hours:minutes:seconds) |
|---|---|---|---|---|
| probname $m;n$ | $\alpha_1;\alpha_2$ | nnz($x$) ; nnz($Bx$) | a \| b \| c \| d \| e | a \| b \| c \| d \| e |
| 96;7129 | $10^{-3}$ ; 0.2 | 98 ; 179 | 5.1-8 \| 2.2-4 \| 9.9-7 \| 5.5-7 \| 1.3-5 | 00 \| 12 \| 12 \| 14 \| 15 |
| | $10^{-3}$ ; 0.01 | 90 ; 175 | 3.1-7 \| 2.1-4 \| 7.1-7 \| 9.9-7 \| 3.1-5 | 00 \| 10 \| 08 \| 18 \| 14 |
| | $10^{-4}$ ; 10 | 919 ; 148 | 2.5-7 \| 1.3-4 \| 1.2-6 \| 5.5-7 \| 1.2-5 | 00 \| 12 \| 25 \| 17 \| 16 |
| | $10^{-4}$ ; 2 | 270 ; 164 | 3.5-7 \| 3.1-4 \| 9.6-7 \| 9.6-7 \| 4.4-5 | 00 \| 12 \| 09 \| 14 \| 17 |
| | $10^{-4}$ ; 0.2 | 101 ; 182 | 2.7-7 \| 2.3-4 \| 6.7-7 \| 9.2-7 \| 7.1-5 | 00 \| 12 \| 18 \| 33 \| 17 |
| | $10^{-4}$ ; 0.01 | 92 ; 180 | 4.2-7 \| 6.5-4 \| 4.6-6 \| 4.4-7 \| 1.8-4 | 00 \| 11 \| 24 \| 41 \| 15 |
| | $10^{-3}$ ; 10 | 383 ; 48 | 2.1-7 \| 3.3-5 \| 8.7-7 \| 8.8-7 \| 9.5-7 | 00 \| 05 \| 01 \| 03 \| 05 |
| lungO | $10^{-3}$ ; 2 | 102 ; 65 | 2.4-8 \| 1.2-4 \| 8.4-7 \| 6.0-8 \| 8.5-6 | 00 \| 05 \| 02 \| 05 \| 07 |
| 39;2880 | $10^{-3}$ ; 0.2 | 40 ; 74 | 7.8-8 \| 3.5-4 \| 9.5-7 \| 9.8-7 \| 1.3-5 | 00 \| 05 \| 05 \| 10 \| 07 |
| | $10^{-3}$ ; 0.01 | 36 ; 72 | 6.6-8 \| 2.5-4 \| 9.9-7 \| 4.2-7 \| 3.4-5 | 00 \| 04 \| 03 \| 07 \| 06 |
| | $10^{-4}$ ; 10 | 422 ; 59 | 2.3-7 \| 8.0-5 \| 9.9-7 \| 2.2-7 \| 2.6-5 | 00 \| 05 \| 07 \| 17 \| 07 |
| | $10^{-4}$ ; 2 | 102 ; 68 | 1.9-7 \| 1.7-4 \| 8.8-7 \| 5.6-7 \| 4.5-5 | 00 \| 05 \| 05 \| 11 \| 08 |
| | $10^{-4}$ ; 0.2 | 40 ; 75 | 1.3-7 \| 3.0-4 \| 4.1-7 \| 6.9-7 \| 1.0-4 | 00 \| 05 \| 10 \| 24 \| 08 |
| | $10^{-4}$ ; 0.01 | 36 ; 71 | 5.6-8 \| 7.4-4 \| 5.3-7 \| 8.7-7 \| 5.5-5 | 00 \| 05 \| 07 \| 20 \| 07 |
| | $10^{-3}$ ; 10 | 785 ; 97 | 1.4-7 \| 8.9-5 \| 8.6-7 \| 8.7-7 \| 3.0-6 | 00 \| 13 \| 05 \| 09 \| 15 |
| NervousSystem | $10^{-3}$ ; 2 | 184 ; 100 | 1.5-7 \| 1.1-4 \| 7.5-7 \| 9.9-7 \| 9.9-7 | 00 \| 13 \| 05 \| 09 \| 15 |
| 60;7129 | $10^{-3}$ ; 0.2 | 65 ; 113 | 2.9-7 \| 3.4-4 \| 9.2-7 \| 3.4-7 \| 1.2-5 | 00 \| 12 \| 10 \| 19 \| 16 |
| | $10^{-3}$ ; 0.01 | 57 ; 113 | 5.9-8 \| 1.1-4 \| 9.9-7 \| 8.4-7 \| 1.5-5 | 00 \| 11 \| 07 \| 15 \| 15 |
| | $10^{-4}$ ; 10 | 823 ; 98 | 1.1-7 \| 1.1-4 \| 9.9-7 \| 9.9-7 \| 9.5-5 | 00 \| 13 \| 12 \| 21 \| 16 |
| | $10^{-4}$ ; 2 | 187 ; 99 | 8.4-8 \| 3.8-4 \| 9.9-7 \| 7.2-7 \| 4.8-5 | 00 \| 13 \| 12 \| 26 \| 17 |
| | $10^{-4}$ ; 0.2 | 64 ; 112 | 3.9-8 \| 5.9-4 \| 4.9-7 \| 8.6-7 \| 1.5-4 | 00 \| 12 \| 18 \| 42 \| 17 |
| | $10^{-4}$ ; 0.01 | 59 ; 116 | 1.4-7 \| 5.7-4 \| 9.8-7 \| 9.9-7 \| 5.3-4 | 00 \| 11 \| 20 \| 45 \| 15 |
| | $10^{-3}$ ; 10 | 2089 ; 102 | 4.2-8 \| 7.3-5 \| 5.6-7 \| 6.6-7 \| 1.8-5 | 01 \| 1:02 \| 14 \| 23 \| 1:09 |
| ovarianP | $10^{-3}$ ; 2 | 824 ; 144 | 1.6-7 \| 1.6-4 \| 9.9-7 \| 9.0-7 \| 9.7-4 | 01 \| 1:01 \| 19 \| 36 \| 1:06 |
| 253;15153 | $10^{-3}$ ; 0.2 | 331 ; 248 | 1.6-7 \| 6.8-4 \| 7.6-7 \| 6.5-7 \| 1.9-3 | 01 \| 57 \| 34 \| 1:35 \| 1:04 |
| | $10^{-3}$ ; 0.01 | 180 ; 285 | 1.3-7 \| 6.2-4 \| 9.9-7 \| 9.9-7 \| 2.7-3 | 01 \| 53 \| 59 \| 2:55 \| 1:00 |
| | $10^{-4}$ ; 10 | 3906 ; 285 | 1.3-7 \| 2.1-4 \| 7.9-7 \| 1.3-7 \| 9.2-3 | 01 \| 58 \| 21 \| 1:02 \| 1:04 |
| | $10^{-4}$ ; 2 | 1259 ; 350 | 2.7-7 \| 4.5-4 \| 8.2-7 \| 9.7-7 \| 1.1-2 | 01 \| 58 \| 45 \| 1:51 \| 1:05 |
| | $10^{-4}$ ; 0.2 | 468 ; 401 | 2.4-7 \| 2.2-3 \| 7.5-7 \| 7.4-7 \| 3.1-3 | 01 \| 57 \| 1:13 \| 3:41 \| 1:05 |
| | $10^{-4}$ ; 0.01 | 255 ; 412 | 9.9-8 \| 1.4-3 \| 2.9-5 \| 1.9-5 \| 4.4-3 | 01 \| 55 \| 1:55 \| 6:11 \| 1:01 |
| | $10^{-3}$ ; 10 | 5748 ; 294 | 5.9-7 \| 1.2-3 \| 7.1-7 \| 2.5-7 \| 2.9-3 | 13 \| 23:02 \| 12:44 \| 19:25 \| 22:46 |
| ovarianS | $10^{-3}$ ; 2 | 1958 ; 352 | 6.7-7 \| 3.8-3 \| 2.1-6 \| 8.5-7 \| 9.4-3 | 15 \| 20:17 \| 46:31 \| 57:19 \| 23:23 |
| 216;373401 | $10^{-3}$ ; 0.2 | 332 ; 396 | 2.2-7 \| 8.4-3 \| 1.8-4 \| 1.0-4 \| 2.8-2 | 15 \| 19:24 \| 41:45 \| 1:11:39 \| 22:43 |
| | $10^{-3}$ ; 0.01 | 205 ; 409 | 6.3-7 \| 8.5-3 \| 1.6-3 \| 3.6-4 \| 3.8-2 | 14 \| 18:41 \| 41:12 \| 1:15:03 \| 21:55 |
| | $10^{-4}$ ; 10 | 5792 ; 358 | 4.4-7 \| 4.7-3 \| 2.6-5 \| 2.6-5 \| 9.5-2 | 20 \| 26:23 \| 39:51 \| 1:33:09 \| 29:27 |
| | $10^{-4}$ ; 2 | 1963 ; 380 | 2.5-7 \| 7.3-3 \| 1.1-3 \| 1.8-3 \| 9.0-2 | 20 \| 16:39 \| 45:03 \| 1:17:03 \| 22:59 |
| | $10^{-4}$ ; 0.2 | 343 ; 410 | 3.0-7 \| 6.0-3 \| 2.9-4 \| 1.4-3 \| 2.1-1 | 19 \| 16:36 \| 41:00 \| 1:37:19 \| 23:26 |
| | $10^{-4}$ ; 0.01 | 212 ; 422 | 2.5-7 \| 6.6-3 \| 1.2-3 \| 6.8-2 \| 1.8-1 | 18 \| 18:15 \| 44:24 \| 1:50:34 \| 23:13 |

We present statistics of the tested UCI datasets in Table 3.

Table 3: Statistics of the UCI test instances.

| probname | $m; n$ | $\lambda_{\max}(\mathcal{A}\mathcal{A}^*)$ |
|---|---|---|
| E2006.train | 16087;150360 | 1.91e+05 |
| log1p.E2006.train | 16087;4272227 | 5.86e+07 |
| E2006.test | 3308;150358 | 4.79e+04 |
| log1p.E2006.test | 3308;4272226 | 1.46e+07 |
| pyrim5 | 74;201376 | 1.22e+06 |
| triazines4 | 186;635376 | 2.07e+07 |
| abalone7 | 4177;6435 | 5.21e+05 |
| bodyfat7 | 252;116280 | 5.29e+04 |
| housing7 | 506;77520 | 3.28e+05 |
| mpg7 | 392;3432 | 1.28e+04 |
| space_ga9 | 3107;5005 | 4.01e+03 |

In Table 4, we report the detailed numerical results for SSNAL, SLEP, ADMM, iADMM and LADMM in solving fused lasso problems with large-scale UCI datasets.

Table 4: Same as Table 2 but for large-scale UCI datasets.

| | | | $\eta$ | time (hours:minutes:seconds) |
|---|---|---|---|---|
| probname $m; n$ | $\alpha_1; \alpha_2$ | nnz($x$) ; nnz($Bx$) | a \| b \| c \| d \| e | a \| b \| c \| d \| e |
| E2006.train | $10^{-6}$ ; 1 | 4 ; 5 | 1.4-8 \| 8.1-4 \| 4.0-7 \| 6.7-7 \| 8.7-6 | 03 \| 18:44 \| 28:42 \| 4:39 \| 19:31 |
| 16087;150360 | $10^{-6}$ ; 0.5 | 8 ; 13 | 2.1-7 \| 2.1-3 \| 2.5-7 \| 3.4-7 \| 3.2-3 | 03 \| 18:49 \| 36:42 \| 7:34 \| 18:39 |
| | $10^{-6}$ ; 0.2 | 8 ; 15 | 1.8-7 \| 2.6-3 \| 1.7-7 \| 4.4-7 \| 5.6-3 | 04 \| 22:13 \| 45:19 \| 9:31 \| 23:19 |
| | $10^{-6}$ ; 0.01 | 25 ; 47 | 6.1-8 \| 9.9-4 \| 8.8-8 \| 5.3-7 \| 6.4-3 | 04 \| 21:12 \| 50:04 \| 9:48 \| 19:48 |
| | $10^{-7}$ ; 1 | 450 ; 586 | 8.1-7 \| 2.1-3 \| 9.1-7 \| 3.5-7 \| 8.1-3 | 14 \| 20:13 \| 48:00 \| 13:47 \| 19:59 |
| | $10^{-7}$ ; 0.5 | 657 ; 1069 | 9.3-7 \| 4.2-3 \| 2.7-7 \| 4.9-8 \| 8.5-3 | 19 \| 20:13 \| 42:04 \| 13:29 \| 20:05 |
| | $10^{-7}$ ; 0.2 | 1007 ; 1844 | 4.6-8 \| 4.3-3 \| 1.2-7 \| 5.0-7 \| 8.8-3 | 40 \| 19:23 \| 44:33 \| 16:04 \| 19:32 |
| | $10^{-7}$ ; 0.01 | 1424 ; 2764 | 1.7-7 \| 4.3-3 \| 4.2-7 \| 8.9-7 \| 9.1-3 | 1:13 \| 19:41 \| 45:20 \| 18:01 \| 20:14 |
| E2006.test | $10^{-6}$ ; 1 | 10 ; 15 | 1.4-8 \| 3.7-4 \| 2.5-7 \| 5.6-7 \| 2.4-3 | 02 \| 5:19 \| 2:51 \| 2:02 \| 6:38 |
| 3308;150358 | $10^{-6}$ ; 0.5 | 14 ; 24 | 2.6-8 \| 6.8-4 \| 3.6-8 \| 5.7-7 \| 4.2-3 | 02 \| 5:32 \| 2:55 \| 2:17 \| 6:37 |
| | $10^{-6}$ ; 0.2 | 25 ; 46 | 3.1-8 \| 1.3-3 \| 3.4-8 \| 6.1-7 \| 4.5-3 | 02 \| 5:33 \| 2:57 \| 2:22 \| 6:51 |
| | $10^{-6}$ ; 0.01 | 49 ; 95 | 1.7-8 \| 4.9-4 \| 9.2-8 \| 3.3-7 \| 4.7-3 | 02 \| 5:20 \| 2:59 \| 2:22 \| 6:39 |
| | $10^{-7}$ ; 1 | 512 ; 802 | 4.0-8 \| 7.1-4 \| 6.1-7 \| 1.1-7 \| 5.0-3 | 05 \| 5:32 \| 3:55 \| 3:49 \| 6:54 |
| | $10^{-7}$ ; 0.5 | 765 ; 1384 | 2.8-8 \| 1.2-3 \| 5.4-7 \| 3.9-7 \| 5.1-3 | 12 \| 5:31 \| 4:10 \| 4:56 \| 6:53 |
| | $10^{-7}$ ; 0.2 | 1026 ; 1927 | 7.3-8 \| 6.6-4 \| 9.4-7 \| 7.8-7 \| 5.1-3 | 22 \| 5:26 \| 4:44 \| 6:42 \| 6:44 |
| | $10^{-7}$ ; 0.01 | 1317 ; 2581 | 2.9-7 \| 1.1-3 \| 7.1-7 \| 7.8-7 \| 5.1-3 | 53 \| 5:07 \| 4:23 \| 5:15 \| 6:24 |
| log1p.E2006.train | $10^{-3}$ ; 1 | 12 ; 7 | 1.7-7 \| 4.4-5 \| 7.4-7 \| 3.2-7 \| 1.9-3 | 25 \| 2:47:42 \| 35:24 \| 13:11 \| 3:00:01 |
| 16087;4272227 | $10^{-3}$ ; 0.5 | 4 ; 5 | 4.0-8 \| 2.5-4 \| 3.5-7 \| 2.7-7 \| 5.3-3 | 24 \| 2:52:08 \| 36:17 \| 14:33 \| 3:00:01 |
| | $10^{-3}$ ; 0.2 | 4 ; 5 | 6.6-7 \| 2.0-4 \| 9.9-7 \| 3.6-7 \| 2.3-3 | 23 \| 2:50:42 \| 32:13 \| 12:00 \| 3:00:01 |
| | $10^{-3}$ ; 0.01 | 5 ; 9 | 9.6-8 \| 1.8-5 \| 6.5-7 \| 4.7-7 \| 2.4-3 | 25 \| 2:45:56 \| 43:08 \| 16:21 \| 3:00:01 |
| | $10^{-4}$ ; 1 | 222 ; 192 | 2.4-8 \| 6.8-5 \| 9.4-7 \| 7.2-7 \| 9.9-3 | 54 \| 2:53:39 \| 39:35 \| 16:31 \| 3:00:01 |
| | $10^{-4}$ ; 0.5 | 256 ; 340 | 1.2-7 \| 1.3-4 \| 9.9-7 \| 8.8-7 \| 1.3-2 | 53 \| 2:47:20 \| 52:33 \| 32:45 \| 3:00:01 |
| | $10^{-4}$ ; 0.2 | 373 ; 620 | 5.0-7 \| 1.4-4 \| 7.3-7 \| 5.9-7 \| 1.1-2 | 1:04 \| 2:41:46 \| 50:18 \| 30:04 \| 3:00:01 |
| | $10^{-4}$ ; 0.01 | 576 ; 1100 | 9.8-7 \| 1.6-4 \| 7.8-7 \| 6.7-7 \| 1.4-2 | 1:09 \| 2:44:02 \| 1:01:16 \| 54:23 \| 3:00:01 |
| log1p.E2006.test | $10^{-3}$ ; 1 | 4 ; 3 | 5.5-7 \| 1.7-4 \| 4.8-7 \| 4.4-7 \| 4.1-5 | 17 \| 1:43:15 \| 6:13 \| 6:08 \| 1:56:24 |
| 3308;4272226 | $10^{-3}$ ; 0.5 | 4 ; 5 | 6.1-7 \| 1.5-4 \| 1.5-8 \| 5.3-7 \| 8.3-4 | 17 \| 1:44:15 \| 6:20 \| 6:05 \| 1:56:52 |
| | $10^{-3}$ ; 0.2 | 5 ; 7 | 2.8-8 \| 1.9-4 \| 8.4-7 \| 8.5-7 \| 1.0-3 | 20 \| 1:43:14 \| 6:34 \| 5:56 \| 1:53:09 |
| | $10^{-3}$ ; 0.01 | 8 ; 15 | 5.8-8 \| 1.4-4 \| 2.7-7 \| 2.0-7 \| 5.2-4 | 21 \| 1:39:06 \| 8:32 \| 8:45 \| 1:52:15 |

Table 4: Same as Table 2 but for large-scale UCI datasets.

| | | | $\eta$ | time (hours:minutes:seconds) |
|---|---|---|---|---|
| probname<br>$m; n$ | $\alpha_1; \alpha_2$ | nnz($x$) ; nnz($Bx$) | a \| b \| c \| d \| e | a \| b \| c \| d \| e |
| | $10^{-4}$ ; 1 | 413 ; 408 | 2.6-7 \| 1.7-4 \| 7.8-7 \| 9.2-7 \| 1.0-3 | 55 \| 1:40:28 \| 11:10 \| 13:16 \| 1:51:49 |
| | $10^{-4}$ ; 0.5 | 597 ; 842 | 7.3-8 \| 2.5-4 \| 5.1-7 \| 6.8-7 \| 1.6-3 | 58 \| 1:41:13 \| 11:54 \| 14:40 \| 1:54:20 |
| | $10^{-4}$ ; 0.2 | 797 ; 1387 | 1.0-7 \| 1.6-4 \| 5.2-7 \| 7.1-7 \| 2.0-3 | 54 \| 1:38:03 \| 13:34 \| 15:01 \| 1:51:59 |
| | $10^{-4}$ ; 0.01 | 1059 ; 2035 | 2.0-7 \| 2.2-4 \| 2.5-7 \| 9.8-7 \| 2.7-3 | 42 \| 1:35:41 \| 12:16 \| 13:37 \| 1:46:12 |
| pyrim5 | $10^{-3}$ ; 1 | 327 ; 97 | 4.3-7 \| 1.1-3 \| 9.9-7 \| 9.9-7 \| 1.0-4 | 05 \| 11:14 \| 20:36 \| 49:59 \| 13:07 |
| 74;201376 | $10^{-3}$ ; 0.5 | 174 ; 123 | 8.5-7 \| 5.6-3 \| 9.9-7 \| 9.9-7 \| 3.2-4 | 04 \| 8:27 \| 12:17 \| 29:20 \| 9:58 |
| | $10^{-3}$ ; 0.2 | 128 ; 124 | 6.1-7 \| 1.4-3 \| 9.1-5 \| 8.2-5 \| 8.6-4 | 05 \| 8:28 \| 17:18 \| 47:59 \| 9:19 |
| | $10^{-3}$ ; 0.01 | 75 ; 145 | 1.7-7 \| 1.9-3 \| 6.8-5 \| 2.0-4 \| 4.3-4 | 04 \| 7:33 \| 16:17 \| 59:36 \| 8:31 |
| | $10^{-4}$ ; 1 | 350 ; 141 | 3.1-7 \| 8.3-3 \| 2.2-4 \| 1.2-4 \| 2.2-3 | 08 \| 9:49 \| 25:49 \| 1:49:37 \| 12:25 |
| | $10^{-4}$ ; 0.5 | 233 ; 142 | 3.0-7 \| 6.8-3 \| 6.2-5 \| 1.4-4 \| 2.5-3 | 07 \| 8:27 \| 19:55 \| 1:35:54 \| 9:33 |
| | $10^{-4}$ ; 0.2 | 165 ; 140 | 6.1-7 \| 5.1-3 \| 1.5-4 \| 2.1-4 \| 1.3-3 | 07 \| 8:33 \| 18:22 \| 1:36:41 \| 9:16 |
| | $10^{-4}$ ; 0.01 | 91 ; 156 | 3.1-8 \| 6.2-3 \| 7.1-3 \| 1.7-3 \| 1.6-3 | 06 \| 7:26 \| 17:16 \| 1:42:19 \| 8:21 |
| triazines4 | $10^{-3}$ ; 1 | 1078 ; 261 | 8.2-7 \| 3.1-3 \| 1.4-4 \| 1.3-3 \| 3.1-3 | 23 \| 1:01:56 \| 2:08:07 \| 3:00:01 \| 1:04:04 |
| 186;635376 | $10^{-3}$ ; 0.5 | 679 ; 260 | 2.9-7 \| 3.4-3 \| 2.9-5 \| 5.9-3 \| 3.8-3 | 25 \| 1:02:49 \| 2:07:21 \| 3:00:02 \| 1:03:59 |
| | $10^{-3}$ ; 0.2 | 455 ; 236 | 3.2-7 \| 3.9-3 \| 8.2-5 \| 4.0-3 \| 4.3-3 | 24 \| 53:41 \| 1:46:59 \| 3:00:01 \| 1:15:14 |
| | $10^{-3}$ ; 0.01 | 217 ; 302 | 1.4-7 \| 2.8-3 \| 3.0-4 \| 1.4-1 \| 4.8-3 | 27 \| 54:52 \| 1:56:48 \| 3:00:01 \| 56:11 |
| | $10^{-4}$ ; 1 | 1192 ; 326 | 2.2-7 \| 1.6-2 \| 2.2-3 \| 8.9-1 \| 2.0-2 | 41 \| 1:02:01 \| 2:11:02 \| 3:00:05 \| 1:04:30 |
| | $10^{-4}$ ; 0.5 | 875 ; 334 | 4.5-7 \| 1.2-2 \| 9.9-3 \| 8.6-1 \| 5.2-2 | 37 \| 1:00:20 \| 2:13:51 \| 3:00:10 \| 1:02:02 |
| | $10^{-4}$ ; 0.2 | 533 ; 365 | 1.7-7 \| 1.4-2 \| 6.7-2 \| 9.2-1 \| 4.0-2 | 38 \| 53:35 \| 2:26:04 \| 3:00:06 \| 54:24 |
| | $10^{-4}$ ; 0.01 | 223 ; 355 | 3.3-7 \| 1.3-2 \| 2.6-2 \| 7.8-1 \| 2.3-2 | 40 \| 1:07:27 \| 2:37:41 \| 3:00:01 \| 1:11:24 |
| abalone7 | $10^{-3}$ ; 1 | 26 ; 15 | 5.3-8 \| 2.1-5 \| 6.2-7 \| 9.4-7 \| 7.0-7 | 01 \| 3:16 \| 51 \| 45 \| 2:19 |
| 4177;6435 | $10^{-3}$ ; 0.5 | 29 ; 17 | 8.4-8 \| 3.7-5 \| 8.8-7 \| 6.8-7 \| 9.9-7 | 01 \| 3:15 \| 53 \| 41 \| 2:18 |
| | $10^{-3}$ ; 0.2 | 27 ; 36 | 1.7-7 \| 4.1-5 \| 5.7-7 \| 2.0-7 \| 8.3-7 | 01 \| 3:18 \| 1:38 \| 1:33 \| 2:17 |
| | $10^{-3}$ ; 0.01 | 25 ; 43 | 7.0-7 \| 7.6-5 \| 8.6-7 \| 7.0-7 \| 9.9-7 | 01 \| 3:19 \| 2:15 \| 2:17 \| 2:29 |
| | $10^{-4}$ ; 1 | 61 ; 57 | 6.9-7 \| 5.7-4 \| 9.9-7 \| 9.6-7 \| 9.9-7 | 02 \| 3:22 \| 1:40 \| 2:23 \| 2:50 |
| | $10^{-4}$ ; 0.5 | 50 ; 75 | 1.7-7 \| 8.8-4 \| 4.4-7 \| 7.4-7 \| 9.9-7 | 02 \| 3:22 \| 1:52 \| 2:28 \| 2:56 |
| | $10^{-4}$ ; 0.2 | 52 ; 95 | 2.5-7 \| 1.6-3 \| 2.7-7 \| 6.4-7 \| 7.8-5 | 03 \| 3:21 \| 2:26 \| 3:55 \| 3:27 |
| | $10^{-4}$ ; 0.01 | 58 ; 110 | 5.7-8 \| 3.3-3 \| 9.0-7 \| 8.7-7 \| 1.0-4 | 04 \| 3:19 \| 4:11 \| 5:31 \| 3:25 |
| bodyfat7 | $10^{-5}$ ; 1 | 37 ; 25 | 3.2-7 \| 9.2-4 \| 9.9-7 \| 9.1-7 \| 9.9-7 | 03 \| 7:24 \| 2:38 \| 6:47 \| 7:53 |
| 252;116280 | $10^{-5}$ ; 0.5 | 36 ; 29 | 6.4-7 \| 2.1-4 \| 9.9-7 \| 6.0-7 \| 2.6-6 | 03 \| 7:14 \| 2:22 \| 7:59 \| 7:39 |
| | $10^{-5}$ ; 0.2 | 25 ; 33 | 3.7-7 \| 2.2-3 \| 9.9-7 \| 7.9-7 \| 9.9-6 | 04 \| 7:21 \| 2:15 \| 7:02 \| 7:44 |
| | $10^{-5}$ ; 0.01 | 25 ; 43 | 3.1-7 \| 7.8-4 \| 5.8-7 \| 8.4-7 \| 2.8-5 | 03 \| 6:56 \| 2:19 \| 8:59 \| 7:20 |
| | $10^{-6}$ ; 1 | 151 ; 103 | 1.8-7 \| 2.1-3 \| 6.8-7 \| 9.3-7 \| 8.0-4 | 05 \| 7:06 \| 2:34 \| 12:47 \| 7:30 |
| | $10^{-6}$ ; 0.5 | 142 ; 136 | 7.9-7 \| 1.4-3 \| 9.2-7 \| 9.4-7 \| 9.1-4 | 05 \| 7:05 \| 3:03 \| 19:30 \| 7:33 |
| | $10^{-6}$ ; 0.2 | 111 ; 169 | 3.2-7 \| 2.0-3 \| 9.9-7 \| 9.9-7 \| 8.7-4 | 06 \| 7:06 \| 4:52 \| 32:28 \| 7:33 |
| | $10^{-6}$ ; 0.01 | 101 ; 190 | 9.2-8 \| 1.4-3 \| 9.9-7 \| 9.9-7 \| 8.7-4 | 06 \| 6:41 \| 9:33 \| 47:33 \| 7:02 |
| housing7 | $10^{-3}$ ; 1 | 131 ; 117 | 8.1-7 \| 1.4-4 \| 9.3-7 \| 8.0-7 \| 9.9-7 | 02 \| 7:19 \| 2:09 \| 8:25 \| 5:42 |
| 506;77520 | $10^{-3}$ ; 0.5 | 126 ; 149 | 4.0-7 \| 2.1-4 \| 9.9-7 \| 9.2-7 \| 2.4-6 | 02 \| 7:21 \| 4:20 \| 17:24 \| 7:33 |
| | $10^{-3}$ ; 0.2 | 117 ; 199 | 4.5-8 \| 1.5-4 \| 9.9-7 \| 8.7-7 \| 3.1-5 | 02 \| 7:18 \| 3:57 \| 16:10 \| 7:30 |
| | $10^{-3}$ ; 0.01 | 151 ; 284 | 4.8-7 \| 3.6-4 \| 9.9-7 \| 7.6-7 \| 1.0-4 | 02 \| 7:03 \| 4:26 \| 18:11 \| 7:16 |
| | $10^{-4}$ ; 1 | 296 ; 304 | 1.6-7 \| 2.4-3 \| 9.9-7 \| 6.7-7 \| 2.1-4 | 03 \| 7:07 \| 3:38 \| 27:04 \| 7:24 |
| | $10^{-4}$ ; 0.5 | 253 ; 352 | 1.6-7 \| 4.4-3 \| 9.9-7 \| 7.6-7 \| 4.0-4 | 03 \| 7:26 \| 6:44 \| 1:02:18 \| 7:36 |
| | $10^{-4}$ ; 0.2 | 268 ; 446 | 1.9-7 \| 3.3-3 \| 9.1-7 \| 7.6-8 \| 1.3-3 | 04 \| 7:25 \| 6:29 \| 51:13 \| 7:41 |
| | $10^{-4}$ ; 0.01 | 276 ; 543 | 2.7-7 \| 7.3-3 \| 9.9-7 \| 7.0-7 \| 1.3-3 | 04 \| 6:59 \| 8:55 \| 1:36:21 \| 7:16 |
| mpg7 | $10^{-3}$ ; 1 | 32 ; 39 | 1.7-7 \| 2.1-6 \| 3.1-7 \| 1.5-7 \| 9.9-7 | 00 \| 10 \| 01 \| 01 \| 01 |
| 392;3432 | $10^{-3}$ ; 0.5 | 35 ; 46 | 1.2-7 \| 4.0-6 \| 3.0-7 \| 1.5-7 \| 9.1-7 | 00 \| 10 \| 01 \| 01 \| 01 |
| | $10^{-3}$ ; 0.2 | 43 ; 68 | 1.0-7 \| 7.5-6 \| 8.9-7 \| 1.2-7 \| 9.4-7 | 00 \| 10 \| 01 \| 02 \| 01 |
| | $10^{-3}$ ; 0.01 | 42 ; 74 | 4.1-8 \| 8.1-6 \| 3.0-7 \| 5.3-7 \| 9.3-7 | 00 \| 09 \| 01 \| 02 \| 03 |

Table 4: Same as Table 2 but for large-scale UCI datasets.

| | | | $\eta$ | time (hours:minutes:seconds) |
|---|---|---|---|---|
| probname<br>$m; n$ | $\alpha_1; \alpha_2$ | nnz($x$) ; nnz($Bx$) | a \| b \| c \| d \| e | a \| b \| c \| d \| e |
| | $10^{-4}$ ; 1 | 149 ; 142 | 5.6-7 \| 4.1-5 \| 5.3-7 \| 8.7-7 \| 2.0-6 | 00 \| 10 \| 02 \| 05 \| 12 |
| | $10^{-4}$ ; 0.5 | 131 ; 171 | 8.6-7 \| 5.0-5 \| 6.0-7 \| 8.8-7 \| 2.0-6 | 00 \| 10 \| 02 \| 05 \| 12 |
| | $10^{-4}$ ; 0.2 | 137 ; 200 | 7.1-7 \| 2.3-4 \| 9.9-7 \| 5.9-7 \| 1.7-5 | 00 \| 09 \| 02 \| 07 \| 12 |
| | $10^{-4}$ ; 0.01 | 128 ; 222 | 2.2-7 \| 1.7-4 \| 5.8-7 \| 9.1-7 \| 8.8-5 | 00 \| 09 \| 02 \| 07 \| 11 |
| space9 | $10^{-3}$ ; 1 | 14 ; 13 | 1.2-7 \| 9.0-7 \| 3.2-7 \| 4.4-7 \| 3.7-7 | 00 \| 04 \| 07 \| 03 \| 06 |
| 3107;5005 | $10^{-3}$ ; 0.5 | 16 ; 16 | 2.6-7 \| 9.0-7 \| 7.3-8 \| 4.2-7 \| 8.4-7 | 00 \| 08 \| 08 \| 04 \| 07 |
| | $10^{-3}$ ; 0.2 | 15 ; 21 | 6.9-7 \| 8.3-7 \| 6.5-7 \| 5.0-7 \| 8.1-7 | 00 \| 26 \| 15 \| 12 \| 09 |
| | $10^{-3}$ ; 0.01 | 14 ; 23 | 8.3-8 \| 8.5-7 \| 9.9-7 \| 9.7-7 \| 1.4-7 | 00 \| 55 \| 17 \| 15 \| 09 |
| | $10^{-4}$ ; 1 | 47 ; 38 | 1.4-7 \| 6.7-6 \| 6.1-7 \| 8.0-7 \| 9.5-7 | 01 \| 1:55 \| 18 \| 28 \| 10 |
| | $10^{-4}$ ; 0.5 | 34 ; 41 | 9.8-7 \| 9.9-7 \| 9.3-7 \| 7.7-7 \| 9.9-7 | 01 \| 1:51 \| 22 \| 33 \| 10 |
| | $10^{-4}$ ; 0.2 | 35 ; 52 | 1.3-7 \| 1.1-5 \| 9.9-7 \| 8.6-7 \| 9.9-7 | 01 \| 1:56 \| 24 \| 31 \| 14 |
| | $10^{-4}$ ; 0.01 | 37 ; 62 | 1.1-7 \| 3.4-5 \| 9.9-7 \| 9.5-7 \| 9.9-7 | 01 \| 1:55 \| 25 \| 34 \| 24 |

In Table 5, we report the detailed results for SSNAL-LSM in solving the least squares constrained fused lasso problems for large-scale datasets.

Table 5: The performance of SSNAL-LSM on least squares constrained fused lasso problems with large-scale datasets (accuracy $\epsilon = 10^{-6}$). $m$ is the sample size and $n$ is the dimension of features. "nnz" denotes the number of nonzeros in the solution. The computation time is in the format of "hours:minutes:seconds".

| probname $m; n$ | $\gamma$ | nnz($x$) ; nnz($Bx$) | $\mu^*$ | iteration | $\eta$ | time |
|---|---|---|---|---|---|---|
| E2006.train | 1.0-1 | 840 ; 547 | $1.30-2$ | 40 | 1.2-7 | 3:07 |
| 16087;150360 | 1.5-1 | 1 ; 1 | $6.86+3$ | 22 | 1.5-7 | 13 |
| | 2.0-1 | 1 ; 1 | $1.11+4$ | 22 | 2.0-7 | 12 |
| log1p.E2006.train | 1.0-1 | 345 ; 177 | $2.38+1$ | 27 | 1.3-7 | 9:17 |
| 16087;4272227 | 1.5-1 | 20 ; 6 | $2.49+3$ | 25 | 7.0-7 | 4:55 |
| | 2.0-1 | 20 ; 6 | $3.94+3$ | 25 | 3.3-7 | 4:46 |
| E2006.test | 5.0-2 | 2393 ; 2240 | $1.20-3$ | 43 | 5.9-7 | 4:45 |
| 3308;150358 | 7.5-2 | 603 ; 680 | $3.36-3$ | 41 | 5.1-8 | 1:08 |
| | 1.0-1 | 1 ; 1 | $2.56+2$ | 21 | 5.8-7 | 06 |
| log1p.E2006.test | 5.0-2 | 3685 ; 2609 | $1.40+0$ | 34 | 2.3-7 | 15:40 |
| 3308;4272226 | 7.5-2 | 1504 ; 1003 | $3.27+0$ | 31 | 5.8-7 | 8:59 |
| | 1.0-1 | 20 ; 7 | $1.15+2$ | 24 | 8.5-7 | 4:10 |
| pyrim5 | 1.0-1 | 254 ; 49 | $3.74-1$ | 24 | 4.7-8 | 40 |
| 74;201376 | 2.0-1 | 38 ; 9 | $1.18+0$ | 24 | 5.6-7 | 37 |
| | 3.0-1 | 54 ; 10 | $2.45+0$ | 23 | 7.1-8 | 35 |
| triazines4 | 1.0-1 | 1338 ; 194 | $1.59-1$ | 27 | 8.2-7 | 5:32 |
| 186;635376 | 2.0-1 | 782 ; 47 | $1.91+0$ | 23 | 9.4-7 | 3:26 |
| | 3.0-1 | 243 ; 18 | $9.33+0$ | 19 | 4.7-7 | 2:35 |
| housing7 | 1.0-1 | 238 ; 134 | $3.87+0$ | 28 | 5.7-7 | 36 |
| 506;77520 | 2.0-1 | 34 ; 21 | $7.06+1$ | 23 | 5.0-7 | 20 |
| | 3.0-1 | 17 ; 12 | $1.83+2$ | 21 | 4.0-7 | 17 |
| bodyfat7 | 1.0-4 | 731 ; 391 | $2.70-6$ | 35 | 4.9-8 | 1:00 |
| 252;116280 | 1.0-3 | 322 ; 150 | $9.87-5$ | 33 | 7.0-7 | 43 |
| | 1.0-2 | 2 ; 3 | $1.98-1$ | 25 | 4.1-7 | 19 |
| DLBCLH | 1.5-1 | 755 ; 233 | $6.21-2$ | 25 | 2.9-7 | 03 |
| 160;7399 | 2.0-1 | 692 ; 216 | $8.43-2$ | 22 | 4.5-7 | 02 |
| | 2.5-1 | 653 ; 194 | $1.08-1$ | 24 | 8.6-8 | 02 |
| DLBCLN | 1.5-1 | 755 ; 233 | $6.21-2$ | 25 | 2.9-7 | 02 |
| 160;7399 | 2.0-1 | 692 ; 216 | $8.43-2$ | 22 | 4.5-7 | 02 |
| | 2.5-1 | 653 ; 194 | $1.08-1$ | 24 | 8.6-8 | 02 |
| DLBCLS | 1.5-1 | 211 ; 58 | $7.13-2$ | 23 | 2.8-7 | 01 |
| 47;4026 | 2.0-1 | 227 ; 53 | $1.10-1$ | 24 | 1.7-7 | 01 |
| | 2.5-1 | 220 ; 54 | $1.54-1$ | 23 | 2.6-7 | 01 |
| lung1 | 1.5-1 | 373 ; 226 | $7.38-2$ | 25 | 5.7-8 | 04 |
| 203;12600 | 2.0-1 | 329 ; 198 | $1.09-1$ | 26 | 2.4-8 | 04 |
| | 2.5-1 | 248 ; 138 | $1.56-1$ | 24 | 6.2-7 | 03 |
| lung2 | 1.5-1 | 293 ; 42 | $2.39-1$ | 23 | 6.2-7 | 02 |
| 149;12533 | 2.0-1 | 226 ; 29 | $3.72-1$ | 23 | 2.3-7 | 02 |
| | 2.5-1 | 184 ; 20 | $5.12-1$ | 23 | 8.1-8 | 02 |
| lungM | 1.5-1 | 183 ; 95 | $2.02-2$ | 25 | 3.1-7 | 01 |
| 96;7129 | 2.0-1 | 127 ; 77 | $2.93-2$ | 23 | 1.5-7 | 01 |
| | 2.5-1 | 79 ; 45 | $4.21-2$ | 23 | 4.0-8 | 01 |
| lungO | 1.5-1 | 90 ; 59 | $1.27-2$ | 24 | 1.8-7 | 01 |

Table 5: The performance of SSNAL-LSM on least squares constrained fused lasso problems with large-scale datasets (accuracy $\epsilon = 10^{-6}$). $m$ is the sample size and $n$ is the dimension of features. "nnz" denotes the number of nonzeros in the solution. The computation time is in the format of "hours:minutes:seconds".

| probname $m; n$ | $\gamma$ | nnz($x$) ; nnz($Bx$) | $\mu^*$ | iteration | $\eta$ | time |
|---|---|---|---|---|---|---|
| 39;2880 | 2.0-1 | 79 ; 52 | $1.71-2$ | 26 | 6.8-7 | 01 |
| | 2.5-1 | 62 ; 42 | $2.35-2$ | 26 | 1.1-7 | 01 |
| NervousSystem | 1.5-1 | 147 ; 71 | $5.16-2$ | 26 | 1.0-7 | 01 |
| 60;7129 | 2.0-1 | 122 ; 57 | $7.39-2$ | 25 | 3.4-9 | 01 |
| | 2.5-1 | 129 ; 61 | $9.92-2$ | 24 | 1.3-7 | 01 |
| ovarianP | 1.5-1 | 591 ; 53 | $5.66-2$ | 25 | 1.1-7 | 06 |
| 253;15153 | 2.0-1 | 686 ; 30 | $1.53-1$ | 22 | 1.1-9 | 05 |
| | 2.5-1 | 368 ; 22 | $2.65-1$ | 23 | 7.0-7 | 05 |
| ovarianS | 1.5-1 | 1506 ; 218 | $6.02-2$ | 26 | 4.6-7 | 2:05 |
| 216;373401 | 2.0-1 | 1395 ; 175 | $8.40-2$ | 25 | 4.2-7 | 1:53 |
| | 2.5-1 | 1123 ; 133 | $1.11-1$ | 23 | 5.5-7 | 1:43 |