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

 num. of constraints =  5
 dim. of socp   var  =  6,   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|7.2e-01|1.0e+01|1.3e+06| 2.250355e+04  0.000000e+00| 0:0:00| chol  1↙
1
 1|1.000|0.867|5.2e-05|1.5e+00|1.9e+05| 2.146557e+04 -6.089137e+01| 0:0:00| chol  1↙
1
 2|0.137|0.991|4.5e-05|4.6e-02|2.9e+04| 2.288566e+04 -1.988814e+02| 0:0:00| chol  1↙
1
 3|0.981|0.894|1.0e-05|1.4e-02|1.8e+04| 1.676007e+04 -1.875607e+02| 0:0:00| chol  1↙
1
 4|0.996|1.000|1.5e-06|3.0e-03|6.7e+02| 4.844653e+02 -1.788789e+02| 0:0:00| chol  1↙
1
 5|1.000|0.349|3.4e-06|2.1e-03|6.3e+02| 4.825078e+02 -1.376598e+02| 0:0:00| chol  1↙
1
 6|1.000|1.000|4.6e-07|3.0e-05|4.8e+02| 3.811113e+02 -9.780335e+01| 0:0:00| chol  1↙
1
 7|0.645|1.000|1.7e-07|3.1e-06|2.7e+02| 1.724950e+02 -9.672300e+01| 0:0:00| chol  1↙
1
 8|1.000|1.000|2.1e-09|3.3e-07|1.2e+02| 5.120744e+01 -6.813193e+01| 0:0:00| chol  1↙
1
 9|1.000|1.000|5.7e-10|3.0e-08|5.9e+01|-4.678378e+00 -6.375893e+01| 0:0:00| chol  1↙
1
10|1.000|1.000|6.9e-14|3.1e-09|2.5e+01|-3.135493e+01 -5.600743e+01| 0:0:00| chol  1↙
1
11|1.000|1.000|8.0e-14|3.0e-10|9.9e+00|-4.405944e+01 -5.396526e+01| 0:0:00| chol  1↙
1
12|1.000|1.000|3.8e-14|3.1e-11|4.0e+00|-4.843943e+01 -5.240159e+01| 0:0:00| chol  1↙
1
13|1.000|1.000|1.7e-14|4.0e-12|1.4e+00|-5.053802e+01 -5.191876e+01| 0:0:00| chol  1↙
1
14|1.000|1.000|1.2e-14|1.3e-12|5.6e-01|-5.112827e+01 -5.169197e+01| 0:0:00| chol  1↙
1
15|1.000|1.000|1.1e-14|1.0e-12|1.8e-01|-5.143391e+01 -5.161302e+01| 0:0:00| chol  1↙
1
16|1.000|1.000|4.6e-15|1.0e-12|7.6e-02|-5.150833e+01 -5.158413e+01| 0:0:00| chol  1↙
1
17|1.000|1.000|4.3e-15|1.0e-12|2.3e-02|-5.155050e+01 -5.157333e+01| 0:0:00| chol  1↙
1
18|1.000|1.000|2.1e-15|1.0e-12|9.9e-03|-5.156000e+01 -5.156988e+01| 0:0:01| chol  1↙
1
19|1.000|1.000|5.9e-16|1.0e-12|2.7e-03|-5.156583e+01 -5.156855e+01| 0:0:01| chol  1↙
1
```

```
20|1.000|1.000|6.6e-16|1.0e-12|1.2e-03|-5.156702e+01 -5.156820e+01| 0:0:01| chol  1↙
1
21|0.990|1.000|2.9e-16|1.0e-12|2.3e-04|-5.156783e+01 -5.156805e+01| 0:0:01| chol  1↙
1
22|1.000|1.000|3.2e-16|1.0e-12|8.6e-05|-5.156794e+01 -5.156803e+01| 0:0:01| chol  1↙
1
23|1.000|1.000|2.4e-15|1.0e-12|1.7e-05|-5.156800e+01 -5.156802e+01| 0:0:01| chol  1↙
1
24|1.000|1.000|1.1e-15|1.0e-12|2.3e-06|-5.156801e+01 -5.156802e+01| 0:0:01|
  stop: max(relative gap, infeasibilities) < 1.00e-07
------------------------------------------------------------------------
 number of iterations   = 24
 primal objective value = -5.15680141e+01
 dual   objective value = -5.15680164e+01
 gap := trace(XZ)       = 2.26e-06
 relative gap           = 2.17e-08
 actual relative gap    = 2.17e-08
 rel. primal infeas     = 1.07e-15
 rel. dual   infeas     = 1.00e-12
 norm(X), norm(y), norm(Z) = 7.1e-01, 5.2e+01, 2.0e+01
 norm(A), norm(b), norm(C) = 5.8e+01, 2.1e+00, 7.7e+01
 Total CPU time (secs)  = 0.54
 CPU time per iteration = 0.02
 termination code       =  0
 DIMACS errors: 1.1e-15  0.0e+00  1.4e-12  0.0e+00  2.2e-08  2.2e-08
------------------------------------------------------------------------

ans =

   51.5680


 num. of constraints =  5
 dim. of socp   var  =  6,   num. of socp blk  =  1
 dim. of linear var  = 800
 number of nearly dependent constraints = 1
 To remove these constraints, re-run sqlp.m with OPTIONS.rmdepconstr = 1.
******************************************************************
   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|2.6e+06|7.5e+12| 1.318544e+11  0.000000e+00| 0:0:00| chol  1↙
2
 1|1.000|0.868|4.3e-07|3.5e+05|1.2e+12| 1.305305e+11 -7.212867e+07| 0:0:00| chol  2↙
2
 2|0.277|0.840|3.1e-07|5.5e+04|4.0e+11| 1.444367e+11 -6.576218e+08| 0:0:00| chol  2↙
2
 3|0.526|0.348|1.5e-07|3.6e+04|3.3e+11| 1.482459e+11 -9.255203e+08| 0:0:00| chol  2↙
2
 4|0.244|0.450|1.1e-07|2.0e+04|2.6e+11| 1.478984e+11 -1.445759e+09| 0:0:00| chol  2↙
2
```

```
 5|0.223|0.484|8.7e-08|1.0e+04|2.1e+11| 1.442653e+11 -2.074687e+09| 0:0:00| chol  1↙
1
 6|0.304|0.384|6.0e-08|6.3e+03|1.8e+11| 1.351181e+11 -2.572782e+09| 0:0:00| chol  1↙
1
 7|0.229|0.615|4.6e-08|2.4e+03|1.5e+11| 1.265372e+11 -2.540121e+09| 0:0:00| chol  2↙
1
 8|0.328|0.178|3.1e-08|2.0e+03|1.3e+11| 1.117785e+11 -2.768575e+09| 0:0:00| chol  2↙
2
 9|0.188|0.810|3.8e-08|3.8e+02|1.1e+11| 1.029303e+11 -1.204864e+09| 0:0:00| chol  2↙
2
10|0.099|0.105|3.3e-08|3.4e+02|1.0e+11| 9.811124e+10 -1.455362e+09| 0:0:00| chol  1↙
2
11|0.184|0.020|8.3e-08|3.3e+02|9.8e+10| 9.223599e+10 -1.489765e+09| 0:0:00| chol  1↙
1
12|0.035|0.298|9.0e-08|2.3e+02|9.6e+10| 9.130287e+10 -1.378008e+09| 0:0:00| chol  2↙
2
13|0.061|0.035|4.1e-08|2.2e+02|9.4e+10| 8.931171e+10 -1.436861e+09| 0:0:00| chol  2↙
2
14|0.021|0.057|2.0e-08|2.1e+02|9.4e+10| 8.896005e+10 -1.508066e+09| 0:0:00| chol  2↙
1
15|0.024|0.053|9.9e-08|2.0e+02|9.3e+10| 8.836207e+10 -1.555828e+09| 0:0:00| chol  2↙
1
16|0.021|0.066|3.4e-07|1.9e+02|9.3e+10| 8.797811e+10 -1.604007e+09| 0:0:00| chol  2↙
1
17|0.025|0.080|2.3e-07|1.7e+02|9.2e+10| 8.747090e+10 -1.632142e+09| 0:0:00| chol  1↙
1
18|0.026|0.088|3.2e-07|1.6e+02|9.1e+10| 8.696274e+10 -1.656085e+09| 0:0:00| chol  2↙
2
19|0.028|0.073|2.8e-07|1.5e+02|9.1e+10| 8.639392e+10 -1.686181e+09| 0:0:00| chol  2↙
2
20|0.024|0.073|2.7e-07|1.4e+02|9.0e+10| 8.592933e+10 -1.722205e+09| 0:0:00| chol  2↙
2
21|0.026|0.072|8.2e-07|1.3e+02|9.0e+10| 8.543654e+10 -1.752400e+09| 0:0:00| chol  2↙
2
22|0.025|0.084|9.4e-07|1.1e+02|8.9e+10| 8.499434e+10 -1.775921e+09| 0:0:00| chol  1↙
1
23|0.028|0.080|1.1e-06|1.1e+02|8.9e+10| 8.449206e+10 -1.797097e+09| 0:0:00| chol  2↙
1
24|0.026|0.084|8.6e-07|9.7e+01|8.8e+10| 8.403547e+10 -1.820382e+09| 0:0:00| chol  2↙
2
25|0.028|0.076|1.2e-06|8.9e+01|8.8e+10| 8.354468e+10 -1.845118e+09| 0:0:00| chol  2↙
1
26|0.026|0.085|8.6e-07|8.2e+01|8.8e+10| 8.311711e+10 -1.867608e+09| 0:0:00| chol  2↙
2
27|0.028|0.082|8.1e-07|7.5e+01|8.7e+10| 8.264553e+10 -1.887357e+09| 0:0:00| chol  2↙
1
28|0.027|0.094|1.1e-06|6.8e+01|8.7e+10| 8.221566e+10 -1.902304e+09| 0:0:00| chol  1↙
2
29|0.030|0.083|8.5e-07|6.2e+01|8.6e+10| 8.172725e+10 -1.922057e+09| 0:0:00| chol  2↙
1
30|0.028|0.097|8.4e-07|5.6e+01|8.6e+10| 8.130326e+10 -1.938847e+09| 0:0:00| chol  2↙
2
31|0.032|0.081|6.0e-07|5.2e+01|8.5e+10| 8.080711e+10 -1.961770e+09| 0:0:00| chol  2↙
1
```

```
32|0.029|0.108|6.6e-07|4.6e+01|8.5e+10| 8.040082e+10 -1.973257e+09| 0:0:00| chol  2↙
1
33|0.035|0.079|8.5e-07|4.3e+01|8.4e+10| 7.986864e+10 -1.998686e+09| 0:0:00| chol  1↙
1
34|0.029|0.122|1.3e-06|3.7e+01|8.4e+10| 7.947739e+10 -2.006686e+09| 0:0:00| chol  2↙
2
35|0.041|0.067|9.4e-07|3.5e+01|8.3e+10| 7.884989e+10 -2.040453e+09| 0:0:00| chol  2↙
2
36|0.028|0.126|9.6e-07|3.1e+01|8.3e+10| 7.851832e+10 -2.066606e+09| 0:0:00| chol  1↙
1
37|0.049|0.061|2.6e-06|2.9e+01|8.2e+10| 7.771530e+10 -2.097773e+09| 0:0:00| chol  2↙
1
38|0.024|0.130|3.1e-06|2.5e+01|8.2e+10| 7.747771e+10 -2.165378e+09| 0:0:00| chol  2↙
1
39|0.064|0.063|3.3e-06|2.3e+01|8.1e+10| 7.642200e+10 -2.183743e+09| 0:0:00| chol  2↙
1
40|0.010|0.195|6.4e-06|1.9e+01|8.1e+10| 7.637014e+10 -2.306567e+09| 0:0:00| chol  2↙
1
41|0.112|0.045|1.0e-05|1.8e+01|8.0e+10| 7.482503e+10 -2.336588e+09| 0:0:00| chol  2↙
2
42|0.004|0.546|1.0e-05|8.2e+00|7.8e+10| 7.490002e+10 -2.159272e+09| 0:0:00| chol  2↙
2
43|0.217|0.080|5.5e-06|7.5e+00|7.6e+10| 7.146013e+10 -2.290298e+09| 0:0:00| chol  2↙
1
44|0.044|0.563|6.1e-06|3.3e+00|7.2e+10| 6.919513e+10 -1.572431e+09| 0:0:00| chol  2↙
1
45|0.143|0.162|1.9e-05|2.7e+00|7.0e+10| 6.592550e+10 -1.872183e+09| 0:0:00| chol  2↙
2
46|0.083|0.620|1.9e-05|1.0e+00|6.8e+10| 6.533091e+10 -1.804914e+09| 0:0:00| chol  1↙
1
47|0.095|0.183|1.9e-05|8.5e-01|6.7e+10| 6.332403e+10 -2.104503e+09| 0:0:00| chol  1↙
1
48|0.026|0.550|1.7e-05|3.8e-01|6.5e+10| 6.209902e+10 -1.493510e+09| 0:0:00| chol  2↙
1
49|0.082|0.419|3.7e-05|2.2e-01|6.4e+10| 6.023056e+10 -2.326259e+09| 0:0:00| chol  1↙
1
50|0.139|0.452|3.6e-04|1.2e-01|6.2e+10| 5.725584e+10 -3.134058e+09| 0:0:00|
  sqlp stop: maximum number of iterations reached
------------------------------------------------------------------
 number of iterations   = 50
 primal objective value =  6.53309098e+10
 dual   objective value = -1.80491442e+09
 gap := trace(XZ)       = 6.80e+10
 relative gap           = 1.01e+00
 actual relative gap    = 1.00e+00
 rel. primal infeas     = 1.90e-05
 rel. dual   infeas     = 1.04e+00
 norm(X), norm(y), norm(Z) = 8.7e+10, 1.8e+09, 2.6e+09
 norm(A), norm(b), norm(C) = 2.0e+08, 1.8e+08, 7.7e+01
 Total CPU time (secs)  = 0.40
 CPU time per iteration = 0.01
 termination code       = -6
 DIMACS errors: 1.9e-05  0.0e+00  1.5e+00  0.0e+00  1.0e+00  1.0e+00
------------------------------------------------------------------
```

```
ans =

   6.9242e+10

Iteration   2   Total error is: 8.0391

 num. of constraints =  5
 dim. of socp   var  =  6,   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|2.3e+03|6.2e+09| 1.102365e+08  0.000000e+00| 0:0:00| chol  1↙
1
 1|1.000|0.855|4.3e-07|3.3e+02|1.1e+09| 1.079106e+08 -4.504341e+04| 0:0:00| chol  1↙
1
 2|0.259|0.852|3.2e-07|4.9e+01|3.3e+08| 1.197101e+08 -5.875832e+05| 0:0:00| chol  1↙
1
 3|0.523|0.353|1.5e-07|3.2e+01|2.8e+08| 1.228834e+08 -8.023547e+05| 0:0:00| chol  1↙
1
 4|0.279|0.414|1.1e-07|1.9e+01|2.2e+08| 1.224106e+08 -1.209150e+06| 0:0:00| chol  1↙
1
 5|0.185|0.582|8.9e-08|7.8e+00|1.7e+08| 1.201432e+08 -1.750720e+06| 0:0:00| chol  1↙
1
 6|0.378|0.256|5.5e-08|5.8e+00|1.5e+08| 1.109971e+08 -2.123252e+06| 0:0:00| chol  1↙
1
 7|0.158|0.867|4.6e-08|7.8e-01|1.1e+08| 1.065447e+08 -1.340354e+06| 0:0:00| chol  1↙
1
 8|0.092|0.165|4.2e-08|6.5e-01|1.1e+08| 1.035711e+08 -1.771303e+06| 0:0:00| chol  1↙
1
 9|0.233|0.036|3.5e-08|6.2e-01|1.1e+08| 9.788440e+07 -1.858896e+06| 0:0:00| chol  1↙
1
10|0.064|0.309|4.6e-08|4.3e-01|9.9e+07| 9.409968e+07 -7.163666e+05| 0:0:00| chol  1↙
1
11|0.045|0.198|4.0e-08|3.5e-01|9.8e+07| 9.285145e+07 -1.074442e+06| 0:0:00| chol  1↙
1
12|0.051|0.075|1.8e-08|3.2e-01|9.6e+07| 9.146332e+07 -1.255301e+06| 0:0:00| chol  1↙
1
13|0.039|0.052|5.4e-08|3.0e-01|9.6e+07| 9.081867e+07 -1.344750e+06| 0:0:00| chol  1↙
1
14|0.025|0.052|7.2e-09|2.9e-01|9.6e+07| 9.044546e+07 -1.436416e+06| 0:0:00| chol  1↙
1
15|0.025|0.059|3.1e-08|2.7e-01|9.5e+07| 8.986961e+07 -1.503169e+06| 0:0:00| chol  1↙
1
16|0.024|0.099|1.6e-07|2.4e-01|9.4e+07| 8.948536e+07 -1.561022e+06| 0:0:00| chol  1↙
1
17|0.035|0.079|1.2e-07|2.2e-01|9.4e+07| 8.884012e+07 -1.605830e+06| 0:0:00| chol  2↙
1
18|0.027|0.102|1.3e-07|2.0e-01|9.3e+07| 8.839357e+07 -1.660472e+06| 0:0:00| chol  1↙
```

```
 1
19|0.036|0.069|9.3e-08|1.9e-01|9.3e+07| 8.770363e+07 -1.707051e+06| 0:0:00| chol  2↙
 1
20|0.026|0.088|1.7e-07|1.7e-01|9.2e+07| 8.729864e+07 -1.768476e+06| 0:0:00| chol  1↙
 1
21|0.033|0.077|6.9e-07|1.6e-01|9.1e+07| 8.672575e+07 -1.812601e+06| 0:0:00| chol  1↙
 1
22|0.029|0.116|4.9e-07|1.4e-01|9.1e+07| 8.630866e+07 -1.852450e+06| 0:0:00| chol  1↙
 1
23|0.039|0.088|4.8e-07|1.3e-01|9.0e+07| 8.572545e+07 -1.893949e+06| 0:0:00| chol  2↙
 1
24|0.032|0.112|6.1e-08|1.1e-01|9.0e+07| 8.526438e+07 -1.943938e+06| 0:0:00| chol  1↙
 1
25|0.039|0.092|4.2e-07|1.0e-01|8.9e+07| 8.468915e+07 -1.992130e+06| 0:0:00| chol  2↙
 1
26|0.036|0.130|4.9e-07|8.9e-02|8.9e+07| 8.422016e+07 -2.036634e+06| 0:0:00| chol  1↙
 1
27|0.045|0.127|8.3e-07|7.8e-02|8.8e+07| 8.364741e+07 -2.080632e+06| 0:0:00| chol  1↙
 1
28|0.048|0.159|7.9e-07|6.6e-02|8.7e+07| 8.305356e+07 -2.124076e+06| 0:0:00| chol  1↙
 1
29|0.055|0.158|1.3e-07|5.5e-02|8.7e+07| 8.236958e+07 -2.186300e+06| 0:0:00| chol  1↙
 1
30|0.064|0.210|4.3e-07|4.4e-02|8.6e+07| 8.163663e+07 -2.246487e+06| 0:0:00| chol  1↙
 1
31|0.078|0.313|2.4e-07|3.0e-02|8.5e+07| 8.079038e+07 -2.300337e+06| 0:0:00| chol  1↙
 1
32|0.127|0.511|2.9e-07|1.5e-02|8.3e+07| 7.953739e+07 -2.367967e+06| 0:0:00| chol  1↙
 1
33|0.194|1.000|3.9e-07|5.8e-08|8.0e+07| 7.773113e+07 -2.213066e+06| 0:0:00| chol  1↙
 1
34|1.000|0.609|1.7e-06|1.0e-07|6.5e+07| 6.074938e+07 -3.877698e+06| 0:0:00| chol  1↙
 1
35|1.000|1.000|1.6e-05|1.2e-07|4.9e+07| 4.695287e+07 -1.820903e+06| 0:0:00| chol  1↙
 1
36|0.890|1.000|1.7e-06|1.7e-07|2.0e+07| 1.821231e+07 -2.113627e+06| 0:0:00| chol  1↙
 1
37|1.000|1.000|3.1e-08|2.6e-07|9.8e+06| 9.118435e+06 -6.813012e+05| 0:0:00| chol  1↙
 1
38|0.913|0.956|3.3e-08|1.8e-08|2.0e+06| 1.765919e+06 -2.334462e+05| 0:0:00| chol  1↙
 1
39|1.000|1.000|2.5e-08|6.6e-09|1.1e+06| 1.008888e+06 -1.333658e+05| 0:0:00| chol  1↙
 1
40|1.000|1.000|1.5e-08|5.0e-09|4.4e+05| 3.727022e+05 -6.726013e+04| 0:0:00| chol  1↙
 1
41|1.000|1.000|3.4e-10|3.1e-09|2.1e+05| 1.731005e+05 -3.310584e+04| 0:0:00| chol  1↙
 1
42|1.000|1.000|9.8e-10|6.9e-11|8.8e+04| 7.091323e+04 -1.676361e+04| 0:0:00| chol  1↙
 1
43|1.000|1.000|9.3e-11|1.0e-10|3.7e+04| 2.925340e+04 -7.311043e+03| 0:0:00| chol  1↙
 1
44|1.000|1.000|3.4e-11|1.9e-11|1.4e+04| 1.065370e+04 -3.104297e+03| 0:0:00| chol  1↙
 1
45|1.000|1.000|1.8e-12|6.9e-12|5.2e+03| 4.050549e+03 -1.189975e+03| 0:0:00| chol  1↙
```

```
1
46|1.000|1.000|1.4e-12|1.0e-12|1.8e+03| 1.366937e+03 -4.696736e+02| 0:0:00| chol  1↙
1
47|1.000|1.000|6.1e-13|1.0e-12|7.0e+02| 5.022052e+02 -1.951267e+02| 0:0:00| chol  1↙
1
48|1.000|1.000|3.2e-13|1.0e-12|2.3e+02| 1.346325e+02 -9.664472e+01| 0:0:00| chol  1↙
1
49|1.000|1.000|1.6e-14|1.0e-12|9.1e+01| 2.699429e+01 -6.422661e+01| 0:0:00| chol  1↙
1
50|1.000|1.000|3.2e-15|1.0e-12|2.7e+01|-2.516763e+01 -5.244731e+01| 0:0:00|
  sqlp stop: maximum number of iterations reached
-----------------------------------------------------------------
 number of iterations   = 50
 primal objective value = -2.51676346e+01
 dual   objective value = -5.24473128e+01
 gap := trace(XZ)       = 2.73e+01
 relative gap           = 3.47e-01
 actual relative gap    = 3.47e-01
 rel. primal infeas     = 3.16e-15
 rel. dual   infeas     = 1.00e-12
 norm(X), norm(y), norm(Z) = 1.5e+04, 6.5e+01, 2.8e+01
 norm(A), norm(b), norm(C) = 1.8e+05, 1.5e+05, 7.7e+01
 Total CPU time (secs)  = 0.36
 CPU time per iteration = 0.01
 termination code       = -6
 DIMACS errors: 3.2e-15  0.0e+00  1.4e-12  0.0e+00  3.5e-01  3.5e-01
-----------------------------------------------------------------

ans =

   51.2026

Iteration   3   Total error is: 0.029283

 num. of constraints =  5
 dim. of socp   var  =  6,   num. of socp blk  =  1
 dim. of linear var  = 800
 number of nearly dependent constraints = 1
 To remove these constraints, re-run sqlp.m with OPTIONS.rmdepconstr = 1.
*****************************************************************
   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|2.0e+05|5.5e+11| 9.778652e+09  0.000000e+00| 0:0:00| chol  1↙
1
 1|1.000|0.867|4.3e-07|2.7e+04|9.0e+10| 9.685610e+09 -5.655752e+06| 0:0:00| chol  1↙
1
 2|0.278|0.842|3.1e-07|4.3e+03|2.9e+10| 1.072287e+10 -4.956147e+07| 0:0:00| chol  1↙
1
 3|0.516|0.343|1.5e-07|2.8e+03|2.5e+10| 1.098946e+10 -6.995162e+07| 0:0:00| chol  2↙
2
```

```
 4|0.247|0.446|1.1e-07|1.6e+03|1.9e+10| 1.096355e+10 -1.087995e+08| 0:0:00| chol  2↙
2
 5|0.220|0.495|8.8e-08|7.9e+02|1.5e+10| 1.069691e+10 -1.557245e+08| 0:0:00| chol  1↙
1
 6|0.315|0.364|6.0e-08|5.0e+02|1.3e+10| 9.987616e+09 -1.919498e+08| 0:0:00| chol  1↙
1
 7|0.214|0.655|4.7e-08|1.7e+02|1.1e+10| 9.403744e+09 -1.814433e+08| 0:0:00| chol  1↙
1
 8|0.299|0.160|3.4e-08|1.5e+02|9.6e+09| 8.442679e+09 -2.008099e+08| 0:0:00| chol  1↙
2
 9|0.222|0.858|4.1e-08|2.1e+01|7.8e+09| 7.536256e+09 -6.363739e+07| 0:0:00| chol  1↙
1
10|0.065|0.117|3.9e-08|1.8e+01|7.6e+09| 7.318192e+09 -8.798100e+07| 0:0:00| chol  1↙
2
11|0.093|0.024|4.9e-08|1.8e+01|7.5e+09| 7.192119e+09 -9.248843e+07| 0:0:00| chol  2↙
2
12|0.019|0.626|3.9e-08|6.7e+00|7.2e+09| 7.094185e+09 -2.666637e+07| 0:0:00| chol  1↙
2
13|0.039|0.064|3.0e-08|6.2e+00|7.2e+09| 7.008146e+09 -4.782682e+07| 0:0:00| chol  1↙
2
14|0.034|0.029|7.7e-08|6.1e+00|7.1e+09| 6.941364e+09 -5.751522e+07| 0:0:00| chol  2↙
2
15|0.026|0.024|7.3e-07|5.9e+00|7.1e+09| 6.908058e+09 -6.366095e+07| 0:0:00| chol  1↙
2
16|0.020|0.050|6.1e-07|5.6e+00|7.1e+09| 6.887842e+09 -7.487469e+07| 0:0:00| chol  1↙
2
17|0.025|0.053|1.0e-07|5.3e+00|7.1e+09| 6.853431e+09 -8.391573e+07| 0:0:00| chol  2↙
2
18|0.023|0.566|1.2e-07|2.3e+00|7.0e+09| 6.832603e+09 -6.403847e+07| 0:0:00| chol  1↙
1
19|0.019|0.094|1.6e-07|2.1e+00|7.0e+09| 6.804577e+09 -8.105755e+07| 0:0:00| chol  2↙
2
20|0.075|0.095|3.9e-07|1.9e+00|6.8e+09| 6.620408e+09 -8.459135e+07| 0:0:00| chol  1↙
2
21|0.000|0.018|3.2e-08|1.9e+00|6.9e+09| 6.579530e+09 -1.153127e+08| 0:0:00| chol  2↙
1
22|0.136|0.373|3.9e-07|1.2e+00|6.7e+09| 6.396408e+09 -1.317718e+08| 0:0:00| chol  2↙
2
23|0.128|0.116|6.3e-06|1.0e+00|6.5e+09| 6.151190e+09 -1.688066e+08| 0:0:00| chol  1↙
2
24|0.116|0.114|1.1e-06|9.2e-01|6.4e+09| 6.013770e+09 -1.977861e+08| 0:0:00| chol  2↙
2
25|0.100|0.117|1.5e-05|8.1e-01|6.3e+09| 5.887600e+09 -2.313627e+08| 0:0:00| chol  2↙
1
26|0.108|0.391|2.5e-05|4.9e-01|6.2e+09| 5.803827e+09 -2.094542e+08| 0:0:00| chol  1↙
1
27|0.065|0.363|2.3e-05|3.1e-01|6.1e+09| 5.672559e+09 -2.183409e+08| 0:0:00| chol  2↙
2
28|0.028|0.602|2.3e-05|1.2e-01|5.9e+09| 5.563048e+09 -2.373677e+08| 0:0:00| chol  1↙
1
29|0.074|0.264|2.1e-05|9.2e-02|5.8e+09| 5.419325e+09 -2.609800e+08| 0:0:00| chol  1↙
2
30|0.238|0.296|2.4e-04|6.5e-02|5.7e+09| 5.227673e+09 -1.827449e+08| 0:0:00| chol  1↙
2
```

```
31|0.095|0.432|1.8e-04|3.7e-02|5.6e+09| 5.034688e+09 -3.302804e+08| 0:0:00| chol  1↙
2
32|0.248|0.300|4.5e-05|2.6e-02|5.0e+09| 4.493768e+09 -3.738465e+08| 0:0:00| chol  1↙
1
33|0.151|0.243|2.8e-04|2.0e-02|4.9e+09| 4.349150e+09 -3.959229e+08| 0:0:00| chol  2↙
1
34|0.180|0.304|8.5e-04|1.4e-02|4.8e+09| 4.209903e+09 -4.159838e+08| 0:0:00| chol  2↙
2
35|0.169|0.242|9.9e-03|1.0e-02|4.6e+09| 4.019593e+09 -4.745069e+08| 0:0:00| chol  2↙
2
36|0.215|0.227|4.1e-03|8.0e-03|4.5e+09| 3.951949e+09 -3.892155e+08| 0:0:00| chol  2↙
2
37|0.308|0.425|6.4e-04|4.6e-03|3.9e+09| 3.262114e+09 -5.895453e+08| 0:0:00| chol  2↙
2
38|1.000|1.000|1.3e-03|4.2e-06|3.0e+09| 2.643799e+09 -3.402288e+08| 0:0:00| chol  2↙
1
39|1.000|1.000|1.4e-04|6.2e-06|1.5e+09| 1.097981e+09 -4.043211e+08| 0:0:00| chol  1↙
1
40|1.000|1.000|2.5e-05|9.3e-06|4.9e+08| 3.910543e+08 -9.308528e+07| 0:0:00| chol  1↙
1
41|1.000|1.000|1.1e-05|5.0e-06|1.9e+08| 1.393006e+08 -4.671784e+07| 0:0:00| chol  1↙
1
42|1.000|1.000|4.1e-07|2.2e-06|7.8e+07| 6.073326e+07 -1.659531e+07| 0:0:00| chol  1↙
1
43|1.000|1.000|1.0e-07|8.1e-08|2.6e+07| 1.949819e+07 -6.924440e+06| 0:0:00| chol  1↙
1
44|1.000|1.000|1.6e-09|2.0e-08|1.1e+07| 8.461301e+06 -2.493690e+06| 0:0:00| chol  1↙
1
45|1.000|1.000|1.1e-07|3.1e-10|3.5e+06| 2.535885e+06 -9.223146e+05| 0:0:00| chol  1↙
1
46|1.000|1.000|4.6e-09|4.7e-10|1.5e+06| 1.127832e+06 -3.402960e+05| 0:0:00| chol  1↙
1
47|1.000|1.000|5.6e-09|7.0e-10|4.5e+05| 3.292124e+05 -1.204518e+05| 0:0:00| chol  1↙
1
48|1.000|1.000|2.2e-09|1.1e-09|1.9e+05| 1.485087e+05 -4.496076e+04| 0:0:00| chol  1↙
1
49|1.000|1.000|1.2e-09|4.3e-10|5.8e+04| 4.286271e+04 -1.563147e+04| 0:0:00| chol  1↙
1
50|1.000|1.000|1.7e-10|2.4e-10|2.5e+04| 1.947348e+04 -5.863553e+03| 0:0:00|
  sqlp stop: maximum number of iterations reached
-----------------------------------------------------------------
 number of iterations   = 50
 primal objective value =  6.39640823e+09
 dual   objective value = -1.31771841e+08
 gap := trace(XZ)       = 6.69e+09
 relative gap           = 1.02e+00
 actual relative gap    = 1.00e+00
 rel. primal infeas     = 3.86e-07
 rel. dual   infeas     = 1.17e+00
 norm(X), norm(y), norm(Z) = 2.6e+09, 1.3e+08, 1.9e+08
 norm(A), norm(b), norm(C) = 1.6e+07, 1.3e+07, 7.7e+01
 Total CPU time (secs)  = 0.34
 CPU time per iteration = 0.01
 termination code       = -6
```

```
 DIMACS errors: 3.9e-07  0.0e+00  1.7e+00  0.0e+00  1.0e+00  1.0e+00
------------------------------------------------------------------

ans =

   5.9624e+09

Iteration   4   Total error is: 3.1417

 num. of constraints =  5
 dim. of socp   var  =  6,   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|5.5e+02|1.3e+09| 2.224051e+07  0.000000e+00| 0:0:00| chol  1↙
1
 1|1.000|0.843|4.3e-07|8.7e+01|2.3e+08| 2.156588e+07 -7.376444e+03| 0:0:00| chol  1↙
1
 2|0.271|0.854|3.1e-07|1.3e+01|6.9e+07| 2.418595e+07 -1.268843e+05| 0:0:00| chol  1↙
1
 3|0.516|0.353|1.5e-07|8.2e+00|5.7e+07| 2.497893e+07 -1.728684e+05| 0:0:00| chol  1↙
1
 4|0.291|0.415|1.1e-07|4.8e+00|4.6e+07| 2.497167e+07 -2.574399e+05| 0:0:00| chol  1↙
1
 5|0.186|0.603|8.7e-08|1.9e+00|3.4e+07| 2.453922e+07 -3.664816e+05| 0:0:00| chol  1↙
1
 6|0.381|0.241|5.4e-08|1.4e+00|3.0e+07| 2.265164e+07 -4.418302e+05| 0:0:00| chol  1↙
1
 7|0.153|0.864|4.0e-08|2.0e-01|2.3e+07| 2.173285e+07 -2.541832e+05| 0:0:00| chol  1↙
1
 8|0.087|0.168|3.7e-08|1.6e-01|2.3e+07| 2.122334e+07 -3.480303e+05| 0:0:00| chol  1↙
1
 9|0.174|0.058|2.8e-08|1.5e-01|2.2e+07| 2.049378e+07 -3.700968e+05| 0:0:00| chol  1↙
1
10|0.029|0.814|2.4e-08|2.9e-02|2.0e+07| 2.000271e+07 -9.346183e+04| 0:0:00| chol  1↙
1
11|0.075|0.146|2.4e-08|2.5e-02|2.0e+07| 1.937153e+07 -1.897635e+05| 0:0:00| chol  1↙
1
12|0.057|0.053|3.0e-08|2.3e-02|2.0e+07| 1.902373e+07 -2.322800e+05| 0:0:00| chol  1↙
1
13|0.050|0.040|1.1e-07|2.2e-02|1.9e+07| 1.889434e+07 -2.547325e+05| 0:0:00| chol  1↙
1
14|0.021|0.085|2.4e-07|2.0e-02|1.9e+07| 1.884563e+07 -3.169939e+05| 0:0:00| chol  1↙
1
15|0.035|1.000|2.3e-07|1.1e-05|1.9e+07| 1.876803e+07 -3.484500e+05| 0:0:00| chol  1↙
1
16|0.101|0.137|2.1e-07|1.1e-05|1.9e+07| 1.843717e+07 -4.544206e+05| 0:0:00| chol  1↙
1
17|0.141|1.000|1.6e-07|2.8e-06|1.9e+07| 1.822217e+07 -6.214308e+05| 0:0:00| chol  1↙
```

```
1
18|1.000|0.884|3.5e-07|1.6e-06|1.4e+07| 1.262769e+07 -1.083693e+06| 0:0:00| chol  1↙
1
19|1.000|1.000|9.8e-07|7.5e-07|1.0e+07| 9.895840e+06 -5.650553e+05| 0:0:00| chol  1↙
1
20|0.833|1.000|7.4e-08|1.4e-07|5.0e+06| 4.357346e+06 -6.880098e+05| 0:0:00| chol  1↙
1
21|1.000|1.000|6.4e-08|2.2e-08|2.7e+06| 2.408513e+06 -2.594191e+05| 0:0:00| chol  1↙
1
22|0.892|1.000|4.3e-08|1.3e-08|7.0e+05| 5.940112e+05 -1.087767e+05| 0:0:00| chol  1↙
1
23|1.000|1.000|1.8e-08|8.6e-09|4.4e+05| 3.747183e+05 -6.212139e+04| 0:0:00| chol  1↙
1
24|1.000|1.000|1.3e-09|3.6e-09|1.5e+05| 1.211757e+05 -3.192504e+04| 0:0:00| chol  1↙
1
25|1.000|1.000|2.3e-10|2.6e-10|7.4e+04| 6.072647e+04 -1.351384e+04| 0:0:00| chol  1↙
1
26|1.000|1.000|2.3e-11|4.7e-11|2.8e+04| 2.172028e+04 -6.609055e+03| 0:0:00| chol  1↙
1
27|1.000|1.000|2.1e-11|4.6e-12|1.1e+04| 8.964222e+03 -2.437148e+03| 0:0:00| chol  1↙
1
28|1.000|1.000|1.8e-11|4.1e-12|3.9e+03| 2.930318e+03 -1.004582e+03| 0:0:00| chol  1↙
1
29|1.000|1.000|3.7e-12|3.6e-12|1.6e+03| 1.217852e+03 -3.892966e+02| 0:0:00| chol  1↙
1
30|1.000|1.000|1.0e-13|1.0e-12|5.1e+02| 3.410530e+02 -1.653727e+02| 0:0:00| chol  1↙
1
31|1.000|1.000|2.7e-13|1.0e-12|2.1e+02| 1.256370e+02 -8.918157e+01| 0:0:00| chol  1↙
1
32|1.000|1.000|4.5e-14|1.0e-12|6.3e+01| 2.617515e+00 -6.030496e+01| 0:0:00| chol  1↙
1
33|1.000|1.000|9.4e-15|1.0e-12|2.7e+01|-2.477209e+01 -5.220118e+01| 0:0:00| chol  1↙
1
34|1.000|1.000|3.8e-15|1.0e-12|6.7e+00|-4.249019e+01 -4.914856e+01| 0:0:00| chol  1↙
1
35|1.000|1.000|6.8e-16|1.0e-12|2.9e+00|-4.570163e+01 -4.862386e+01| 0:0:00| chol  1↙
1
36|0.968|0.990|5.0e-15|1.0e-12|3.8e-01|-4.804412e+01 -4.841988e+01| 0:0:00| chol  1↙
1
37|0.966|0.995|4.5e-14|1.0e-12|3.9e-02|-4.837156e+01 -4.841077e+01| 0:0:00| chol  1↙
1
38|0.962|0.979|4.1e-13|1.0e-12|1.8e-03|-4.840865e+01 -4.841045e+01| 0:0:00| chol  1↙
1
39|0.974|0.989|1.1e-11|1.0e-12|4.6e-05|-4.841040e+01 -4.841044e+01| 0:0:00| chol  2↙
2
40|0.978|1.000|1.8e-13|1.5e-12|3.7e-06|-4.841044e+01 -4.841044e+01| 0:0:00|
  stop: max(relative gap, infeasibilities) < 1.00e-07
------------------------------------------------------------------
 number of iterations   = 40
 primal objective value = -4.84104411e+01
 dual   objective value = -4.84104448e+01
 gap := trace(XZ)       = 3.70e-06
 relative gap           = 3.78e-08
 actual relative gap    = 3.78e-08
```

```
 rel. primal infeas     = 1.81e-13
 rel. dual   infeas     = 1.50e-12
 norm(X), norm(y), norm(Z) = 2.9e+00, 5.5e+01, 2.1e+01
 norm(A), norm(b), norm(C) = 4.2e+04, 3.0e+04, 7.7e+01
 Total CPU time (secs)  = 0.30
 CPU time per iteration = 0.01
 termination code       =  0
 DIMACS errors: 1.8e-13  0.0e+00  2.1e-12  0.0e+00  3.8e-08  3.8e-08
------------------------------------------------------------------

ans =

   48.4104

Iteration   5   Total error is: 0.0293

 num. of constraints =  5
 dim. of socp   var  =  6,   num. of socp blk  =  1
 dim. of linear var  = 800
 number of nearly dependent constraints = 1
 To remove these constraints, re-run sqlp.m with OPTIONS.rmdepconstr = 1.
******************************************************************
   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|2.0e+05|4.8e+11| 8.493939e+09  0.000000e+00| 0:0:00| chol  1↙
1
 1|1.000|0.850|4.3e-07|3.0e+04|8.4e+10| 8.293425e+09 -3.504871e+06| 0:0:00| chol  1↙
1
 2|0.254|0.859|3.2e-07|4.2e+03|2.5e+10| 9.204410e+09 -4.726552e+07| 0:0:00| chol  1↙
1
 3|0.499|0.347|1.6e-07|2.8e+03|2.1e+10| 9.413811e+09 -6.446886e+07| 0:0:00| chol  2↙
2
 4|0.295|0.394|1.1e-07|1.7e+03|1.7e+10| 9.374770e+09 -9.551237e+07| 0:0:00| chol  2↙
2
 5|0.170|0.640|9.3e-08|6.0e+02|1.3e+10| 9.223859e+09 -1.358255e+08| 0:0:00| chol  1↙
1
 6|0.378|0.215|5.8e-08|4.7e+02|1.1e+10| 8.534673e+09 -1.633681e+08| 0:0:00| chol  1↙
1
 7|0.161|0.892|4.8e-08|5.1e+01|8.6e+09| 8.116814e+09 -5.595174e+07| 0:0:00| chol  1↙
1
 8|0.050|0.186|4.6e-08|4.2e+01|8.4e+09| 7.998286e+09 -9.317502e+07| 0:0:00| chol  1↙
1
 9|0.067|0.059|4.2e-08|3.9e+01|8.4e+09| 7.899170e+09 -1.068315e+08| 0:0:00| chol  1↙
1
10|0.219|0.061|3.3e-08|3.7e+01|7.6e+09| 7.012202e+09 -1.068913e+08| 0:0:00| chol  1↙
2
11|0.001|0.096|3.9e-08|3.3e+01|7.6e+09| 7.044678e+09 -1.698559e+08| 0:0:00| chol  1↙
1
12|0.412|0.309|2.3e-08|2.3e+01|5.7e+09| 5.178823e+09 -1.683680e+08| 0:0:00| chol  1↙
1
```

```
13|0.081|0.594|2.0e-08|9.4e+00|5.3e+09| 4.965933e+09 -1.431563e+08| 0:0:00| chol  1↙
1
14|0.132|0.337|6.3e-08|6.2e+00|5.1e+09| 4.733697e+09 -1.921277e+08| 0:0:00| chol  1↙
1
15|0.095|0.773|4.2e-08|1.4e+00|4.9e+09| 4.569722e+09 -2.127877e+08| 0:0:00| chol  1↙
1
16|0.192|0.167|2.5e-07|1.2e+00|4.7e+09| 4.285982e+09 -2.573771e+08| 0:0:00| chol  1↙
1
17|0.265|0.123|4.6e-06|1.0e+00|4.4e+09| 3.839977e+09 -2.747581e+08| 0:0:00| chol  1↙
2
18|0.035|0.157|6.9e-06|8.7e-01|4.4e+09| 3.903482e+09 -3.020429e+08| 0:0:00| chol  2↙
2
19|0.122|0.385|3.3e-05|5.3e-01|4.0e+09| 3.491342e+09 -1.163493e+08| 0:0:00| chol  2↙
1
20|0.772|0.494|2.2e-05|2.7e-01|3.4e+09| 2.707861e+09 -2.813773e+08| 0:0:00| chol  1↙
1
21|0.415|0.599|1.6e-05|1.1e-01|2.7e+09| 2.155994e+09 -2.477357e+08| 0:0:00| chol  1↙
1
22|0.926|0.974|1.5e-05|2.8e-03|2.6e+08| 2.060604e+08 -4.263168e+07| 0:0:00| chol  2↙
1
23|0.853|1.000|5.3e-05|1.5e-07|1.9e+08| 1.313260e+08 -5.378781e+07| 0:0:00| chol  1↙
1
24|1.000|1.000|1.8e-06|2.2e-07|1.1e+08| 8.895786e+07 -2.311556e+07| 0:0:00| chol  1↙
1
25|0.995|1.000|6.8e-06|3.3e-07|3.1e+07| 2.198769e+07 -8.689687e+06| 0:0:00| chol  1↙
1
26|1.000|1.000|1.8e-06|4.9e-07|1.5e+07| 1.119581e+07 -3.308931e+06| 0:0:00| chol  1↙
1
27|1.000|1.000|3.0e-07|3.6e-07|4.4e+06| 3.183613e+06 -1.174139e+06| 0:0:00| chol  1↙
1
28|1.000|1.000|1.0e-07|6.1e-08|1.9e+06| 1.468014e+06 -4.423894e+05| 0:0:00| chol  1↙
1
29|1.000|1.000|9.1e-09|2.1e-08|5.8e+05| 4.237419e+05 -1.563421e+05| 0:0:00| chol  1↙
1
30|1.000|1.000|6.4e-09|1.8e-09|2.5e+05| 1.928554e+05 -5.835114e+04| 0:0:00| chol  1↙
1
31|1.000|1.000|1.1e-10|1.3e-09|7.6e+04| 5.548032e+04 -2.035789e+04| 0:0:00| chol  1↙
1
32|1.000|1.000|1.2e-10|2.3e-11|3.3e+04| 2.527959e+04 -7.613291e+03| 0:0:00| chol  1↙
1
33|1.000|1.000|3.2e-11|2.4e-11|9.9e+03| 7.234748e+03 -2.645900e+03| 0:0:00| chol  1↙
1
34|1.000|1.000|8.3e-12|6.3e-12|4.3e+03| 3.291498e+03 -1.007316e+03| 0:0:00| chol  1↙
1
35|1.000|1.000|2.2e-12|1.7e-12|1.3e+03| 9.131549e+02 -3.685855e+02| 0:0:00| chol  1↙
1
36|1.000|1.000|1.2e-12|1.0e-12|5.6e+02| 3.974481e+02 -1.632464e+02| 0:0:00| chol  1↙
1
37|1.000|1.000|1.8e-13|1.0e-12|1.6e+02| 7.966817e+01 -8.395814e+01| 0:0:00| chol  1↙
1
38|1.000|1.000|6.6e-14|1.0e-12|7.2e+01| 1.214064e+01 -6.020749e+01| 0:0:00| chol  1↙
1
39|1.000|1.000|5.4e-15|1.0e-12|1.9e+01|-3.194150e+01 -5.122869e+01| 0:0:00| chol  1↙
1
```

```
40|1.000|1.000|3.3e-15|1.0e-12|8.6e+00|-4.051143e+01 -4.914790e+01| 0:0:00| chol  1↙
1
41|0.982|1.000|1.6e-15|1.0e-12|1.6e+00|-4.674970e+01 -4.834781e+01| 0:0:00| chol  1↙
1
42|1.000|1.000|6.6e-17|1.0e-12|6.3e-01|-4.764762e+01 -4.827790e+01| 0:0:00| chol  1↙
1
43|0.968|0.978|1.2e-14|1.0e-12|5.0e-02|-4.820379e+01 -4.825362e+01| 0:0:00| chol  1↙
1
44|0.973|0.981|1.5e-13|1.0e-12|1.5e-03|-4.825138e+01 -4.825286e+01| 0:0:00| chol  1↙
1
45|0.981|0.990|1.2e-12|1.0e-12|2.8e-05|-4.825282e+01 -4.825284e+01| 0:0:00| chol  2↙
2
46|0.970|1.000|2.7e-13|1.0e-12|2.2e-06|-4.825284e+01 -4.825284e+01| 0:0:00|
  stop: max(relative gap, infeasibilities) < 1.00e-07
-------------------------------------------------------------------
 number of iterations   = 46
 primal objective value = -4.82528412e+01
 dual   objective value = -4.82528434e+01
 gap := trace(XZ)       = 2.21e-06
 relative gap           = 2.27e-08
 actual relative gap    = 2.27e-08
 rel. primal infeas     = 2.67e-13
 rel. dual   infeas     = 1.00e-12
 norm(X), norm(y), norm(Z) = 3.1e+00, 5.5e+01, 2.1e+01
 norm(A), norm(b), norm(C) = 1.5e+07, 1.1e+07, 7.7e+01
 Total CPU time (secs)  = 0.32
 CPU time per iteration = 0.01
 termination code       =  0
 DIMACS errors: 2.7e-13  0.0e+00  1.4e-12  0.0e+00  2.3e-08  2.3e-08
-------------------------------------------------------------------

ans =

   48.2528

Iteration   6   Total error is: 0.029298

 num. of constraints =  5
 dim. of socp   var  =  6,   num. of socp blk  =  1
 dim. of linear var  = 800
 number of nearly dependent constraints = 1
 To remove these constraints, re-run sqlp.m with OPTIONS.rmdepconstr = 1.
*******************************************************************
   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|5.9e+07|1.6e+14| 2.810466e+12  0.000000e+00| 0:0:00| chol  2↙
2
 1|1.000|0.865|4.3e-07|8.0e+06|2.6e+13| 2.778766e+12 -1.523870e+09| 0:0:00| chol  2↙
2
 2|0.272|0.845|3.1e-07|1.2e+06|8.4e+12| 3.074906e+12 -1.437371e+10| 0:0:00| chol  2↙
```

```
2
 3|0.514|0.344|1.5e-07|8.1e+05|7.0e+12| 3.148524e+12 -2.017457e+10| 0:0:00| chol  2↙
2
 4|0.254|0.436|1.1e-07|4.6e+05|5.6e+12| 3.139009e+12 -3.114413e+10| 0:0:00| chol  2↙
2
 5|0.209|0.520|8.9e-08|2.2e+05|4.4e+12| 3.067687e+12 -4.476251e+10| 0:0:00| chol  2↙
1
 6|0.338|0.323|5.9e-08|1.5e+05|3.8e+12| 2.850320e+12 -5.491614e+10| 0:0:00| chol  2↙
1
 7|0.187|0.734|4.8e-08|3.9e+04|3.0e+12| 2.712943e+12 -4.737794e+10| 0:0:00| chol  1↙
1
 8|0.225|0.148|3.7e-08|3.4e+04|2.8e+12| 2.524594e+12 -5.464608e+10| 0:0:00| chol  2↙
2
 9|0.279|0.325|2.5e-08|2.3e+04|2.4e+12| 2.182064e+12 -4.767513e+10| 0:0:00| chol  2↙
2
10|0.122|0.449|1.3e-08|1.3e+04|2.3e+12| 2.123766e+12 -4.154492e+10| 0:0:00| chol  2↙
2
11|0.164|0.137|7.5e-09|1.1e+04|2.1e+12| 1.946562e+12 -4.279697e+10| 0:0:00| chol  2↙
2
12|0.044|0.187|1.3e-09|8.8e+03|2.1e+12| 1.921851e+12 -4.464835e+10| 0:0:00| chol  2↙
2
13|0.066|0.291|6.5e-09|6.2e+03|2.0e+12| 1.898096e+12 -4.353748e+10| 0:0:00| chol  2↙
2
14|0.087|0.117|2.9e-09|5.5e+03|2.0e+12| 1.864023e+12 -4.619554e+10| 0:0:00| chol  2↙
2
15|0.047|0.605|1.0e-07|2.2e+03|1.9e+12| 1.854454e+12 -3.140317e+10| 0:0:00| chol  2↙
2
16|0.062|0.123|8.2e-08|1.9e+03|1.9e+12| 1.821404e+12 -3.520084e+10| 0:0:00| chol  2↙
2
17|0.097|0.212|1.6e-07|1.5e+03|1.8e+12| 1.709345e+12 -3.223049e+10| 0:0:00| chol  2↙
2
18|0.003|0.100|3.7e-07|1.4e+03|1.8e+12| 1.714186e+12 -7.024042e+10| 0:0:00| chol  2↙
2
19|0.063|0.634|4.8e-07|4.9e+02|1.7e+12| 1.668718e+12 -2.816773e+10| 0:0:00| chol  1↙
2
20|0.153|0.197|2.8e-07|4.0e+02|1.7e+12| 1.575542e+12 -4.858831e+10| 0:0:00| chol  2↙
2
21|0.179|0.135|4.8e-08|3.4e+02|1.6e+12| 1.485488e+12 -6.249680e+10| 0:0:00| chol  2↙
2
22|0.131|0.415|1.1e-07|2.0e+02|1.6e+12| 1.443909e+12 -5.395437e+10| 0:0:00| chol  2↙
2
23|0.060|0.267|2.8e-06|1.5e+02|1.6e+12| 1.388280e+12 -7.906498e+10| 0:0:00| chol  2↙
2
24|0.245|0.367|3.8e-06|9.3e+01|1.5e+12| 1.281005e+12 -9.369495e+10| 0:0:00| chol  2↙
2
25|0.225|0.277|3.9e-05|6.7e+01|1.4e+12| 1.195070e+12 -1.092528e+11| 0:0:00| chol  2↙
2
26|0.176|0.262|1.5e-04|5.0e+01|1.4e+12| 1.127733e+12 -1.217751e+11| 0:0:00| chol  2↙
2
27|0.135|0.356|1.3e-04|3.2e+01|1.3e+12| 1.076900e+12 -1.228136e+11| 0:0:00| chol  2↙
2
28|0.169|0.203|4.4e-05|2.5e+01|1.3e+12| 1.008279e+12 -1.281744e+11| 0:0:00| chol  2↙
2
29|0.125|0.364|1.7e-03|1.6e+01|1.2e+12| 9.754010e+11 -9.716049e+10| 0:0:00| chol  2↙
```

```
2
30|0.097|0.264|1.4e-03|1.2e+01|1.1e+12| 9.307955e+11 -9.998859e+10| 0:0:00| chol  2↙
2
31|0.108|0.265|1.2e-03|8.7e+00|1.1e+12| 8.886228e+11 -1.082762e+11| 0:0:00| chol  2↙
2
32|0.087|0.110|1.8e-03|7.8e+00|1.1e+12| 8.605671e+11 -1.147353e+11| 0:0:00| chol  2↙
2
33|0.077|0.151|2.2e-03|6.6e+00|1.1e+12| 8.400328e+11 -1.128952e+11| 0:0:00| chol  2↙
2
34|0.055|0.096|1.0e-02|6.0e+00|1.1e+12| 8.217705e+11 -1.175820e+11| 0:0:00| chol  2↙
2
35|0.054|0.080|5.9e-03|5.5e+00|1.0e+12| 8.081269e+11 -1.204748e+11| 0:0:00| chol  2↙
2
36|0.042|0.059|2.8e-02|5.2e+00|1.0e+12| 7.965541e+11 -1.236977e+11| 0:0:00| chol  2↙
2
37|0.036|0.078|2.1e-02|4.8e+00|1.0e+12| 7.884666e+11 -1.245839e+11| 0:0:00| chol  2↙
2
38|0.034|0.099|1.6e-02|4.3e+00|1.0e+12| 7.787007e+11 -1.232922e+11| 0:0:00| chol  2↙
2
39|0.039|0.098|3.3e-02|3.9e+00|1.0e+12| 7.695265e+11 -1.212061e+11| 0:0:00| chol  2↙
2
40|0.035|0.071|3.4e-02|3.6e+00|1.0e+12| 7.594685e+11 -1.218444e+11| 0:0:00| chol  2↙
2
41|0.031|0.058|4.5e-02|3.4e+00|1.0e+12| 7.520917e+11 -1.227503e+11| 0:0:00| chol  2↙
2
42|0.027|0.049|1.1e-01|3.2e+00|9.9e+11| 7.453529e+11 -1.238469e+11| 0:0:00| chol  2↙
2
43|0.023|0.072|1.1e-01|3.0e+00|9.8e+11| 7.402245e+11 -1.227704e+11| 0:0:00| chol  2↙
2
44|0.028|0.071|9.8e-02|2.8e+00|9.7e+11| 7.326712e+11 -1.215596e+11| 0:0:00| chol  2↙
* 2
45|0.025|0.056|9.6e-02|2.6e+00|9.7e+11| 7.268194e+11 -1.214938e+11| 0:0:00| chol  2↙
* 2
46|0.022|0.046|8.3e-02|2.5e+00|9.6e+11| 7.214041e+11 -1.218523e+11| 0:0:00| chol  2↙
2
47|0.019|0.064|6.1e-02|2.3e+00|9.6e+11| 7.171659e+11 -1.207211e+11| 0:0:00| chol  2↙
* 2
48|0.025|0.044|6.2e-02|2.2e+00|9.5e+11| 7.108182e+11 -1.205363e+11| 0:0:00| chol  1↙
* 2
49|0.017|0.046|6.8e-02|2.1e+00|9.5e+11| 7.069658e+11 -1.206490e+11| 0:0:00| chol  2↙
* 2
50|0.020|0.039|6.5e-02|2.1e+00|9.4e+11| 7.022474e+11 -1.207427e+11| 0:0:00|
  sqlp stop: maximum number of iterations reached
------------------------------------------------------------------------
 number of iterations   = 50
 primal objective value =  7.17165881e+11
 dual   objective value = -1.20721057e+11
 gap := trace(XZ)       = 9.55e+11
 relative gap           = 1.14e+00
 actual relative gap    = 1.00e+00
 rel. primal infeas     = 6.06e-02
 rel. dual   infeas     = 2.35e+00
 norm(X), norm(y), norm(Z) = 8.7e+12, 1.2e+11, 1.7e+11
 norm(A), norm(b), norm(C) = 4.5e+09, 3.8e+09, 7.7e+01
```

```
 Total CPU time (secs)  = 0.36
 CPU time per iteration = 0.01
 termination code       = -6
 DIMACS errors: 6.1e-02  0.0e+00  3.4e+00  0.0e+00  1.0e+00  1.1e+00
------------------------------------------------------------------

ans =

   1.0986e+13

Iteration   7   Total error is: 85.9039

 num. of constraints =  5
 dim. of socp   var  =  6,   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|5.7e+03|1.3e+10| 2.273410e+08  0.000000e+00| 0:0:00| chol  1↙
1
 1|1.000|0.849|4.3e-07|8.5e+02|2.3e+09| 2.219465e+08 -9.854154e+04| 0:0:00| chol  1↙
1
 2|0.251|0.863|3.2e-07|1.2e+02|6.7e+08| 2.461485e+08 -1.285547e+06| 0:0:00| chol  1↙
1
 3|0.486|0.344|1.6e-07|7.7e+01|5.6e+08| 2.509651e+08 -1.754125e+06| 0:0:00| chol  1↙
1
 4|0.303|0.382|1.1e-07|4.8e+01|4.6e+08| 2.497555e+08 -2.577620e+06| 0:0:00| chol  1↙
1
 5|0.163|0.671|9.6e-08|1.6e+01|3.3e+08| 2.460075e+08 -3.613863e+06| 0:0:00| chol  1↙
1
 6|0.364|0.202|6.1e-08|1.2e+01|3.0e+08| 2.283768e+08 -4.346154e+06| 0:0:00| chol  1↙
1
 7|0.180|0.872|4.9e-08|1.6e+00|2.3e+08| 2.142713e+08 -1.195031e+06| 0:0:00| chol  1↙
1
 8|0.059|0.192|4.6e-08|1.3e+00|2.2e+08| 2.107309e+08 -2.228402e+06| 0:0:00| chol  1↙
1
 9|0.061|0.077|4.3e-08|1.2e+00|2.2e+08| 2.077724e+08 -2.666854e+06| 0:0:00| chol  1↙
1
10|0.218|0.067|3.2e-08|1.1e+00|2.0e+08| 1.888352e+08 -2.705222e+06| 0:0:00| chol  1↙
2
11|0.002|0.022|1.4e-07|1.1e+00|2.0e+08| 1.884124e+08 -4.538655e+06| 0:0:00| chol  1↙
1
12|0.211|0.445|1.1e-07|6.0e-01|2.0e+08| 1.823824e+08 -4.336583e+06| 0:0:00| chol  1↙
1
13|0.162|0.340|9.2e-08|4.0e-01|1.8e+08| 1.654073e+08 -4.142518e+06| 0:0:00| chol  1↙
1
14|0.070|0.198|4.5e-07|3.2e-01|1.7e+08| 1.617287e+08 -5.203659e+06| 0:0:00| chol  1↙
1
15|0.142|0.489|1.7e-07|1.6e-01|1.7e+08| 1.582188e+08 -2.905557e+06| 0:0:00| chol  1↙
1
```

```
16|0.048|0.298|2.2e-07|1.1e-01|1.7e+08| 1.553260e+08 -5.819823e+06| 0:0:00| chol  1↙
1
17|0.217|0.227|6.6e-08|8.8e-02|1.6e+08| 1.443922e+08 -6.840288e+06| 0:0:00| chol  1↙
1
18|0.295|0.454|1.3e-07|4.8e-02|1.5e+08| 1.398902e+08 -6.743658e+06| 0:0:00| chol  1↙
1
19|0.223|1.000|1.2e-06|7.2e-07|1.2e+08| 1.170675e+08 -4.775532e+06| 0:0:00| chol  1↙
1
20|1.000|0.642|3.1e-06|3.3e-07|7.6e+07| 6.868839e+07 -7.749741e+06| 0:0:00| chol  1↙
1
21|1.000|1.000|2.6e-05|5.2e-08|5.6e+07| 5.084005e+07 -5.560246e+06| 0:0:00| chol  1↙
1
22|1.000|1.000|1.8e-06|6.8e-08|2.6e+07| 2.187043e+07 -4.375493e+06| 0:0:00| chol  1↙
1
23|1.000|1.000|1.6e-06|1.0e-07|9.5e+06| 7.972535e+06 -1.516700e+06| 0:0:00| chol  1↙
1
24|1.000|1.000|4.3e-07|1.5e-07|3.9e+06| 3.069666e+06 -8.411131e+05| 0:0:00| chol  1↙
1
25|1.000|1.000|7.6e-09|8.7e-08|1.7e+06| 1.347908e+06 -3.146275e+05| 0:0:00| chol  1↙
1
26|1.000|1.000|3.0e-08|1.5e-09|6.4e+05| 4.854703e+05 -1.532374e+05| 0:0:00| chol  1↙
1
27|1.000|1.000|1.3e-09|2.3e-09|2.6e+05| 2.044761e+05 -5.573391e+04| 0:0:00| chol  1↙
1
28|1.000|1.000|7.1e-10|2.6e-10|8.9e+04| 6.650841e+04 -2.274774e+04| 0:0:00| chol  1↙
1
29|1.000|1.000|1.3e-10|1.4e-10|3.7e+04| 2.837947e+04 -8.305961e+03| 0:0:00| chol  1↙
1
30|1.000|1.000|7.5e-11|2.5e-11|1.2e+04| 8.590486e+03 -3.033806e+03| 0:0:00| chol  1↙
1
31|1.000|1.000|1.6e-11|1.5e-11|4.9e+03| 3.772535e+03 -1.146246e+03| 0:0:00| chol  1↙
1
32|1.000|1.000|3.2e-12|3.3e-12|1.5e+03| 1.077951e+03 -4.198069e+02| 0:0:00| chol  1↙
1
33|1.000|1.000|4.5e-14|1.0e-12|6.5e+02| 4.638663e+02 -1.827709e+02| 0:0:00| chol  1↙
1
34|1.000|1.000|9.6e-14|1.0e-12|1.9e+02| 1.004604e+02 -9.042030e+01| 0:0:00| chol  1↙
1
35|1.000|1.000|2.1e-14|1.0e-12|8.4e+01| 2.106298e+01 -6.268015e+01| 0:0:00| chol  1↙
1
36|1.000|1.000|7.9e-15|1.0e-12|2.3e+01|-2.925844e+01 -5.206737e+01| 0:0:00| chol  1↙
1
37|1.000|1.000|6.1e-15|1.0e-12|1.0e+01|-3.938160e+01 -4.952601e+01| 0:0:00| chol  1↙
1
38|0.990|1.000|2.9e-15|1.0e-12|2.0e+00|-4.659089e+01 -4.855526e+01| 0:0:00| chol  1↙
1
39|1.000|1.000|3.8e-15|1.0e-12|8.3e-01|-4.762915e+01 -4.846000e+01| 0:0:00| chol  1↙
1
40|0.967|0.976|9.0e-15|1.0e-12|6.7e-02|-4.835537e+01 -4.842256e+01| 0:0:00| chol  1↙
1
41|0.972|0.981|7.1e-14|1.0e-12|2.1e-03|-4.841929e+01 -4.842137e+01| 0:0:00| chol  1↙
1
42|0.981|0.990|4.9e-13|1.0e-12|3.9e-05|-4.842131e+01 -4.842135e+01| 0:0:00| chol  1↙
2
```

```
43|0.971|1.000|1.1e-13|1.0e-12|2.9e-06|-4.842134e+01 -4.842134e+01| 0:0:00|
  stop: max(relative gap, infeasibilities) < 1.00e-07
------------------------------------------------------------------------
 number of iterations   = 43
 primal objective value = -4.84213419e+01
 dual   objective value = -4.84213448e+01
 gap := trace(XZ)       = 2.91e-06
 relative gap           = 2.97e-08
 actual relative gap    = 2.97e-08
 rel. primal infeas     = 1.13e-13
 rel. dual   infeas     = 1.00e-12
 norm(X), norm(y), norm(Z) = 2.9e+00, 5.5e+01, 2.1e+01
 norm(A), norm(b), norm(C) = 4.3e+05, 3.0e+05, 7.7e+01
 Total CPU time (secs)  = 0.28
 CPU time per iteration = 0.01
 termination code       =  0
 DIMACS errors: 1.1e-13  0.0e+00  1.4e-12  0.0e+00  3.0e-08  3.0e-08
------------------------------------------------------------------------

ans =

   48.4213

Iteration   8   Total error is: 0.0293
The total representation error of the testing signals is: 0.01219
>>
```