```
Starting to train the dictionary
solving the quadratic problem with YALMIP...

 num. of constraints = 53
 dim. of socp  var  = 54,   num. of socp blk  =  1
 dim. of linear var  = 800
*********************************************************************
   SDPT3: Infeasible path-following algorithms
*********************************************************************
 version  predcorr  gam  expon  scale_data
   HKM       1      0.000   1        0
it pstep dstep pinfeas dinfeas  gap       prim-obj       dual-obj    cputime
-------------------------------------------------------------------
 0|0.000|0.000|1.2e+00|2.0e+01|2.5e+06| 2.225582e+04  0.000000e+00| 0:0:00| chol  1↙
1
 1|1.000|0.943|1.4e-05|1.3e+00|1.7e+05| 2.188046e+04 -8.355096e+01| 0:0:00| chol  1↙
1
 2|0.302|0.994|8.0e-06|4.1e-02|3.0e+04| 2.413776e+04 -1.977607e+02| 0:0:00| chol  1↙
1
 3|1.000|1.000|4.0e-06|1.0e-02|1.5e+04| 1.430014e+04 -1.948460e+02| 0:0:00| chol  1↙
1
 4|0.970|0.996|1.6e-06|3.0e-03|4.7e+02| 2.803240e+02 -1.790331e+02| 0:0:00| chol  1↙
1
 5|0.692|0.131|5.9e-06|2.7e-03|5.7e+02| 4.106219e+02 -1.465575e+02| 0:0:00| chol  1↙
1
 6|0.096|0.121|4.8e-06|2.3e-03|5.6e+02| 2.834817e+02 -2.727028e+02| 0:0:00| chol  1↙
1
 7|1.000|0.626|1.3e-07|8.8e-04|5.4e+02| 4.554838e+02 -8.433508e+01| 0:0:00| chol  1↙
1
 8|0.932|1.000|9.4e-09|3.2e-07|8.3e+01| 9.322473e+00 -7.326299e+01| 0:0:00| chol  1↙
1
 9|0.820|1.000|1.9e-09|3.2e-08|3.1e+01|-3.079838e+01 -6.137098e+01| 0:0:00| chol  1↙
1
10|1.000|1.000|1.0e-13|3.4e-09|1.2e+01|-4.187168e+01 -5.353977e+01| 0:0:00| chol  1↙
1
11|0.977|1.000|8.2e-14|3.0e-10|4.1e+00|-4.868710e+01 -5.277756e+01| 0:0:00| chol  1↙
1
12|1.000|1.000|1.8e-14|3.1e-11|1.8e+00|-5.016661e+01 -5.193612e+01| 0:0:00| chol  1↙
1
13|1.000|1.000|8.3e-15|4.0e-12|5.4e-01|-5.116175e+01 -5.170211e+01| 0:0:00| chol  1↙
1
14|1.000|1.000|8.4e-15|1.3e-12|2.2e-01|-5.138517e+01 -5.160830e+01| 0:0:00| chol  1↙
1
15|1.000|1.000|4.7e-14|1.0e-12|6.6e-02|-5.151188e+01 -5.157741e+01| 0:0:00| chol  1↙
1
16|1.000|1.000|6.6e-14|1.0e-12|2.7e-02|-5.153921e+01 -5.156600e+01| 0:0:00| chol  1↙
1
17|1.000|1.000|3.2e-14|1.0e-12|6.5e-03|-5.155552e+01 -5.156199e+01| 0:0:00| chol  1↙
1
18|1.000|1.000|6.4e-12|1.0e-12|2.8e-03|-5.155833e+01 -5.156111e+01| 0:0:00| chol  1↙
1
19|1.000|0.902|2.6e-12|1.4e-12|5.9e-04|-5.156016e+01 -5.156075e+01| 0:0:00| chol  1↙
2
```

```
20|0.739|1.000|1.7e-12|1.0e-12|3.1e-04|-5.156038e+01 -5.156069e+01| 0:0:00| chol  2✔
1
21|1.000|0.944|2.8e-11|1.1e-12|7.5e-05|-5.156060e+01 -5.156067e+01| 0:0:00| chol  2✔
2
22|0.850|1.000|4.7e-12|1.5e-12|3.4e-05|-5.156063e+01 -5.156067e+01| 0:0:01| chol  2✔
2
23|0.942|1.000|9.0e-13|1.0e-12|9.5e-06|-5.156066e+01 -5.156067e+01| 0:0:01|
  stop: max(relative gap, infeasibilities) < 1.00e-07
-------------------------------------------------------------------
 number of iterations   = 23
 primal objective value = -5.15606560e+01
 dual   objective value = -5.15606655e+01
 gap := trace(XZ)       = 9.48e-06
 relative gap           = 9.10e-08
 actual relative gap    = 9.10e-08
 rel. primal infeas     = 9.03e-13
 rel. dual   infeas     = 1.00e-12
 norm(X), norm(y), norm(Z) = 9.3e-01, 5.2e+01, 2.0e+01
 norm(A), norm(b), norm(C) = 4.1e+02, 8.0e+00, 7.7e+01
 Total CPU time (secs)  = 0.51
 CPU time per iteration = 0.02
 termination code       =  0
 DIMACS errors: 1.8e-12  0.0e+00  1.4e-12  0.0e+00  9.1e-08  9.1e-08
-------------------------------------------------------------------


ans =

   51.5607


 num. of constraints = 53
 dim. of socp   var = 54,   num. of socp blk  =  1
 dim. of linear var = 800
*********************************************************************
   SDPT3: Infeasible path-following algorithms
*********************************************************************
 version  predcorr  gam  expon  scale_data
   HKM      1       0.000   1        0
it pstep dstep pinfeas dinfeas  gap       prim-obj      dual-obj     cputime
-------------------------------------------------------------------
 0|0.000|0.000|1.0e+00|6.0e+04|6.7e+10| 6.152981e+08  0.000000e+00| 0:0:00| chol  2✔
2
 1|1.000|0.973|2.8e-07|1.6e+03|2.9e+09| 5.926951e+08 -1.232167e+06| 0:0:00| chol  8✔
8
 2|0.702|0.582|8.4e-08|6.8e+02|1.7e+09| 5.738445e+08 -2.130925e+06| 0:0:00| chol  8✔
8
 3|0.323|0.486|6.5e-08|3.5e+02|1.2e+09| 5.790499e+08 -4.140702e+06| 0:0:00| chol  8✔
8
 4|0.281|0.402|5.8e-08|2.1e+02|1.0e+09| 5.722073e+08 -6.310973e+06| 0:0:00| chol
  linsysolve: Schur complement matrix not positive definite
  switch to LU factor. lu 17    4
 5|0.189|0.464|7.7e-08|1.1e+02|8.1e+08| 5.572003e+08 -9.203721e+06| 0:0:00| lu 12✔
4
 6|0.269|0.355|4.7e-08|7.3e+01|7.0e+08| 5.227288e+08 -1.209202e+07| 0:0:00| lu 30✔
```

```
30
 7|0.004|0.006|3.1e-06|7.2e+01|7.0e+08| 5.217202e+08 -1.209423e+07| 0:0:00| lu 26↙
^20
 8|0.044|0.484|7.7e-06|3.7e+01|6.1e+08| 5.139883e+08 -1.033550e+07| 0:0:00| lu 19↙
3
 9|0.217|0.345|5.1e-06|2.4e+01|5.7e+08| 4.878938e+08 -1.418756e+07| 0:0:00| lu 14↙
3
10|0.448|0.362|9.3e-06|1.6e+01|5.0e+08| 4.251885e+08 -1.919847e+07| 0:0:00| lu 15↙
3
11|0.221|0.250|4.2e-06|1.2e+01|4.8e+08| 4.034096e+08 -2.519768e+07| 0:0:00| lu  9↙
3
12|0.372|0.375|5.4e-06|7.3e+00|4.3e+08| 3.476673e+08 -2.172677e+07| 0:0:00| lu 11↙
3
13|0.599|0.564|2.3e-06|3.2e+00|3.0e+08| 2.360083e+08 -2.703240e+07| 0:0:00| lu 22↙
3
14|0.303|0.325|1.8e-06|2.1e+00|2.7e+08| 2.084242e+08 -2.861518e+07| 0:0:00| lu 30↙
12
15|0.215|0.409|3.3e-06|1.3e+00|2.4e+08| 1.954295e+08 -2.515873e+07| 0:0:00| lu 12↙
14
16|0.196|0.224|4.0e-06|9.8e-01|2.3e+08| 1.798713e+08 -2.531634e+07| 0:0:00| lu 26 ^↙
4
17|0.135|0.483|6.1e-06|5.1e-01|2.1e+08| 1.722130e+08 -1.966854e+07| 0:0:00| lu 19↙
4
18|0.131|0.201|5.9e-06|4.1e-01|2.0e+08| 1.620506e+08 -2.026410e+07| 0:0:00| lu 30↙
17
19|0.045|0.174|1.8e-05|3.3e-01|1.9e+08| 1.578835e+08 -1.709163e+07| 0:0:00| lu 30↙
8
20|0.032|0.071|2.5e-05|3.1e-01|1.9e+08| 1.565355e+08 -1.764311e+07| 0:0:00| lu 14↙
30
21|0.139|0.108|3.3e-05|2.8e-01|1.9e+08| 1.490424e+08 -1.937971e+07| 0:0:00| lu 12 ^↙
4
22|0.035|0.036|4.6e-05|2.7e-01|1.9e+08| 1.472356e+08 -1.990701e+07| 0:0:00| lu 12↙
30
23|0.072|0.065|1.5e-04|2.5e-01|1.8e+08| 1.443253e+08 -2.103942e+07| 0:0:00| lu 30↙
^14
24|0.035|0.166|9.8e-05|2.1e-01|1.8e+08| 1.425168e+08 -2.064515e+07| 0:0:00| lu 15↙
30
25|0.001|0.005|1.2e-04|2.1e-01|1.8e+08| 1.424694e+08 -2.056618e+07| 0:0:00| lu 18 ^↙
9
26|0.000|0.001|9.5e-05|2.1e-01|1.8e+08| 1.426495e+08 -1.943969e+07| 0:0:00| lu 14↙
30
27|0.024|0.053|1.5e-04|2.0e-01|1.8e+08| 1.415330e+08 -1.997735e+07| 0:0:00| lu 18↙
^28
28|0.052|0.083|2.8e-04|1.8e-01|1.8e+08| 1.395268e+08 -1.913647e+07| 0:0:01| lu 30↙
30
29|0.008|0.014|3.0e-04|1.8e-01|1.8e+08| 1.390724e+08 -2.047561e+07| 0:0:01| lu 21↙
30
30|0.000|0.000|3.1e-04|1.8e-01|1.8e+08| 1.391181e+08 -2.013867e+07| 0:0:01| lu 21 ^↙
9
31|0.001|0.004|1.9e-04|1.8e-01|1.8e+08| 1.391636e+08 -2.047991e+07| 0:0:01| lu 20↙
^12
32|0.001|0.003|2.0e-04|1.8e-01|1.8e+08| 1.391305e+08 -2.075263e+07| 0:0:01| lu 13↙
30
33|0.028|0.024|2.7e-04|1.7e-01|1.8e+08| 1.380000e+08 -2.094429e+07| 0:0:01| lu 16 ^↙
```

```
8
34|0.001|0.001|2.9e-04|1.7e-01|1.8e+08| 1.378751e+08 -2.074525e+07| 0:0:01| lu 22↙
^25
35|0.000|0.000|3.1e-04|1.7e-01|1.8e+08| 1.379062e+08 -2.102283e+07| 0:0:01| lu 16↙
30
36|0.000|0.002|4.6e-04|1.7e-01|1.8e+08| 1.380082e+08 -2.157622e+07| 0:0:01| lu 25↙
30
37|0.008|0.006|3.8e-04|1.7e-01|1.8e+08| 1.373928e+08 -2.157861e+07| 0:0:01| lu 13 ^↙
8
38|0.000|0.000|4.0e-04|1.7e-01|1.8e+08| 1.374195e+08 -2.166768e+07| 0:0:01| lu 24↙
^29
39|0.000|0.000|3.9e-04|1.7e-01|1.8e+08| 1.374174e+08 -2.240446e+07| 0:0:01| lu 12↙
30
40|0.013|0.012|4.0e-04|1.7e-01|1.8e+08| 1.369044e+08 -2.259832e+07| 0:0:01| lu 30↙
^17
41|0.011|0.016|3.1e-04|1.7e-01|1.8e+08| 1.365394e+08 -2.283947e+07| 0:0:01| lu 30↙
30
42|0.000|0.000|3.0e-04|1.7e-01|1.8e+08| 1.365514e+08 -2.280821e+07| 0:0:01| lu 28↙
^19
43|0.056|0.056|8.3e-04|1.6e-01|1.8e+08| 1.346946e+08 -2.393718e+07| 0:0:01| lu 30↙
29
44|0.014|0.031|5.5e-04|1.5e-01|1.8e+08| 1.344790e+08 -2.373160e+07| 0:0:01| lu 26↙
^23
45|0.004|0.005|4.5e-04|1.5e-01|1.7e+08| 1.343187e+08 -2.547919e+07| 0:0:01| lu 16↙
^13
46|0.012|0.021|9.4e-04|1.5e-01|1.8e+08| 1.346098e+08 -3.324805e+07| 0:0:01| lu 30↙
5
47|0.199|0.339|8.7e-04|9.8e-02|1.6e+08| 1.242635e+08 -1.842551e+07| 0:0:01| lu 17↙
4
48|0.489|0.479|4.4e-04|5.1e-02|1.2e+08| 9.338778e+07 -1.815733e+07| 0:0:01| lu 26↙
^24
49|0.756|0.305|1.5e-04|3.5e-02|9.6e+07| 6.483244e+07 -1.885018e+07| 0:0:01| lu 24↙
30
50|0.014|0.024|2.2e-04|3.4e-02|9.6e+07| 6.472444e+07 -1.901068e+07| 0:0:01|
  sqlp stop: maximum number of iterations reached
-----------------------------------------------------------------
 number of iterations   = 50
 primal objective value =  1.95429549e+08
 dual   objective value = -2.51587293e+07
 gap := trace(XZ)        = 2.45e+08
 relative gap            = 1.11e+00
 actual relative gap     = 1.00e+00
 rel. primal infeas      = 3.26e-06
 rel. dual   infeas      = 1.26e+00
 norm(X), norm(y), norm(Z) = 5.6e+07, 2.5e+07, 3.6e+07
 norm(A), norm(b), norm(C) = 9.1e+06, 1.5e+06, 7.7e+01
 Total CPU time (secs)  = 1.03
 CPU time per iteration = 0.02
 termination code       = -6
 DIMACS errors: 5.9e-06  0.0e+00  1.8e+00  0.0e+00  1.0e+00  1.1e+00
-----------------------------------------------------------------


ans =
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    1.2378e+09

 Iteration   2   Total error is: 0.47655

 num. of constraints = 53
 dim. of socp   var = 54,   num. of socp blk = 1
 dim. of linear var = 800
****
    SDPT3: Infeasible path-following algorithms
****
 version   predcorr   gam   expon   scale_data
    HKM   1   0.000   1   0
it pstep dstep pinfeas dinfeas gap   prim-obj   dual-obj   cputime
----
 0|0.000|0.000|1.0e+00|5.2e+02|8.8e+08| 8.074138e+06 0.000000e+00| 0:0:00| chol 1↙
1
 1|1.000|0.951|1.7e-06|2.6e+01|5.7e+07| 7.777817e+06 -7.234520e+03| 0:0:00| chol 2↙
2
 2|0.417|0.692|1.0e-06|7.9e+00|2.8e+07| 8.428057e+06 -3.382172e+04| 0:0:00| chol 1↙
2
 3|0.440|0.400|5.7e-07|4.7e+00|2.2e+07| 8.776943e+06 -5.665411e+04| 0:0:00| chol 2↙
2
 4|0.169|0.470|5.1e-07|2.5e+00|1.7e+07| 8.833402e+06 -1.015470e+05| 0:0:00| chol 2↙
2
 5|0.281|0.332|3.7e-07|1.7e+00|1.4e+07| 8.624307e+06 -1.441957e+05| 0:0:00| chol 2↙
2
 6|0.115|0.556|3.3e-07|7.5e-01|1.1e+07| 8.422287e+06 -2.245482e+05| 0:0:00| chol 2↙
2
 7|0.370|0.252|2.1e-07|5.6e-01|9.9e+06| 7.652232e+06 -2.765494e+05| 0:0:00| chol 2↙
3
 8|0.074|0.748|2.2e-07|1.4e-01|8.2e+06| 7.398749e+06 -2.535459e+05| 0:0:00| chol 2↙
2
 9|0.147|0.308|1.8e-07|9.7e-02|7.9e+06| 7.087105e+06 -3.204893e+05| 0:0:00| chol 2↙
2
10|0.159|0.231|1.6e-07|7.5e-02|7.5e+06| 6.670791e+06 -3.526781e+05| 0:0:00| chol 3↙
3
11|0.024|0.076|3.0e-07|6.9e-02|7.4e+06| 6.585969e+06 -2.909027e+05| 0:0:00| chol 3↙
3
12|0.199|0.339|2.7e-07|4.6e-02|7.1e+06| 6.240418e+06 -3.801688e+05| 0:0:00| chol 3↙
3
13|0.207|0.243|2.0e-07|3.5e-02|6.5e+06| 5.704409e+06 -4.353044e+05| 0:0:00| chol 3↙
2
14|0.165|0.156|4.0e-07|2.9e-02|6.2e+06| 5.409142e+06 -4.618643e+05| 0:0:00| chol 3↙
3
15|0.129|0.172|8.8e-07|2.4e-02|6.1e+06| 5.252779e+06 -4.841786e+05| 0:0:00| chol 3↙
3
16|0.102|0.191|1.4e-06|2.0e-02|5.9e+06| 5.108945e+06 -5.064995e+05| 0:0:00| chol 3↙
3
17|0.121|0.436|1.2e-06|1.1e-02|5.6e+06| 5.015599e+06 -4.440239e+05| 0:0:00| chol 3↙
3
18|0.176|0.340|5.7e-07|7.3e-03|5.4e+06| 4.764986e+06 -5.245746e+05| 0:0:00| chol 3↙
3
19|0.285|0.885|2.6e-06|8.4e-04|4.9e+06| 4.498589e+06 -3.650105e+05| 0:0:00| chol 2↙
2

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20|0.455|0.870|1.8e-06|1.1e-04|4.6e+06| 3.865796e+06 -6.957755e+05| 0:0:00| chol  2↙
2
21|0.651|1.000|8.0e-07|2.6e-07|3.8e+06| 3.224712e+06 -5.940445e+05| 0:0:00| chol  2↙
2
22|1.000|1.000|3.4e-07|1.6e-07|2.1e+06| 1.666807e+06 -4.391786e+05| 0:0:00| chol  2↙
2
23|0.967|0.969|1.4e-07|7.3e-08|5.8e+05| 4.666787e+05 -1.169887e+05| 0:0:00| chol  2↙
2
24|1.000|1.000|1.7e-08|2.7e-08|3.2e+05| 2.558871e+05 -6.830657e+04| 0:0:00| chol  2↙
2
25|1.000|1.000|9.7e-09|3.3e-09|8.9e+04| 6.830584e+04 -2.042854e+04| 0:0:00| chol  2↙
2
26|1.000|1.000|3.1e-10|1.9e-09|4.2e+04| 3.213761e+04 -9.535910e+03| 0:0:00| chol  2↙
2
27|1.000|1.000|3.6e-10|6.2e-11|1.2e+04| 8.823175e+03 -2.932429e+03| 0:0:00| chol  2↙
2
28|1.000|1.000|1.1e-10|7.2e-11|5.1e+03| 3.895786e+03 -1.215107e+03| 0:0:00| chol  2↙
2
29|1.000|1.000|8.0e-11|2.2e-11|1.5e+03| 1.067303e+03 -4.134752e+02| 0:0:00| chol  2↙
2
30|1.000|1.000|3.7e-11|1.6e-11|6.3e+02| 4.447170e+02 -1.812225e+02| 0:0:00| chol  2↙
2
31|1.000|1.000|2.5e-11|7.4e-12|1.8e+02| 9.320048e+01 -8.850563e+01| 0:0:00| chol  2↙
2
32|1.000|1.000|1.2e-11|4.9e-12|7.6e+01| 1.682501e+01 -5.958821e+01| 0:0:00| chol  2↙
2
33|1.000|1.000|1.2e-11|2.4e-12|2.1e+01|-2.791787e+01 -4.914047e+01| 0:0:00| chol  2↙
1
34|1.000|1.000|8.9e-11|2.3e-12|9.2e+00|-3.675130e+01 -4.592750e+01| 0:0:00| chol  2↙
2
35|1.000|1.000|3.8e-12|3.5e-12|2.4e+00|-4.244205e+01 -4.479388e+01| 0:0:00| chol  2↙
2
36|1.000|1.000|1.7e-12|1.0e-12|1.1e+00|-4.340602e+01 -4.448598e+01| 0:0:00| chol  2↙
2
37|0.978|1.000|1.3e-12|1.0e-12|2.5e-01|-4.411225e+01 -4.436291e+01| 0:0:00| chol  2↙
2
38|1.000|1.000|1.8e-12|1.0e-12|1.1e-01|-4.422566e+01 -4.433915e+01| 0:0:00| chol  2↙
2
39|0.967|0.905|3.2e-12|1.1e-12|2.4e-02|-4.430540e+01 -4.432908e+01| 0:0:00| chol  2↙
2
40|0.947|1.000|8.7e-12|1.0e-12|1.1e-02|-4.431629e+01 -4.432699e+01| 0:0:00| chol  2↙
2
41|0.891|1.000|1.9e-11|1.5e-12|2.9e-03|-4.432340e+01 -4.432629e+01| 0:0:00| chol  3↙
3
42|0.850|1.000|2.6e-11|2.3e-12|1.0e-03|-4.432518e+01 -4.432622e+01| 0:0:00| chol  4↙
4
43|0.851|1.000|3.9e-11|3.4e-12|2.9e-04|-4.432590e+01 -4.432619e+01| 0:0:00| chol  4↙
5
44|0.951|0.905|3.2e-10|5.4e-12|4.7e-05|-4.432614e+01 -4.432619e+01| 0:0:00| chol
  linsysolve: Schur complement matrix not positive definite
  switch to LU factor. lu 30    2
45|0.967|0.966|3.4e-10|7.8e-12|1.1e-05|-4.432618e+01 -4.432619e+01| 0:0:00| lu 30↙
^13
46|1.000|1.000|1.9e-09|1.1e-11|2.1e-06|-4.432618e+01 -4.432619e+01| 0:0:00|
```

```
  stop: max(relative gap, infeasibilities) < 1.00e-07
 ----------------------------------------------------------------
 number of iterations   = 46
 primal objective value = -4.43261849e+01
 dual   objective value = -4.43261866e+01
 gap := trace(XZ)       = 2.06e-06
 relative gap           = 2.30e-08
 actual relative gap    = 1.93e-08
 rel. primal infeas     = 1.87e-09
 rel. dual   infeas     = 1.14e-11
 norm(X), norm(y), norm(Z) = 1.6e+02, 5.9e+01, 2.3e+01
 norm(A), norm(b), norm(C) = 1.0e+05, 1.9e+04, 7.7e+01
 Total CPU time (secs)  = 0.35
 CPU time per iteration = 0.01
 termination code       =  0
 DIMACS errors: 3.3e-09  0.0e+00  1.6e-11  0.0e+00  1.9e-08  2.3e-08
 ----------------------------------------------------------------

 ans =

    44.3262

 Iteration   3   Total error is: 0.029286

 num. of constraints = 53
 dim. of socp   var  = 54,   num. of socp blk  =  1
 dim. of linear var  = 800
 *******************************************************************
    SDPT3: Infeasible path-following algorithms
 *******************************************************************
 version  predcorr  gam  expon  scale_data
   HKM       1       0.000   1        0
 it pstep dstep pinfeas dinfeas  gap        prim-obj       dual-obj     cputime
 ----------------------------------------------------------------
 0|0.000|0.000|1.0e+00|1.2e+05|2.2e+11| 1.972326e+09  0.000000e+00| 0:0:00| chol  2✔
 3
 1|1.000|0.953|4.6e-07|5.5e+03|1.3e+10| 1.899968e+09 -2.155447e+06| 0:0:00| chol  8✔
 9
 2|0.449|0.761|2.5e-07|1.3e+03|5.8e+09| 2.048453e+09 -7.462380e+06| 0:0:00| chol
   linsysolve: Schur complement matrix not positive definite
   switch to LU factor. lu 30   3
 3|0.461|0.387|1.3e-07|8.1e+02|4.6e+09| 2.055229e+09 -1.191119e+07| 0:0:00| lu 12✔
 5
 4|0.196|0.536|7.3e-08|3.8e+02|3.4e+09| 2.042853e+09 -1.901771e+07| 0:0:00| lu 30✔
 3
 5|0.331|0.335|5.4e-08|2.5e+02|2.9e+09| 1.939739e+09 -2.515941e+07| 0:0:00| lu 12✔
 4
 6|0.141|0.663|1.4e-07|8.4e+01|2.3e+09| 1.878113e+09 -2.745075e+07| 0:0:00| lu 30 ^✔
 2
 7|0.212|0.281|2.7e-07|6.1e+01|2.1e+09| 1.783969e+09 -3.327527e+07| 0:0:00| lu 22✔
 ^17
 8|0.087|0.448|8.7e-06|3.3e+01|1.9e+09| 1.733484e+09 -2.420074e+07| 0:0:00| lu 30 ^✔
 7
 9|0.137|0.339|6.5e-06|2.2e+01|1.8e+09| 1.676824e+09 -3.638957e+07| 0:0:00| lu 30 ^✔
```

```
3
10|0.000|0.001|2.1e-05|2.2e+01|1.8e+09| 1.676188e+09 -3.873661e+07| 0:0:00| lu 25↙
8
11|0.146|0.264|2.8e-05|1.6e+01|1.8e+09| 1.617344e+09 -4.704473e+07| 0:0:00| lu 16↙
^20
12|0.000|0.000|8.9e-05|1.6e+01|1.8e+09| 1.613285e+09 -5.051161e+07| 0:0:00| lu 29↙
20
13|0.121|0.137|1.5e-04|1.4e+01|1.7e+09| 1.592675e+09 -7.033923e+07| 0:0:00| lu 28↙
^10
14|0.000|0.003|1.3e-04|1.4e+01|1.7e+09| 1.590181e+09 -4.556910e+07| 0:0:00| lu 20↙
^14
15|0.109|0.286|1.1e-04|1.0e+01|1.7e+09| 1.549709e+09 -6.026533e+07| 0:0:00| lu 21 ^↙
4
16|0.002|0.004|1.1e-04|1.0e+01|1.7e+09| 1.545945e+09 -5.985096e+07| 0:0:00| lu 15↙
6
17|0.141|0.341|1.0e-04|6.6e+00|1.6e+09| 1.479436e+09 -8.375344e+07| 0:0:00| lu 30↙
8
18|0.158|0.081|5.4e-05|6.0e+00|1.7e+09| 1.446626e+09 -7.103326e+07| 0:0:00| lu 26↙
5
19|0.623|0.785|2.1e-05|1.3e+00|8.5e+08| 7.457296e+08 -5.314215e+07| 0:0:00| lu 18↙
6
20|0.705|0.588|1.4e-05|5.3e-01|3.9e+08| 3.211931e+08 -3.918461e+07| 0:0:00| lu 30↙
9
21|0.347|0.248|3.3e-05|4.0e-01|3.5e+08| 2.789283e+08 -3.851830e+07| 0:0:00| lu 13 ^↙
4
22|0.066|0.230|9.7e-05|3.1e-01|3.3e+08| 2.758814e+08 -2.356904e+07| 0:0:00| lu 30↙
7
23|0.173|0.227|8.6e-05|2.4e-01|3.2e+08| 2.575802e+08 -3.272668e+07| 0:0:00| lu *22↙
4
24|0.557|0.604|1.2e-04|9.5e-02|2.6e+08| 2.166692e+08 -2.432525e+07| 0:0:00| lu 30↙
30
25|0.064|0.137|6.7e-04|8.2e-02|2.6e+08| 2.109403e+08 -3.468953e+07| 0:0:00| lu 20↙
10
26|0.454|0.329|2.1e-04|5.5e-02|2.1e+08| 1.655647e+08 -2.961313e+07| 0:0:00| lu 19 ^↙
7
27|0.231|0.204|7.9e-04|4.4e-02|2.0e+08| 1.633022e+08 -2.662245e+07| 0:0:00| lu 30 ^↙
5
28|0.000|0.003|8.0e-04|4.4e-02|2.1e+08| 1.603406e+08 -3.018839e+07| 0:0:01| lu 12↙
12
29|0.853|0.611|3.0e-04|1.7e-02|1.4e+08| 1.067514e+08 -2.649221e+07| 0:0:01| lu 18↙
^17
30|0.815|0.415|9.4e-04|9.9e-03|1.2e+08| 9.611542e+07 -1.738052e+07| 0:0:01| lu 29↙
5
31|0.401|0.459|1.1e-03|5.4e-03|1.0e+08| 6.984731e+07 -3.127649e+07| 0:0:01| lu 11↙
5
32|0.580|0.379|1.5e-03|3.3e-03|9.0e+07| 7.007230e+07 -1.376291e+07| 0:0:01| lu 11↙
6
33|0.878|1.000|3.0e-04|2.0e-04|5.1e+07| 3.507757e+07 -1.330766e+07| 0:0:01| lu  9↙
3
34|0.983|0.940|1.3e-05|7.2e-05|1.2e+07| 8.948486e+06 -2.769054e+06| 0:0:01| lu  9↙
6
35|1.000|1.000|2.9e-06|2.5e-06|6.2e+06| 4.868516e+06 -1.358449e+06| 0:0:01| lu  9↙
3
36|1.000|1.000|6.3e-07|5.9e-07|2.2e+06| 1.636909e+06 -5.304282e+05| 0:0:01| lu  9↙
```

```
4
37|1.000|1.000|7.4e-07|1.3e-07|8.3e+05| 6.399911e+05 -1.927988e+05| 0:0:01| lu  5↙
3
38|1.000|1.000|1.8e-07|1.5e-07|2.7e+05| 2.006803e+05 -6.978984e+04| 0:0:01| lu  5↙
3
39|1.000|1.000|1.4e-07|3.7e-08|1.1e+05| 8.203003e+04 -2.505359e+04| 0:0:01| lu  6↙
2
40|1.000|1.000|7.4e-08|2.7e-08|3.3e+04| 2.435112e+04 -8.853955e+03| 0:0:01| lu 10↙
4
41|1.000|1.000|3.3e-08|1.5e-08|1.4e+04| 1.034002e+04 -3.158160e+03| 0:0:01| lu  7↙
2
42|1.000|1.000|3.5e-08|6.5e-09|4.1e+03| 2.955740e+03 -1.156644e+03| 0:0:01| lu  6↙
2
43|1.000|1.000|1.0e-08|7.1e-09|1.7e+03| 1.269067e+03 -4.288058e+02| 0:0:01| lu  4↙
2
44|1.000|1.000|4.5e-09|2.0e-09|5.1e+02| 3.267495e+02 -1.851208e+02| 0:0:01| lu  5↙
2
45|1.000|1.000|5.1e-09|9.0e-10|2.1e+02| 1.204712e+02 -9.314029e+01| 0:0:01| lu 18↙
5
46|1.000|1.000|1.1e-08|1.0e-09|6.3e+01|-2.310868e-02 -6.337067e+01| 0:0:01| lu  6↙
2
47|1.000|1.000|7.8e-09|1.5e-09|2.7e+01|-2.528705e+01 -5.211018e+01| 0:0:01| lu  7↙
2
48|1.000|1.000|9.0e-10|1.6e-09|7.7e+00|-4.076568e+01 -4.842203e+01| 0:0:01| lu  6↙
1
49|1.000|1.000|3.8e-10|1.8e-10|3.3e+00|-4.378757e+01 -4.711086e+01| 0:0:01| lu  4↙
1
50|1.000|1.000|1.4e-10|7.5e-11|9.3e-01|-4.573258e+01 -4.666210e+01| 0:0:01|
  sqlp stop: maximum number of iterations reached
-------------------------------------------------------------------
 number of iterations   = 50
 primal objective value = -4.57325787e+01
 dual   objective value = -4.66621034e+01
 gap := trace(XZ)       = 9.30e-01
 relative gap           = 9.95e-03
 actual relative gap    = 9.95e-03
 rel. primal infeas     = 1.45e-10
 rel. dual   infeas     = 7.54e-11
 norm(X), norm(y), norm(Z) = 5.9e+04, 5.7e+01, 2.2e+01
 norm(A), norm(b), norm(C) = 1.9e+07, 3.4e+06, 7.7e+01
 Total CPU time (secs)  = 0.74
 CPU time per iteration = 0.01
 termination code       = -6
 DIMACS errors: 1.9e-10  0.0e+00  1.1e-10  0.0e+00  1.0e-02  1.0e-02
-------------------------------------------------------------------

ans =

   46.6177


Iteration   4   Total error is: 0.029286

ans =
```

```
    NaN

Iteration   5   Total error is: NaN
Error using svd
Input to SVD must not contain NaN or Inf.

Error in pinv (line 18)
[U,S,V] = svd(A,'econ');

Error in OMP_non_normalized_atoms (line 53)
        a = pinv(normalized_D(:,indx(1:j))) * x;

Error in Polynomial_Dictionary_Learning (line 170)
        CoefMatrix = OMP_non_normalized_atoms(Dictionary,Y, param.T0);

Error in demo_Polynomial_Dictionary_Learning (line 83)
[Dictionary_Pol, output_Pol, err]  = Polynomial_Dictionary_Learning(TrainSignal,↵
param, initial_sparsity_mx);
```