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

 num. of constraints = 85
 dim. of socp   var  = 86,   num. of socp blk  =  1
 dim. of linear var  = 800
 dim. of free   var  =  5
 *** convert ublk to linear blk
******************************************************************************↙
********
   SDPT3: homogeneous self-dual path-following algorithms
******************************************************************************↙
********
 version  predcorr  gam  expon
   HKM      1      0.000   1
it pstep dstep pinfeas dinfeas  gap     mean(obj)    cputime    kap    tau    theta
------------------------------------------------------------------------------↙
--------
 0|0.000|0.000|1.1e+01|1.3e+02|1.1e+07| 1.107923e+04| 0:0:00|1.1e+07|1.0e+00|1.↙
0e+00| chol 1  1
 1|0.013|0.013|1.1e+01|1.3e+02|1.1e+07| 1.109167e+04| 0:0:00|1.1e+07|1.0e+00|9.9e-↙
01| chol 1  1
 2|0.026|0.026|1.1e+01|1.3e+02|1.1e+07| 1.111725e+04| 0:0:00|1.1e+07|1.0e+00|9.6e-↙
01| chol 1  1
 3|0.330|0.330|7.2e+00|8.7e+01|7.5e+06| 1.115931e+04| 0:0:00|7.4e+06|1.0e+00|6.5e-↙
01| chol 1  1
 4|0.623|0.623|2.7e+00|3.3e+01|2.8e+06| 1.115994e+04| 0:0:00|2.8e+06|1.0e+00|2.5e-↙
01| chol 1  1
 5|0.908|0.908|2.6e-01|3.1e+00|2.8e+05| 1.085679e+04| 0:0:00|2.2e+05|1.0e+00|2.3e-↙
02| chol 1  1
 6|0.055|0.055|2.5e-01|3.0e+00|2.8e+05| 1.121021e+04| 0:0:00|2.1e+05|1.0e+00|2.3e-↙
02| chol 1  1
 7|0.110|0.110|2.5e-01|3.0e+00|3.0e+05| 1.207561e+04| 0:0:00|2.0e+05|9.6e-01|2.1e-↙
02| chol 1  1
 8|0.579|0.579|1.4e-01|1.6e+00|1.8e+05| 1.226756e+04| 0:0:00|8.7e+04|9.4e-01|1.2e-↙
02| chol 1  1
 9|0.517|0.517|9.9e-02|1.2e+00|1.5e+05| 1.310934e+04| 0:0:00|4.6e+04|9.0e-01|8.0e-↙
03| chol 1  1
10|0.753|0.753|3.6e-02|4.3e-01|4.8e+04| 8.485107e+03| 0:0:00|2.0e+03|1.1e+00|3.5e-↙
03| chol 1  1
11|0.746|0.746|1.4e-02|1.6e-01|1.7e+04| 4.569960e+03| 0:0:01|1.0e+02|1.3e+00|1.6e-↙
03| chol 1  1
12|0.912|0.912|2.8e-03|3.4e-02|3.1e+03| 1.091562e+03| 0:0:01|4.1e+00|1.7e+00|4.3e-↙
04| chol 1  1
13|0.762|0.762|1.3e-03|1.4e-02|1.2e+03| 4.068108e+02| 0:0:01|5.1e+00|1.8e+00|1.9e-↙
04| chol 1  1
14|0.583|0.583|9.3e-04|1.1e-02|9.8e+02| 3.192833e+02| 0:0:01|3.5e+00|1.8e+00|1.5e-↙
04| chol 1  1
15|1.000|1.000|6.3e-04|6.2e-03|5.7e+02| 1.651508e+02| 0:0:01|1.9e+00|1.9e+00|8.6e-↙
05| chol 1  1
16|0.812|0.812|3.6e-04|4.4e-03|4.0e+02| 8.500640e+01| 0:0:01|1.3e+00|1.9e+00|6.1e-↙
05| chol 1  1
17|1.000|1.000|2.8e-04|2.4e-03|2.1e+02| 2.561280e+01| 0:0:01|8.2e-01|1.9e+00|3.4e-↙
```

```
05| chol 1  1
18|1.000|1.000|1.2e-04|1.3e-03|1.1e+02|-1.654380e+01| 0:0:01|4.5e-01|1.9e+00|1.8e-↙
05| chol 1  1
19|1.000|1.000|1.1e-04|5.2e-04|4.5e+01|-3.724560e+01| 0:0:01|2.3e-01|1.9e+00|7.3e-↙
06| chol 1  1
20|1.000|1.000|4.1e-05|2.4e-04|2.0e+01|-4.629457e+01| 0:0:01|9.5e-02|1.9e+00|3.2e-↙
06| chol 1  1
21|1.000|1.000|3.3e-05|9.6e-05|7.3e+00|-4.944675e+01| 0:0:01|4.3e-02|1.9e+00|1.2e-↙
06| chol 1  1
22|0.488|0.488|1.8e-05|7.7e-05|5.6e+00|-5.001284e+01| 0:0:01|3.0e-02|1.9e+00|9.0e-↙
07| chol 1  1
23|1.000|1.000|3.9e-06|4.7e-05|3.1e+00|-5.073625e+01| 0:0:01|1.2e-02|2.0e+00|5.2e-↙
07| chol 1  1
24|1.000|1.000|6.5e-06|2.5e-05|8.3e-01|-5.134630e+01| 0:0:01|6.6e-03|2.0e+00|1.4e-↙
07| chol 1  1
25|1.000|1.000|3.0e-06|2.0e-05|3.6e-01|-5.146925e+01| 0:0:01|1.8e-03|2.0e+00|6.1e-↙
08| chol 1  1
26|1.000|1.000|5.9e-07|8.1e-06|9.4e-02|-5.153642e+01| 0:0:01|7.9e-04|2.0e+00|1.6e-↙
08| chol 1  1
27|1.000|1.000|5.2e-07|3.3e-06|3.8e-02|-5.155098e+01| 0:0:01|2.1e-04|2.0e+00|6.7e-↙
09| chol 1  1
28|1.000|1.000|7.3e-07|1.3e-06|9.5e-03|-5.155857e+01| 0:0:01|8.5e-05|2.0e+00|1.6e-↙
09| chol 1  1
29|0.868|0.868|1.5e-06|6.4e-07|4.2e-03|-5.156016e+01| 0:0:01|3.0e-05|2.0e+00|7.3e-↙
10| chol 1  1
  stop: primal infeas has deteriorated too much, 8.2e-06  0, 0, 1
30|0.862|0.862|1.5e-06|6.4e-07|4.2e-03|-5.156016e+01| 0:0:01|3.0e-05|2.0e+00|7.3e-↙
10|
------------------------------------------------------------------
 number of iterations   = 30
 primal objective value = -5.15582660e+01
 dual   objective value = -5.15620493e+01
 gap := trace(XZ)       = 4.21e-03
 relative gap           = 8.00e-05
 actual relative gap    = 3.63e-05
 rel. primal infeas     = 1.45e-06
 rel. dual   infeas     = 6.44e-07
 norm(X), norm(y), norm(Z) = 4.7e+01, 5.2e+01, 2.0e+01
 norm(A), norm(b), norm(C) = 7.4e+03, 3.9e+01, 7.6e+01
 Total CPU time (secs)  = 0.73
 CPU time per iteration = 0.02
 termination code       = -7
 DIMACS errors: 1.5e-06  0.0e+00  6.4e-07  0.0e+00  3.6e-05  4.0e-05
------------------------------------------------------------------

ans =

   51.5619


 num. of constraints = 85
 dim. of socp   var  = 86,   num. of socp blk  =  1
 dim. of linear var  = 800
 dim. of free   var  =  5
```

```
 *** convert ublk to linear blk
******************************************************************************↙
********
   SDPT3: homogeneous self-dual path-following algorithms
******************************************************************************↙
********
 version  predcorr  gam  expon
   HKM      1      0.000   1
it pstep dstep pinfeas dinfeas  gap     mean(obj)    cputime    kap   tau    theta
------------------------------------------------------------------------------↙
--------
 0|0.000|0.000|2.2e+00|1.3e+03|9.1e+09| 8.988156e+06| 0:0:00|9.1e+09|1.0e+00|1.↙
0e+00| chol 1  1
 1|0.000|0.000|2.2e+00|1.3e+03|9.1e+09| 8.988324e+06| 0:0:00|9.1e+09|1.0e+00|1.↙
0e+00| chol 1  1
 2|0.000|0.000|2.2e+00|1.3e+03|9.1e+09| 8.989411e+06| 0:0:00|9.1e+09|1.0e+00|1.↙
0e+00| chol 1  1
 3|0.001|0.001|2.2e+00|1.3e+03|9.1e+09| 8.992723e+06| 0:0:00|9.1e+09|1.0e+00|1.↙
0e+00| chol 1  1
 4|0.009|0.009|2.2e+00|1.3e+03|9.0e+09| 9.003133e+06| 0:0:00|9.0e+09|1.0e+00|9.9e-↙
01| chol 1  1
 5|0.131|0.131|1.9e+00|1.1e+03|7.9e+09| 9.018753e+06| 0:0:00|7.8e+09|1.0e+00|8.6e-↙
01| chol 1  1
 6|0.404|0.404|1.2e+00|6.8e+02|4.7e+09| 9.023541e+06| 0:0:00|4.7e+09|1.0e+00|5.2e-↙
01| chol 1  1
 7|0.751|0.751|2.9e-01|1.7e+02|1.2e+09| 8.935964e+06| 0:0:00|1.2e+09|1.0e+00|1.3e-↙
01| chol 2  2
 8|0.417|0.417|1.7e-01|1.0e+02|7.1e+08| 8.877219e+06| 0:0:00|6.7e+08|1.0e+00|7.8e-↙
02| chol 2  4
 9|0.255|0.255|1.4e-01|8.0e+01|5.9e+08| 9.178033e+06| 0:0:00|5.1e+08|9.9e-01|6.0e-↙
02| chol 3  3
10|0.661|0.661|5.1e-02|3.0e+01|2.3e+08| 9.000937e+06| 0:0:00|1.7e+08|9.9e-01|2.3e-↙
02| chol 3  3
11|0.546|0.546|2.8e-02|1.7e+01|1.4e+08| 8.965727e+06| 0:0:00|7.9e+07|9.9e-01|1.3e-↙
02| chol 3  3
12|0.799|0.799|6.9e-03|4.1e+00|3.3e+07| 6.152713e+06| 0:0:00|2.7e+06|1.2e+00|3.6e-↙
03| chol 3  3
13|0.413|0.413|5.0e-03|2.9e+00|2.4e+07| 5.411707e+06| 0:0:00|1.5e+06|1.2e+00|2.7e-↙
03| chol 3  3
14|0.793|0.793|2.1e-03|1.2e+00|1.0e+07| 3.182864e+06| 0:0:00|9.1e+04|1.4e+00|1.3e-↙
03| chol 4  3
15|0.702|0.702|1.2e-03|7.3e-01|6.2e+06| 2.166723e+06| 0:0:00|3.2e+04|1.5e+00|8.4e-↙
04| chol 3  4
16|1.000|1.000|7.0e-04|4.1e-01|3.6e+06| 1.350703e+06| 0:0:00|8.7e+03|1.6e+00|5.0e-↙
04| chol 4  3
17|1.000|1.000|3.8e-04|2.0e-01|1.7e+06| 6.273465e+05| 0:0:00|6.0e+03|1.7e+00|2.6e-↙
04| chol 4  3
18|1.000|1.000|3.4e-04|1.0e-01|8.3e+05| 2.846182e+05| 0:0:00|3.0e+03|1.7e+00|1.3e-↙
04| chol 4  4
19|1.000|1.000|3.9e-04|3.7e-02|2.7e+05| 7.796067e+04| 0:0:00|1.5e+03|1.7e+00|4.8e-↙
05| chol 3  3
20|0.645|0.645|3.5e-04|2.0e-02|1.3e+05| 4.141659e+04| 0:0:00|8.2e+02|1.8e+00|2.6e-↙
05| chol 3  3
21|0.401|0.401|2.2e-04|1.7e-02|1.1e+05| 2.930438e+04| 0:0:00|5.6e+02|1.8e+00|2.3e-↙
```

```
05| chol 3  3
22|1.000|1.000|1.8e-04|1.0e-02|7.0e+04| 2.246173e+04| 0:0:00|2.3e+02|1.8e+00|1.4e-↙
05| chol 4  3
23|0.872|0.872|1.1e-04|5.7e-03|3.7e+04| 9.655773e+03| 0:0:00|1.5e+02|1.9e+00|8.2e-↙
06| chol 3  3
24|1.000|1.000|1.1e-04|3.2e-03|2.0e+04| 5.695395e+03| 0:0:00|7.7e+01|1.9e+00|4.6e-↙
06| chol 3  3
25|1.000|1.000|6.8e-05|1.3e-03|7.7e+03| 2.146501e+03| 0:0:00|4.1e+01|1.9e+00|2.0e-↙
06| chol 3  3
26|1.000|1.000|5.6e-05|5.8e-04|3.0e+03| 8.473519e+02| 0:0:00|1.6e+01|1.9e+00|8.7e-↙
07| chol 2  4
27|1.000|1.000|4.3e-05|2.7e-04|1.1e+03| 3.071039e+02| 0:0:00|6.4e+00|2.0e+00|4.1e-↙
07| chol 3  2
28|1.000|1.000|3.7e-05|1.5e-04|4.6e+02| 1.294824e+02| 0:0:00|2.4e+00|2.0e+00|2.3e-↙
07| chol 2  3
29|1.000|1.000|3.1e-05|8.8e-05|1.7e+02| 3.795980e+01| 0:0:00|1.0e+00|2.0e+00|1.3e-↙
07| chol 2  2
30|1.000|1.000|2.8e-05|5.8e-05|7.0e+01| 1.226066e+01| 0:0:00|3.8e-01|2.0e+00|8.6e-↙
08| chol 2  2
31|1.000|1.000|2.4e-05|4.2e-05|3.0e+01|-5.755056e+00| 0:0:00|1.5e-01|2.0e+00|6.0e-↙
08| chol 2  2
32|0.968|0.968|2.2e-05|3.3e-05|1.6e+01|-4.896240e+00| 0:0:00|7.0e-02|2.0e+00|4.8e-↙
08| chol 2  2
33|0.605|0.605|2.0e-05|2.8e-05|1.3e+01|-1.412076e+01| 0:0:01|4.9e-02|2.0e+00|4.0e-↙
08| chol 2  2
34|0.890|0.890|1.9e-05|2.4e-05|8.2e+00|-8.924750e+00| 0:0:01|3.0e-02|2.0e+00|3.4e-↙
08| chol 2  2
35|0.782|0.782|1.8e-05|2.1e-05|5.4e+00|-1.310287e+01| 0:0:01|2.1e-02|2.0e+00|2.9e-↙
08| chol 2  2
36|0.921|0.921|1.7e-05|1.8e-05|3.2e+00|-1.134139e+01| 0:0:01|1.3e-02|2.0e+00|2.6e-↙
08| chol 2  2
37|0.723|0.723|1.7e-05|1.7e-05|2.2e+00|-1.340161e+01| 0:0:01|8.6e-03|2.0e+00|2.4e-↙
08| chol 2  2
38|0.106|0.106|1.7e-05|1.7e-05|2.6e+00|-1.290176e+01| 0:0:01|8.2e-03|2.0e+00|2.4e-↙
08| chol 2  2
39|0.199|0.199|1.8e-05|1.7e-05|3.2e+00|-1.315499e+01| 0:0:01|7.8e-03|2.0e+00|2.4e-↙
08| chol 2  2
40|0.357|0.357|1.9e-05|1.6e-05|3.5e+00|-1.364497e+01| 0:0:01|7.5e-03|2.0e+00|2.4e-↙
08| chol 2  2
41|0.598|0.598|2.0e-05|1.6e-05|2.9e+00|-1.424373e+01| 0:0:01|7.6e-03|2.0e+00|2.4e-↙
08| chol 2  2
42|0.337|0.337|2.0e-05|1.6e-05|2.8e+00|-1.443755e+01| 0:0:01|7.2e-03|2.0e+00|2.4e-↙
08| chol 2  2
43|0.173|0.173|2.0e-05|1.6e-05|3.0e+00|-1.447291e+01| 0:0:01|7.1e-03|2.0e+00|2.4e-↙
08| chol 3  3
44|0.379|0.379|2.1e-05|1.6e-05|3.0e+00|-1.460772e+01| 0:0:01|6.9e-03|2.0e+00|2.4e-↙
08| chol 2  2
45|0.519|0.519|2.0e-05|1.5e-05|2.6e+00|-1.455765e+01| 0:0:01|6.8e-03|2.0e+00|2.3e-↙
08| chol 2  2
46|0.370|0.370|2.0e-05|1.5e-05|2.5e+00|-1.449931e+01| 0:0:01|6.4e-03|2.0e+00|2.3e-↙
08| chol 4  3
47|0.316|0.316|2.1e-05|1.5e-05|2.5e+00|-1.446905e+01| 0:0:01|6.2e-03|2.0e+00|2.3e-↙
08| chol 3  3
48|0.484|0.484|2.1e-05|1.5e-05|2.3e+00|-1.443176e+01| 0:0:01|5.9e-03|2.0e+00|2.3e-↙
```

```
08| chol 3  3
49|0.328|0.328|2.2e-05|1.5e-05|2.2e+00|-1.446463e+01| 0:0:01|5.6e-03|2.0e+00|2.3e-↙
08| chol 3  3
50|0.183|0.183|2.2e-05|1.5e-05|2.3e+00|-1.444362e+01| 0:0:01|5.5e-03|2.0e+00|2.3e-↙
08|
  Stop: maximum number of iterations reached
-------------------------------------------------------------------
 number of iterations   = 50
 primal objective value =  3.89970777e+01
 dual   objective value = -6.78843123e+01
 gap := trace(XZ)       = 2.29e+00
 relative gap           = 4.21e-02
 actual relative gap    = 9.91e-01
 rel. primal infeas     = 2.19e-05
 rel. dual   infeas     = 1.54e-05
 norm(X), norm(y), norm(Z) = 3.0e+05, 1.6e+02, 1.3e+02
 norm(A), norm(b), norm(C) = 1.5e+05, 2.1e+05, 7.6e+01
 Total CPU time (secs)  = 0.75
 CPU time per iteration = 0.01
 termination code       = -6
 DIMACS errors: 2.2e-05  0.0e+00  1.5e-05  0.0e+00  9.9e-01  2.1e-02
-------------------------------------------------------------------

ans =

   67.9055

Iteration   2   Total error is: 0.017628

 num. of constraints = 85
 dim. of socp   var  = 86,   num. of socp blk  =  1
 dim. of linear var  = 800
 dim. of free   var  =  5
 *** convert ublk to linear blk
******************************************************************************↙
********
   SDPT3: homogeneous self-dual path-following algorithms
******************************************************************************↙
********
 version  predcorr  gam  expon
   HKM      1      0.000   1
it pstep dstep pinfeas dinfeas  gap     mean(obj)    cputime    kap   tau    theta
------------------------------------------------------------------------------↙
--------
 0|0.000|0.000|2.2e+00|1.4e+03|9.6e+09| 9.496371e+06| 0:0:00|9.6e+09|1.0e+00|1.↙
0e+00| chol 1  1
 1|0.000|0.000|2.2e+00|1.4e+03|9.6e+09| 9.496547e+06| 0:0:00|9.6e+09|1.0e+00|1.↙
0e+00| chol 1  1
 2|0.000|0.000|2.2e+00|1.4e+03|9.6e+09| 9.497690e+06| 0:0:00|9.6e+09|1.0e+00|1.↙
0e+00| chol 1  1
 3|0.001|0.001|2.2e+00|1.4e+03|9.6e+09| 9.501168e+06| 0:0:00|9.6e+09|1.0e+00|1.↙
0e+00| chol 1  1
 4|0.009|0.009|2.2e+00|1.4e+03|9.5e+09| 9.512109e+06| 0:0:00|9.5e+09|1.0e+00|9.9e-↙
01| chol 1  1
```

```
 5|0.129|0.129|1.9e+00|1.2e+03|8.3e+09| 9.528583e+06| 0:0:00|8.3e+09|1.0e+00|8.6e-↙
01| chol 1  2
 6|0.399|0.399|1.1e+00|7.5e+02|5.1e+09| 9.534257e+06| 0:0:00|5.0e+09|1.0e+00|5.2e-↙
01| chol 1  2
 7|0.746|0.746|2.9e-01|1.9e+02|1.3e+09| 9.444953e+06| 0:0:00|1.3e+09|1.0e+00|1.3e-↙
01| chol 2  2
 8|0.434|0.434|1.7e-01|1.1e+02|7.5e+08| 9.375148e+06| 0:0:00|7.1e+08|1.0e+00|7.8e-↙
02| chol 2  3
 9|0.254|0.254|1.3e-01|8.8e+01|6.2e+08| 9.689789e+06| 0:0:00|5.4e+08|9.9e-01|6.1e-↙
02| chol 5  3
10|0.657|0.657|5.1e-02|3.3e+01|2.5e+08| 9.513048e+06| 0:0:00|1.8e+08|9.9e-01|2.3e-↙
02| chol 3  3
11|0.541|0.541|2.8e-02|1.9e+01|1.5e+08| 9.521293e+06| 0:0:00|8.6e+07|9.9e-01|1.3e-↙
02| chol 3  3
12|0.789|0.789|6.7e-03|4.4e+00|3.4e+07| 6.392519e+06| 0:0:00|2.8e+06|1.2e+00|3.6e-↙
03| chol 3  6
13|0.422|0.422|4.8e-03|3.1e+00|2.5e+07| 5.577934e+06| 0:0:00|1.5e+06|1.2e+00|2.7e-↙
03| chol 3  4
14|0.791|0.791|2.0e-03|1.3e+00|1.0e+07| 3.211029e+06| 0:0:00|8.9e+04|1.4e+00|1.3e-↙
03| chol 3  4
15|0.689|0.689|1.2e-03|7.8e-01|6.3e+06| 2.221132e+06| 0:0:00|3.3e+04|1.5e+00|8.2e-↙
04| chol 4  3
16|1.000|1.000|6.8e-04|4.4e-01|3.7e+06| 1.386241e+06| 0:0:00|8.9e+03|1.6e+00|4.9e-↙
04| chol 4  4
17|1.000|1.000|3.5e-04|2.2e-01|1.7e+06| 6.497301e+05| 0:0:00|6.1e+03|1.7e+00|2.5e-↙
04| chol 4  4
18|1.000|1.000|3.3e-04|1.0e-01|7.7e+05| 2.740991e+05| 0:0:00|3.1e+03|1.7e+00|1.2e-↙
04| chol 3  4
19|1.000|1.000|3.4e-04|4.3e-02|3.1e+05| 9.562256e+04| 0:0:00|1.4e+03|1.7e+00|5.2e-↙
05| chol 4  4
20|0.896|0.896|3.6e-04|1.9e-02|1.2e+05| 3.687031e+04| 0:0:00|6.3e+02|1.8e+00|2.3e-↙
05| chol 3  3
21|0.400|0.400|2.2e-04|1.6e-02|1.0e+05| 2.684338e+04| 0:0:00|4.5e+02|1.8e+00|2.0e-↙
05| chol 4  3
22|0.977|0.977|1.5e-04|9.5e-03|6.0e+04| 1.989776e+04| 0:0:00|2.1e+02|1.8e+00|1.2e-↙
05| chol 3  5
23|0.780|0.780|8.5e-05|5.9e-03|3.7e+04| 9.738915e+03| 0:0:00|1.4e+02|1.9e+00|7.7e-↙
06| chol 3  3
24|1.000|1.000|7.7e-05|3.4e-03|2.1e+04| 6.339242e+03| 0:0:00|7.8e+01|1.9e+00|4.5e-↙
06| chol 3  3
25|1.000|1.000|5.7e-05|1.4e-03|8.1e+03| 2.211236e+03| 0:0:00|4.4e+01|1.9e+00|1.9e-↙
06| chol 3  3
26|1.000|1.000|5.0e-05|6.5e-04|3.3e+03| 9.797649e+02| 0:0:00|1.7e+01|1.9e+00|8.8e-↙
07| chol 3  2
27|0.980|0.980|4.0e-05|3.1e-04|1.3e+03| 3.424687e+02| 0:0:00|7.3e+00|2.0e+00|4.2e-↙
07| chol 3  3
28|1.000|1.000|3.6e-05|1.6e-04|4.6e+02| 1.383601e+02| 0:0:00|2.8e+00|2.0e+00|2.2e-↙
07| chol 2  2
29|1.000|1.000|3.0e-05|9.5e-05|1.9e+02| 3.957473e+01| 0:0:00|1.0e+00|2.0e+00|1.3e-↙
07| chol 2  2
30|1.000|1.000|2.7e-05|6.5e-05|7.6e+01| 1.767667e+01| 0:0:00|4.1e-01|2.0e+00|8.8e-↙
08| chol 2  2
31|0.948|0.948|2.3e-05|4.6e-05|3.6e+01|-5.198326e+00| 0:0:00|1.8e-01|2.0e+00|6.1e-↙
08| chol 2  2
```

```
32|0.956|0.956|2.1e-05|3.6e-05|2.0e+01|-1.058254e+00| 0:0:00|8.5e-02|2.0e+00|4.7e-↙
08| chol 2  2
33|0.445|0.445|1.8e-05|3.0e-05|1.8e+01|-1.429818e+01| 0:0:00|6.7e-02|2.0e+00|3.8e-↙
08| chol 2  2
34|0.912|0.912|1.7e-05|2.4e-05|1.2e+01|-4.546089e+00| 0:0:00|4.3e-02|2.0e+00|3.1e-↙
08| chol 3  2
35|0.592|0.592|1.5e-05|2.0e-05|9.6e+00|-1.325756e+01| 0:0:00|3.4e-02|2.0e+00|2.5e-↙
08| chol 2  2
36|0.932|0.932|1.4e-05|1.6e-05|6.2e+00|-7.889485e+00| 0:0:01|2.2e-02|2.0e+00|2.0e-↙
08| chol 2  2
37|0.513|0.513|1.2e-05|1.4e-05|5.3e+00|-1.314345e+01| 0:0:01|1.8e-02|2.0e+00|1.7e-↙
08| chol 2  2
38|0.882|0.882|1.2e-05|1.2e-05|3.6e+00|-9.878306e+00| 0:0:01|1.2e-02|2.0e+00|1.4e-↙
08| chol 4  2
39|0.776|0.776|1.1e-05|1.0e-05|2.3e+00|-1.197757e+01| 0:0:01|9.0e-03|2.0e+00|1.2e-↙
08| chol 2  2
40|0.908|0.908|1.1e-05|9.0e-06|1.3e+00|-1.119180e+01| 0:0:01|5.5e-03|2.0e+00|1.1e-↙
08| chol 2  2
41|0.797|0.797|1.0e-05|8.2e-06|7.9e-01|-1.192308e+01| 0:0:01|3.5e-03|2.0e+00|1.0e-↙
08| chol 2  2
42|0.087|0.087|1.1e-05|8.3e-06|1.0e+00|-1.173340e+01| 0:0:01|3.3e-03|2.0e+00|1.0e-↙
08| chol 2  2
43|0.148|0.148|1.1e-05|8.1e-06|1.3e+00|-1.200625e+01| 0:0:01|3.2e-03|2.0e+00|1.0e-↙
08| chol 2  2
44|0.373|0.373|1.2e-05|7.7e-06|1.5e+00|-1.239786e+01| 0:0:01|3.1e-03|2.0e+00|1.0e-↙
08| chol 2  2
45|0.652|0.652|1.3e-05|7.3e-06|1.4e+00|-1.277075e+01| 0:0:01|3.3e-03|2.0e+00|9.9e-↙
09| chol 2  2
46|0.573|0.573|1.3e-05|7.3e-06|1.1e+00|-1.300058e+01| 0:0:01|3.2e-03|2.0e+00|9.9e-↙
09| chol 3  2
47|0.136|0.136|1.3e-05|7.3e-06|1.2e+00|-1.300988e+01| 0:0:01|3.1e-03|2.0e+00|9.9e-↙
09| chol 2  3
48|0.192|0.192|1.3e-05|7.3e-06|1.2e+00|-1.301815e+01| 0:0:01|3.0e-03|2.0e+00|9.9e-↙
09| chol 2  2
49|0.623|0.623|1.3e-05|7.2e-06|8.2e-01|-1.314243e+01| 0:0:01|2.8e-03|2.0e+00|9.8e-↙
09| chol 2  2
50|0.452|0.452|1.2e-05|7.1e-06|7.0e-01|-1.318327e+01| 0:0:01|2.4e-03|2.0e+00|9.8e-↙
09|
  Stop: maximum number of iterations reached
-----------------------------------------------------------------
 number of iterations   = 50
 primal objective value =  1.05219077e+01
 dual   objective value = -3.68884449e+01
 gap := trace(XZ)       = 6.99e-01
 relative gap           = 2.83e-02
 actual relative gap    = 9.79e-01
 rel. primal infeas     = 1.25e-05
 rel. dual   infeas     = 7.12e-06
 norm(X), norm(y), norm(Z) = 1.0e+05, 1.2e+02, 9.1e+01
 norm(A), norm(b), norm(C) = 1.6e+05, 2.3e+05, 7.6e+01
 Total CPU time (secs)  = 0.72
 CPU time per iteration = 0.01
 termination code       = -6
 DIMACS errors: 1.2e-05  0.0e+00  7.1e-06  0.0e+00  9.8e-01  1.4e-02
```

```
------------------------------------------------------------------

ans =

   36.8904

Iteration   3   Total error is: 0.015485

 num. of constraints = 85
 dim. of socp   var  = 86,   num. of socp blk  =  1
 dim. of linear var  = 800
 dim. of free   var  =  5
 *** convert ublk to linear blk
******************************************************************************↙
********
   SDPT3: homogeneous self-dual path-following algorithms
******************************************************************************↙
********
 version  predcorr  gam  expon
   HKM      1      0.000   1
it pstep dstep pinfeas dinfeas  gap     mean(obj)    cputime    kap    tau    theta
------------------------------------------------------------------------------↙
--------
 0|0.000|0.000|2.1e+00|1.5e+03|9.8e+09| 9.731754e+06| 0:0:00|9.8e+09|1.0e+00|1.↙
0e+00| chol 1  1
 1|0.000|0.000|2.1e+00|1.5e+03|9.8e+09| 9.731933e+06| 0:0:00|9.8e+09|1.0e+00|1.↙
0e+00| chol 1  1
 2|0.000|0.000|2.1e+00|1.5e+03|9.8e+09| 9.733108e+06| 0:0:00|9.8e+09|1.0e+00|1.↙
0e+00| chol 1  1
 3|0.001|0.001|2.1e+00|1.5e+03|9.8e+09| 9.736672e+06| 0:0:00|9.8e+09|1.0e+00|1.↙
0e+00| chol 1  1
 4|0.009|0.009|2.1e+00|1.4e+03|9.8e+09| 9.747910e+06| 0:0:00|9.7e+09|1.0e+00|9.9e-↙
01| chol 1  1
 5|0.128|0.128|1.9e+00|1.3e+03|8.6e+09| 9.764990e+06| 0:0:00|8.5e+09|1.0e+00|8.7e-↙
01| chol 1  2
 6|0.397|0.397|1.1e+00|7.7e+02|5.2e+09| 9.771465e+06| 0:0:00|5.1e+09|1.0e+00|5.3e-↙
01| chol 1  1
 7|0.743|0.743|2.9e-01|2.0e+02|1.4e+09| 9.681612e+06| 0:0:00|1.3e+09|1.0e+00|1.4e-↙
01| chol 2  2
 8|0.442|0.442|1.7e-01|1.1e+02|7.7e+08| 9.606221e+06| 0:0:00|7.3e+08|1.0e+00|7.8e-↙
02| chol 2  3
 9|0.252|0.252|1.3e-01|9.0e+01|6.4e+08| 9.930491e+06| 0:0:00|5.6e+08|9.9e-01|6.1e-↙
02| chol 2  3
10|0.654|0.654|5.0e-02|3.4e+01|2.5e+08| 9.759255e+06| 0:0:00|1.9e+08|9.9e-01|2.3e-↙
02| chol 4  4
11|0.549|0.549|2.8e-02|1.9e+01|1.5e+08| 9.729909e+06| 0:0:00|8.7e+07|9.9e-01|1.3e-↙
02| chol 3  3
12|0.790|0.790|6.6e-03|4.5e+00|3.5e+07| 6.539541e+06| 0:0:00|2.8e+06|1.2e+00|3.6e-↙
03| chol 5  2
13|0.462|0.462|4.5e-03|3.0e+00|2.4e+07| 5.563313e+06| 0:0:00|1.4e+06|1.2e+00|2.5e-↙
03| chol 4  4
14|0.793|0.793|1.8e-03|1.3e+00|9.8e+06| 3.178782e+06| 0:0:00|8.3e+04|1.4e+00|1.2e-↙
03| chol 4  3
15|0.703|0.703|1.1e-03|7.5e-01|6.1e+06| 2.183672e+06| 0:0:00|3.0e+04|1.5e+00|7.9e-↙
```

```
04| chol 3  4
16|1.000|1.000|6.3e-04|4.3e-01|3.6e+06| 1.365317e+06| 0:0:00|8.9e+03|1.6e+00|4.7e-↙
04| chol 4  4
17|1.000|1.000|3.3e-04|2.0e-01|1.6e+06| 6.082099e+05| 0:0:00|6.0e+03|1.7e+00|2.3e-↙
04| chol 4  4
18|1.000|1.000|2.8e-04|1.0e-01|7.6e+05| 2.720723e+05| 0:0:00|2.9e+03|1.7e+00|1.2e-↙
04| chol 3  6
19|1.000|1.000|3.3e-04|4.0e-02|2.8e+05| 8.867345e+04| 0:0:00|1.4e+03|1.7e+00|4.7e-↙
05| chol 3  4
20|0.834|0.834|3.1e-04|1.9e-02|1.2e+05| 3.935366e+04| 0:0:00|6.5e+02|1.8e+00|2.3e-↙
05| chol 3  5
21|0.422|0.422|2.0e-04|1.6e-02|1.0e+05| 2.908957e+04| 0:0:00|4.6e+02|1.8e+00|2.0e-↙
05| chol 3  3
22|1.000|1.000|1.5e-04|9.7e-03|6.2e+04| 2.055127e+04| 0:0:00|2.1e+02|1.8e+00|1.2e-↙
05| chol 3  3
23|0.766|0.766|7.9e-05|6.1e-03|3.9e+04| 1.029787e+04| 0:0:00|1.4e+02|1.9e+00|7.9e-↙
06| chol 3  3
24|1.000|1.000|7.6e-05|3.6e-03|2.2e+04| 6.688943e+03| 0:0:00|8.1e+01|1.9e+00|4.6e-↙
06| chol 3  3
25|1.000|1.000|5.1e-05|1.5e-03|8.5e+03| 2.328822e+03| 0:0:00|4.6e+01|1.9e+00|1.9e-↙
06| chol 3  3
26|1.000|1.000|4.5e-05|6.9e-04|3.5e+03| 1.058838e+03| 0:0:00|1.8e+01|1.9e+00|9.1e-↙
07| chol 2  2
27|1.000|1.000|3.5e-05|3.1e-04|1.3e+03| 3.530552e+02| 0:0:00|7.6e+00|2.0e+00|4.2e-↙
07| chol 2  2
28|1.000|1.000|3.0e-05|1.6e-04|5.2e+02| 1.578644e+02| 0:0:00|2.9e+00|2.0e+00|2.2e-↙
07| chol 2  2
29|1.000|1.000|2.5e-05|9.1e-05|2.0e+02| 4.407816e+01| 0:0:00|1.1e+00|2.0e+00|1.2e-↙
07| chol 2  3
30|1.000|1.000|2.2e-05|5.9e-05|8.5e+01| 2.225473e+01| 0:0:00|4.5e-01|2.0e+00|7.7e-↙
08| chol 2  2
31|0.922|0.922|1.8e-05|4.0e-05|4.3e+01|-3.702487e+00| 0:0:00|2.1e-01|2.0e+00|5.2e-↙
08| chol 2  2
32|1.000|1.000|1.7e-05|3.0e-05|2.1e+01|-1.586632e-01| 0:0:00|9.5e-02|2.0e+00|3.9e-↙
08| chol 2  2
33|0.644|0.644|1.4e-05|2.5e-05|1.6e+01|-1.089742e+01| 0:0:00|6.5e-02|2.0e+00|3.0e-↙
08| chol 2  2
34|0.943|0.943|1.4e-05|2.0e-05|9.7e+00|-5.201007e+00| 0:0:00|3.7e-02|2.0e+00|2.4e-↙
08| chol 2  2
35|0.464|0.464|1.1e-05|1.7e-05|8.5e+00|-1.247996e+01| 0:0:00|3.0e-02|2.0e+00|2.0e-↙
08| chol 2  2
36|0.928|0.928|1.1e-05|1.4e-05|5.7e+00|-7.379030e+00| 0:0:00|2.0e-02|2.0e+00|1.6e-↙
08| chol 2  2
37|0.566|0.566|9.6e-06|1.2e-05|4.5e+00|-1.183522e+01| 0:0:00|1.6e-02|2.0e+00|1.3e-↙
08| chol 2  2
38|0.881|0.881|9.5e-06|9.9e-06|3.0e+00|-9.265826e+00| 0:0:00|1.1e-02|2.0e+00|1.1e-↙
08| chol 2  3
39|0.781|0.781|8.5e-06|8.6e-06|1.9e+00|-1.103426e+01| 0:0:01|7.6e-03|2.0e+00|9.3e-↙
09| chol 2  2
40|0.911|0.911|8.2e-06|7.4e-06|1.1e+00|-1.033818e+01| 0:0:01|4.5e-03|2.0e+00|8.2e-↙
09| chol 2  3
41|0.520|0.520|7.7e-06|6.9e-06|9.8e-01|-1.128670e+01| 0:0:01|3.5e-03|2.0e+00|7.4e-↙
09| chol 3  2
42|0.121|0.121|8.1e-06|6.9e-06|1.2e+00|-1.104059e+01| 0:0:01|3.3e-03|2.0e+00|7.5e-↙
```

```
09| chol 2  2
43|0.213|0.213|8.5e-06|6.5e-06|1.5e+00|-1.112037e+01| 0:0:01|3.2e-03|2.0e+00|7.4e-↙
09| chol 2  2
44|0.418|0.418|9.0e-06|5.9e-06|1.6e+00|-1.145980e+01| 0:0:01|3.2e-03|2.0e+00|7.3e-↙
09| chol 2  2
45|0.601|0.601|9.6e-06|5.5e-06|1.4e+00|-1.186879e+01| 0:0:01|3.4e-03|2.0e+00|7.2e-↙
09| chol 2  2
46|0.682|0.682|9.9e-06|5.4e-06|1.1e+00|-1.210488e+01| 0:0:01|3.2e-03|2.0e+00|7.2e-↙
09| chol 3  2
47|0.206|0.206|9.9e-06|5.4e-06|1.1e+00|-1.213041e+01| 0:0:01|3.0e-03|2.0e+00|7.2e-↙
09| chol 2  2
48|0.338|0.338|9.9e-06|5.4e-06|1.2e+00|-1.214734e+01| 0:0:01|2.9e-03|2.0e+00|7.2e-↙
09| chol 2  2
49|0.799|0.799|9.4e-06|5.3e-06|6.7e-01|-1.229795e+01| 0:0:01|2.6e-03|2.0e+00|7.1e-↙
09| chol 2  2
50|0.493|0.493|9.3e-06|5.2e-06|5.6e-01|-1.233557e+01| 0:0:01|2.1e-03|2.0e+00|7.1e-↙
09|
  Stop: maximum number of iterations reached
-------------------------------------------------------------------
 number of iterations   = 50
 primal objective value =  5.26193050e+00
 dual   objective value = -2.99330750e+01
 gap := trace(XZ)       = 5.63e-01
 relative gap           = 3.03e-02
 actual relative gap    = 9.72e-01
 rel. primal infeas     = 9.29e-06
 rel. dual   infeas     = 5.24e-06
 norm(X), norm(y), norm(Z) = 9.6e+04, 1.2e+02, 8.4e+01
 norm(A), norm(b), norm(C) = 1.7e+05, 2.5e+05, 7.6e+01
 Total CPU time (secs)  = 0.67
 CPU time per iteration = 0.01
 termination code       = -6
 DIMACS errors: 9.3e-06  0.0e+00  5.2e-06  0.0e+00  9.7e-01  1.6e-02
-------------------------------------------------------------------

ans =

   29.9341

Iteration   4   Total error is: 0.014827

 num. of constraints = 85
 dim. of socp   var  = 86,   num. of socp blk  =  1
 dim. of linear var  = 800
 dim. of free   var  =  5
 *** convert ublk to linear blk
*****************************************************************************↙
********
   SDPT3: homogeneous self-dual path-following algorithms
*****************************************************************************↙
********
 version  predcorr  gam  expon
   HKM      1      0.000   1
it pstep dstep pinfeas dinfeas  gap     mean(obj)    cputime    kap   tau    theta
```

```
--------------------------------------------------------------------------------↙
--------
 0|0.000|0.000|2.1e+00|1.5e+03|9.8e+09| 9.649371e+06| 0:0:00|9.8e+09|1.0e+00|1.↙
0e+00| chol 1  1
 1|0.000|0.000|2.1e+00|1.5e+03|9.8e+09| 9.649546e+06| 0:0:00|9.8e+09|1.0e+00|1.↙
0e+00| chol 1  1
 2|0.000|0.000|2.1e+00|1.5e+03|9.8e+09| 9.650715e+06| 0:0:00|9.8e+09|1.0e+00|1.↙
0e+00| chol 1  1
 3|0.001|0.001|2.1e+00|1.5e+03|9.8e+09| 9.654246e+06| 0:0:00|9.7e+09|1.0e+00|1.↙
0e+00| chol 1  1
 4|0.009|0.009|2.1e+00|1.5e+03|9.7e+09| 9.665405e+06| 0:0:00|9.7e+09|1.0e+00|9.9e-↙
01| chol 1  1
 5|0.127|0.127|1.8e+00|1.3e+03|8.5e+09| 9.682464e+06| 0:0:00|8.4e+09|1.0e+00|8.7e-↙
01| chol 1  2
 6|0.395|0.395|1.1e+00|7.7e+02|5.2e+09| 9.689302e+06| 0:0:00|5.1e+09|1.0e+00|5.3e-↙
01| chol 1  2
 7|0.743|0.743|2.9e-01|2.0e+02|1.4e+09| 9.600816e+06| 0:0:00|1.3e+09|1.0e+00|1.4e-↙
01| chol 2  2
 8|0.447|0.447|1.6e-01|1.1e+02|7.6e+08| 9.523891e+06| 0:0:00|7.2e+08|1.0e+00|7.8e-↙
02| chol 2  3
 9|0.252|0.252|1.3e-01|9.0e+01|6.3e+08| 9.844733e+06| 0:0:00|5.5e+08|9.9e-01|6.1e-↙
02| chol 3  5
10|0.655|0.655|5.0e-02|3.4e+01|2.5e+08| 9.668719e+06| 0:0:00|1.9e+08|9.9e-01|2.3e-↙
02| chol 3  3
11|0.546|0.546|2.7e-02|1.9e+01|1.5e+08| 9.644922e+06| 0:0:00|8.6e+07|9.9e-01|1.3e-↙
02| chol 3  4
12|0.789|0.789|6.5e-03|4.5e+00|3.4e+07| 6.463535e+06| 0:0:00|2.8e+06|1.2e+00|3.6e-↙
03| chol 3  5
13|0.464|0.464|4.4e-03|3.0e+00|2.4e+07| 5.488176e+06| 0:0:00|1.4e+06|1.2e+00|2.5e-↙
03| chol 4  4
14|0.793|0.793|1.8e-03|1.2e+00|9.7e+06| 3.128886e+06| 0:0:00|8.1e+04|1.4e+00|1.2e-↙
03| chol 3  4
15|0.704|0.704|1.1e-03|7.5e-01|6.0e+06| 2.150352e+06| 0:0:00|3.0e+04|1.5e+00|7.8e-↙
04| chol 3  3
16|1.000|1.000|6.4e-04|4.3e-01|3.5e+06| 1.344146e+06| 0:0:00|8.8e+03|1.6e+00|4.7e-↙
04| chol 3  4
17|1.000|1.000|3.2e-04|2.0e-01|1.6e+06| 6.017856e+05| 0:0:00|5.9e+03|1.7e+00|2.3e-↙
04| chol 4  4
18|1.000|1.000|2.9e-04|1.0e-01|7.5e+05| 2.691165e+05| 0:0:00|2.9e+03|1.7e+00|1.2e-↙
04| chol 4  4
19|1.000|1.000|3.4e-04|3.5e-02|2.4e+05| 7.496004e+04| 0:0:00|1.4e+03|1.7e+00|4.1e-↙
05| chol 3  3
20|0.731|0.731|3.0e-04|2.1e-02|1.3e+05| 4.444313e+04| 0:0:00|6.6e+02|1.8e+00|2.5e-↙
05| chol 3  3
21|0.737|0.737|1.7e-04|1.5e-02|9.6e+04| 2.974957e+04| 0:0:00|3.5e+02|1.8e+00|1.9e-↙
05| chol 3  3
22|1.000|1.000|1.1e-04|8.5e-03|5.5e+04| 1.806405e+04| 0:0:00|1.9e+02|1.9e+00|1.1e-↙
05| chol 3  3
23|1.000|1.000|7.6e-05|4.0e-03|2.5e+04| 7.474691e+03| 0:0:00|1.1e+02|1.9e+00|5.2e-↙
06| chol 3  3
24|1.000|1.000|5.6e-05|2.0e-03|1.2e+04| 3.704619e+03| 0:0:00|5.1e+01|1.9e+00|2.6e-↙
06| chol 3  2
25|1.000|1.000|4.2e-05|8.6e-04|4.7e+03| 1.307893e+03| 0:0:00|2.5e+01|1.9e+00|1.1e-↙
06| chol 4  2
```

```
26|1.000|1.000|3.7e-05|4.1e-04|1.9e+03| 6.015169e+02| 0:0:00|1.0e+01|2.0e+00|5.5e-↙
07| chol 2  2
27|1.000|1.000|3.0e-05|2.0e-04|7.5e+02| 1.923887e+02| 0:0:00|4.1e+00|2.0e+00|2.7e-↙
07| chol 2  2
28|1.000|1.000|2.6e-05|1.1e-04|3.0e+02| 9.204921e+01| 0:0:00|1.6e+00|2.0e+00|1.5e-↙
07| chol 2  2
29|1.000|1.000|2.1e-05|6.6e-05|1.2e+02| 2.016845e+01| 0:0:00|6.6e-01|2.0e+00|8.7e-↙
08| chol 2  2
30|1.000|1.000|1.9e-05|4.4e-05|5.5e+01| 1.294750e+01| 0:0:00|2.7e-01|2.0e+00|5.7e-↙
08| chol 2  2
31|0.758|0.758|1.5e-05|3.2e-05|3.6e+01|-7.630438e+00| 0:0:00|1.6e-01|2.0e+00|4.0e-↙
08| chol 2  2
32|0.966|0.966|1.4e-05|2.4e-05|2.0e+01|-3.670859e-01| 0:0:00|8.2e-02|2.0e+00|2.9e-↙
08| chol 2  2
33|0.551|0.551|1.1e-05|1.9e-05|1.6e+01|-1.126700e+01| 0:0:00|6.1e-02|2.0e+00|2.2e-↙
08| chol 2  2
34|0.946|0.946|1.1e-05|1.5e-05|1.0e+01|-4.943096e+00| 0:0:00|3.8e-02|2.0e+00|1.6e-↙
08| chol 2  2
35|0.546|0.546|8.5e-06|1.2e-05|8.2e+00|-1.128218e+01| 0:0:00|2.9e-02|2.0e+00|1.2e-↙
08| chol 2  2
36|0.970|0.970|8.2e-06|9.6e-06|5.0e+00|-7.668689e+00| 0:0:00|1.8e-02|2.0e+00|9.6e-↙
09| chol 2  2
37|0.535|0.535|6.7e-06|8.4e-06|4.0e+00|-1.108597e+01| 0:0:01|1.5e-02|2.0e+00|7.5e-↙
09| chol 2  2
38|0.970|0.970|6.5e-06|6.9e-06|2.5e+00|-9.075464e+00| 0:0:01|9.1e-03|2.0e+00|6.1e-↙
09| chol 2  2
39|0.484|0.484|5.5e-06|6.3e-06|2.1e+00|-1.102180e+01| 0:0:01|7.4e-03|2.0e+00|4.9e-↙
09| chol 2  2
40|0.867|0.867|5.5e-06|5.3e-06|1.4e+00|-9.928669e+00| 0:0:01|5.1e-03|2.0e+00|4.2e-↙
09| chol 2  2
41|0.838|0.838|4.9e-06|4.7e-06|7.8e-01|-1.061204e+01| 0:0:01|3.5e-03|2.0e+00|3.4e-↙
09| chol 2  2
42|0.814|0.814|4.8e-06|4.2e-06|4.9e-01|-1.056244e+01| 0:0:01|2.1e-03|2.0e+00|3.1e-↙
09| chol 2  2
43|0.077|0.077|5.0e-06|4.1e-06|6.5e-01|-1.076140e+01| 0:0:01|2.0e-03|2.0e+00|3.0e-↙
09| chol 2  2
44|0.146|0.146|5.4e-06|3.8e-06|9.1e-01|-1.095049e+01| 0:0:01|1.9e-03|2.0e+00|3.0e-↙
09| chol 2  2
45|0.334|0.334|5.9e-06|3.1e-06|1.1e+00|-1.131251e+01| 0:0:01|2.0e-03|2.0e+00|2.9e-↙
09| chol 2  2
46|0.540|0.540|6.7e-06|2.5e-06|1.1e+00|-1.167162e+01| 0:0:01|2.2e-03|2.0e+00|3.0e-↙
09| chol 2  3
47|0.642|0.642|7.2e-06|2.3e-06|9.4e-01|-1.191068e+01| 0:0:01|2.4e-03|2.0e+00|3.0e-↙
09| chol 2  2
48|0.786|0.786|7.1e-06|2.2e-06|6.1e-01|-1.207819e+01| 0:0:01|2.2e-03|2.0e+00|3.0e-↙
09| chol 2  2
49|0.360|0.360|6.9e-06|2.2e-06|5.9e-01|-1.209812e+01| 0:0:01|1.9e-03|2.0e+00|3.0e-↙
09| chol 2  2
50|0.230|0.230|6.8e-06|2.2e-06|5.9e-01|-1.210759e+01| 0:0:01|1.7e-03|2.0e+00|3.0e-↙
09|
  Stop: maximum number of iterations reached
-----------------------------------------------------------------
 number of iterations   = 50
 primal objective value = -4.72381083e+00
```

```
 dual   objective value = -1.94913745e+01
 gap := trace(XZ)       = 5.90e-01
 relative gap           = 4.50e-02
 actual relative gap    = 5.86e-01
 rel. primal infeas     = 6.85e-06
 rel. dual   infeas     = 2.25e-06
 norm(X), norm(y), norm(Z) = 1.2e+05, 1.0e+02, 7.0e+01
 norm(A), norm(b), norm(C) = 1.7e+05, 2.6e+05, 7.6e+01
 Total CPU time (secs)  = 0.68
 CPU time per iteration = 0.01
 termination code       = -6
 DIMACS errors: 6.8e-06  0.0e+00  2.2e-06  0.0e+00  5.9e-01  2.3e-02
------------------------------------------------------------------

ans =

   19.4849

Iteration   5   Total error is: 0.014428

 num. of constraints = 85
 dim. of socp   var  = 86,   num. of socp blk  =  1
 dim. of linear var  = 800
 dim. of free   var  =  5
 *** convert ublk to linear blk
******************************************************************************↙
********
   SDPT3: homogeneous self-dual path-following algorithms
******************************************************************************↙
********
 version  predcorr  gam  expon
   HKM      1      0.000   1
it pstep dstep pinfeas dinfeas  gap     mean(obj)    cputime    kap   tau    theta
------------------------------------------------------------------------------↙
--------
 0|0.000|0.000|2.1e+00|1.5e+03|9.7e+09| 9.600385e+06| 0:0:00|9.7e+09|1.0e+00|1.↙
0e+00| chol 1  1
 1|0.000|0.000|2.1e+00|1.5e+03|9.7e+09| 9.600559e+06| 0:0:00|9.7e+09|1.0e+00|1.↙
0e+00| chol 1  1
 2|0.000|0.000|2.1e+00|1.5e+03|9.7e+09| 9.601725e+06| 0:0:00|9.7e+09|1.0e+00|1.↙
0e+00| chol 1  1
 3|0.001|0.001|2.1e+00|1.5e+03|9.7e+09| 9.605243e+06| 0:0:00|9.7e+09|1.0e+00|1.↙
0e+00| chol 1  1
 4|0.009|0.009|2.1e+00|1.5e+03|9.6e+09| 9.616380e+06| 0:0:00|9.6e+09|1.0e+00|9.9e-↙
01| chol 1  1
 5|0.126|0.126|1.8e+00|1.3e+03|8.5e+09| 9.633530e+06| 0:0:00|8.4e+09|1.0e+00|8.7e-↙
01| chol 1  2
 6|0.394|0.394|1.1e+00|7.8e+02|5.2e+09| 9.640792e+06| 0:0:00|5.1e+09|1.0e+00|5.3e-↙
01| chol 1  1
 7|0.743|0.743|2.9e-01|2.0e+02|1.3e+09| 9.553299e+06| 0:0:00|1.3e+09|1.0e+00|1.4e-↙
01| chol 2  2
 8|0.450|0.450|1.6e-01|1.1e+02|7.6e+08| 9.475002e+06| 0:0:00|7.1e+08|1.0e+00|7.7e-↙
02| chol 2  3
 9|0.250|0.250|1.3e-01|9.0e+01|6.3e+08| 9.797267e+06| 0:0:00|5.5e+08|9.9e-01|6.1e-↙
```

```
02| chol 3  3
10|0.653|0.653|5.0e-02|3.4e+01|2.5e+08| 9.631382e+06| 0:0:00|1.9e+08|9.9e-01|2.3e-↙
02| chol 4  5
11|0.550|0.550|2.7e-02|1.9e+01|1.5e+08| 9.601158e+06| 0:0:00|8.6e+07|9.9e-01|1.3e-↙
02| chol 3  4
12|0.790|0.790|6.5e-03|4.5e+00|3.4e+07| 6.450149e+06| 0:0:00|2.8e+06|1.2e+00|3.6e-↙
03| chol 4  5
13|0.463|0.463|4.4e-03|3.0e+00|2.4e+07| 5.480900e+06| 0:0:00|1.4e+06|1.2e+00|2.5e-↙
03| chol 3  3
14|0.793|0.793|1.8e-03|1.3e+00|9.7e+06| 3.128101e+06| 0:0:00|8.2e+04|1.4e+00|1.2e-↙
03| chol 4  5
15|0.700|0.700|1.1e-03|7.6e-01|6.0e+06| 2.153449e+06| 0:0:00|3.0e+04|1.5e+00|7.9e-↙
04| chol 4  2
16|1.000|1.000|6.3e-04|4.3e-01|3.6e+06| 1.349473e+06| 0:0:00|8.8e+03|1.6e+00|4.7e-↙
04| chol 4  4
17|1.000|1.000|3.3e-04|2.1e-01|1.6e+06| 6.178836e+05| 0:0:00|6.0e+03|1.7e+00|2.4e-↙
04| chol 3  3
18|1.000|1.000|2.7e-04|1.0e-01|7.5e+05| 2.663891e+05| 0:0:00|3.0e+03|1.7e+00|1.2e-↙
04| chol 4  4
19|1.000|1.000|2.8e-04|3.5e-02|2.4e+05| 7.409132e+04| 0:0:00|1.4e+03|1.7e+00|4.1e-↙
05| chol 3  3
20|0.724|0.724|2.3e-04|2.1e-02|1.3e+05| 4.496253e+04| 0:0:00|6.6e+02|1.8e+00|2.5e-↙
05| chol 3  3
21|0.876|0.876|1.5e-04|1.3e-02|8.7e+04| 2.740326e+04| 0:0:00|3.0e+02|1.8e+00|1.7e-↙
05| chol 3  4
22|1.000|1.000|9.6e-05|7.9e-03|5.1e+04| 1.626492e+04| 0:0:00|1.7e+02|1.9e+00|1.0e-↙
05| chol 3  3
23|1.000|1.000|7.3e-05|3.5e-03|2.1e+04| 6.519067e+03| 0:0:00|1.0e+02|1.9e+00|4.6e-↙
06| chol 3  3
24|1.000|1.000|5.2e-05|1.7e-03|9.9e+03| 3.060043e+03| 0:0:00|4.4e+01|1.9e+00|2.2e-↙
06| chol 2  2
25|1.000|1.000|4.1e-05|7.3e-04|3.9e+03| 1.089921e+03| 0:0:00|2.1e+01|1.9e+00|9.7e-↙
07| chol 2  2
26|1.000|1.000|3.5e-05|3.4e-04|1.5e+03| 4.599964e+02| 0:0:00|8.2e+00|2.0e+00|4.6e-↙
07| chol 2  2
27|1.000|1.000|2.8e-05|1.7e-04|5.8e+02| 1.536647e+02| 0:0:00|3.2e+00|2.0e+00|2.3e-↙
07| chol 2  2
28|1.000|1.000|2.5e-05|9.6e-05|2.3e+02| 6.771169e+01| 0:0:00|1.3e+00|2.0e+00|1.3e-↙
07| chol 2  3
29|1.000|1.000|2.0e-05|5.8e-05|9.3e+01| 1.428289e+01| 0:0:00|5.0e-01|2.0e+00|7.6e-↙
08| chol 3  2
30|1.000|1.000|1.8e-05|4.0e-05|4.3e+01| 8.261551e+00| 0:0:00|2.1e-01|2.0e+00|5.1e-↙
08| chol 2  2
31|0.739|0.739|1.5e-05|3.0e-05|2.8e+01|-8.450822e+00| 0:0:00|1.2e-01|2.0e+00|3.7e-↙
08| chol 2  2
32|0.975|0.975|1.4e-05|2.3e-05|1.6e+01|-2.213882e+00| 0:0:00|6.4e-02|2.0e+00|2.8e-↙
08| chol 2  2
33|0.543|0.543|1.1e-05|1.9e-05|1.3e+01|-1.126290e+01| 0:0:00|4.8e-02|2.0e+00|2.2e-↙
08| chol 2  2
34|0.959|0.959|1.1e-05|1.5e-05|7.8e+00|-5.819752e+00| 0:0:00|2.9e-02|2.0e+00|1.7e-↙
08| chol 2  2
35|0.517|0.517|9.2e-06|1.3e-05|6.4e+00|-1.131151e+01| 0:0:00|2.3e-02|2.0e+00|1.4e-↙
08| chol 2  2
36|0.928|0.928|9.0e-06|1.1e-05|4.1e+00|-8.034154e+00| 0:0:00|1.5e-02|2.0e+00|1.1e-↙
```

```
08| chol 2  2
37|0.677|0.677|7.8e-06|9.2e-06|2.9e+00|-1.068763e+01| 0:0:01|1.1e-02|2.0e+00|9.1e-↙
09| chol 3  2
38|0.936|0.936|7.6e-06|7.8e-06|1.7e+00|-9.489891e+00| 0:0:01|6.7e-03|2.0e+00|7.8e-↙
09| chol 2  2
39|0.618|0.618|6.8e-06|7.1e-06|1.3e+00|-1.066342e+01| 0:0:01|4.9e-03|2.0e+00|6.6e-↙
09| chol 2  2
40|0.883|0.883|6.6e-06|6.2e-06|8.9e-01|-9.974357e+00| 0:0:01|3.2e-03|2.0e+00|5.8e-↙
09| chol 2  2
41|0.475|0.475|6.1e-06|5.8e-06|8.2e-01|-1.078738e+01| 0:0:01|2.6e-03|2.0e+00|5.2e-↙
09| chol 2  2
42|0.850|0.850|6.1e-06|5.0e-06|5.4e-01|-1.037952e+01| 0:0:01|1.9e-03|2.0e+00|4.9e-↙
09| chol 2  2
43|0.048|0.048|6.3e-06|5.0e-06|6.9e-01|-1.057471e+01| 0:0:01|1.9e-03|2.0e+00|4.8e-↙
09| chol 2  2
44|0.102|0.102|6.6e-06|4.9e-06|9.4e-01|-1.069089e+01| 0:0:01|1.9e-03|2.0e+00|4.8e-↙
09| chol 2  2
45|0.325|0.325|7.3e-06|4.3e-06|1.2e+00|-1.105877e+01| 0:0:01|1.9e-03|2.0e+00|4.7e-↙
09| chol 2  2
46|0.511|0.511|8.0e-06|3.8e-06|1.3e+00|-1.142465e+01| 0:0:01|2.3e-03|2.0e+00|4.8e-↙
09| chol 2  2
47|0.756|0.756|8.5e-06|3.6e-06|8.8e-01|-1.174973e+01| 0:0:01|2.7e-03|2.0e+00|4.8e-↙
09| chol 2  2
48|0.596|0.596|8.4e-06|3.6e-06|6.7e-01|-1.188808e+01| 0:0:01|2.2e-03|2.0e+00|4.8e-↙
09| chol 2  2
49|0.375|0.375|8.3e-06|3.6e-06|6.7e-01|-1.190476e+01| 0:0:01|2.0e-03|2.0e+00|4.8e-↙
09| chol 2  2
50|0.676|0.676|8.1e-06|3.5e-06|5.3e-01|-1.194495e+01| 0:0:01|1.6e-03|2.0e+00|4.7e-↙
09|
  Stop: maximum number of iterations reached
-----------------------------------------------------------------
 number of iterations   = 50
 primal objective value = -2.95022502e-01
 dual   objective value = -2.35948676e+01
 gap := trace(XZ)       = 5.34e-01
 relative gap           = 4.12e-02
 actual relative gap    = 9.36e-01
 rel. primal infeas     = 8.11e-06
 rel. dual   infeas     = 3.53e-06
 norm(X), norm(y), norm(Z) = 1.1e+05, 1.1e+02, 7.6e+01
 norm(A), norm(b), norm(C) = 1.7e+05, 2.6e+05, 7.6e+01
 Total CPU time (secs)  = 0.69
 CPU time per iteration = 0.01
 termination code       = -6
 DIMACS errors: 8.1e-06  0.0e+00  3.5e-06  0.0e+00  9.4e-01  2.1e-02
-----------------------------------------------------------------

ans =

   23.5945

Iteration   6   Total error is: 0.014494

 num. of constraints = 85
```

```
 dim. of socp   var  = 86,   num. of socp blk  =  1
 dim. of linear var  = 800
 dim. of free   var  =  5
 *** convert ublk to linear blk
******************************************************************************↙
********
   SDPT3: homogeneous self-dual path-following algorithms
******************************************************************************↙
********
 version  predcorr  gam  expon
   HKM      1      0.000   1
it pstep dstep pinfeas dinfeas  gap     mean(obj)    cputime    kap   tau    theta
------------------------------------------------------------------------------↙
--------
 0|0.000|0.000|2.1e+00|1.4e+03|9.5e+09| 9.442122e+06| 0:0:00|9.5e+09|1.0e+00|1.↙
0e+00| chol 1  1
 1|0.000|0.000|2.1e+00|1.4e+03|9.5e+09| 9.442294e+06| 0:0:00|9.5e+09|1.0e+00|1.↙
0e+00| chol 1  1
 2|0.000|0.000|2.1e+00|1.4e+03|9.5e+09| 9.443440e+06| 0:0:00|9.5e+09|1.0e+00|1.↙
0e+00| chol 1  1
 3|0.001|0.001|2.1e+00|1.4e+03|9.5e+09| 9.446904e+06| 0:0:00|9.5e+09|1.0e+00|1.↙
0e+00| chol 1  1
 4|0.009|0.009|2.1e+00|1.4e+03|9.5e+09| 9.457858e+06| 0:0:00|9.5e+09|1.0e+00|9.9e-↙
01| chol 1  1
 5|0.127|0.127|1.8e+00|1.3e+03|8.3e+09| 9.474666e+06| 0:0:00|8.3e+09|1.0e+00|8.7e-↙
01| chol 1  2
 6|0.395|0.395|1.1e+00|7.7e+02|5.1e+09| 9.481561e+06| 0:0:00|5.0e+09|1.0e+00|5.3e-↙
01| chol 1  2
 7|0.743|0.743|2.9e-01|2.0e+02|1.3e+09| 9.395045e+06| 0:0:00|1.3e+09|1.0e+00|1.4e-↙
01| chol 2  2
 8|0.448|0.448|1.6e-01|1.1e+02|7.5e+08| 9.318873e+06| 0:0:00|7.0e+08|1.0e+00|7.7e-↙
02| chol 2  3
 9|0.251|0.251|1.3e-01|8.9e+01|6.2e+08| 9.633243e+06| 0:0:00|5.4e+08|9.9e-01|6.0e-↙
02| chol 3  3
10|0.655|0.655|4.9e-02|3.4e+01|2.4e+08| 9.460806e+06| 0:0:00|1.8e+08|9.9e-01|2.3e-↙
02| chol 3  3
11|0.548|0.548|2.7e-02|1.9e+01|1.4e+08| 9.426399e+06| 0:0:00|8.4e+07|9.9e-01|1.3e-↙
02| chol 3  3
12|0.789|0.789|6.5e-03|4.4e+00|3.3e+07| 6.313408e+06| 0:0:00|2.7e+06|1.2e+00|3.6e-↙
03| chol 4  3
13|0.465|0.465|4.4e-03|3.0e+00|2.3e+07| 5.356953e+06| 0:0:00|1.3e+06|1.2e+00|2.5e-↙
03| chol 4  5
14|0.793|0.793|1.8e-03|1.2e+00|9.4e+06| 3.057386e+06| 0:0:00|7.9e+04|1.4e+00|1.2e-↙
03| chol 3  3
15|0.703|0.703|1.1e-03|7.4e-01|5.8e+06| 2.101780e+06| 0:0:00|2.9e+04|1.5e+00|7.8e-↙
04| chol 4  4
16|1.000|1.000|6.2e-04|4.2e-01|3.5e+06| 1.315180e+06| 0:0:00|8.6e+03|1.6e+00|4.7e-↙
04| chol 3  5
17|1.000|1.000|3.2e-04|2.0e-01|1.6e+06| 5.929329e+05| 0:0:00|5.8e+03|1.7e+00|2.3e-↙
04| chol 4  4
18|1.000|1.000|2.7e-04|9.9e-02|7.3e+05| 2.621449e+05| 0:0:00|2.8e+03|1.7e+00|1.2e-↙
04| chol 5  4
19|1.000|1.000|3.1e-04|3.7e-02|2.5e+05| 7.764771e+04| 0:0:00|1.4e+03|1.7e+00|4.3e-↙
05| chol 4  5
```

```
20|0.791|0.791|2.6e-04|2.0e-02|1.2e+05| 4.103029e+04| 0:0:00|6.2e+02|1.8e+00|2.4e-↙
05| chol 3  3
21|0.480|0.480|1.6e-04|1.6e-02|1.0e+05| 3.043376e+04| 0:0:00|4.2e+02|1.8e+00|2.1e-↙
05| chol 3  3
22|1.000|1.000|1.3e-04|9.8e-03|6.3e+04| 2.073735e+04| 0:0:00|2.1e+02|1.8e+00|1.2e-↙
05| chol 3  3
23|0.863|0.863|7.6e-05|5.5e-03|3.5e+04| 9.851271e+03| 0:0:00|1.3e+02|1.9e+00|7.2e-↙
06| chol 3  3
24|1.000|1.000|6.3e-05|3.1e-03|1.9e+04| 5.882536e+03| 0:0:00|7.3e+01|1.9e+00|4.1e-↙
06| chol 3  3
25|1.000|1.000|4.4e-05|1.3e-03|7.6e+03| 2.197229e+03| 0:0:00|4.0e+01|1.9e+00|1.7e-↙
06| chol 3  3
26|1.000|1.000|3.8e-05|5.8e-04|3.0e+03| 8.955403e+02| 0:0:00|1.6e+01|1.9e+00|7.7e-↙
07| chol 2  3
27|1.000|1.000|3.0e-05|2.5e-04|1.1e+03| 3.131191e+02| 0:0:00|6.4e+00|2.0e+00|3.4e-↙
07| chol 2  3
28|1.000|1.000|2.5e-05|1.3e-04|4.2e+02| 1.260024e+02| 0:0:00|2.4e+00|2.0e+00|1.7e-↙
07| chol 2  2
29|1.000|1.000|2.1e-05|7.0e-05|1.6e+02| 3.836947e+01| 0:0:00|9.3e-01|2.0e+00|9.3e-↙
08| chol 3  2
30|1.000|1.000|1.8e-05|4.4e-05|6.5e+01| 1.422846e+01| 0:0:00|3.6e-01|2.0e+00|5.7e-↙
08| chol 2  2
31|0.979|0.979|1.5e-05|2.9e-05|2.9e+01|-3.189933e+00| 0:0:00|1.5e-01|2.0e+00|3.7e-↙
08| chol 2  2
32|0.946|0.946|1.3e-05|2.2e-05|1.7e+01|-1.783101e+00| 0:0:00|7.0e-02|2.0e+00|2.7e-↙
08| chol 2  2
33|0.474|0.474|1.1e-05|1.8e-05|1.5e+01|-1.099725e+01| 0:0:00|5.4e-02|2.0e+00|2.1e-↙
08| chol 2  2
34|0.950|0.950|1.0e-05|1.4e-05|9.3e+00|-5.058005e+00| 0:0:00|3.3e-02|2.0e+00|1.6e-↙
08| chol 2  2
35|0.551|0.551|8.4e-06|1.2e-05|7.3e+00|-1.091387e+01| 0:0:00|2.6e-02|2.0e+00|1.2e-↙
08| chol 2  2
36|0.957|0.957|8.1e-06|9.6e-06|4.6e+00|-7.575861e+00| 0:0:00|1.7e-02|2.0e+00|9.6e-↙
09| chol 2  2
37|0.501|0.501|6.7e-06|8.4e-06|3.8e+00|-1.092026e+01| 0:0:00|1.3e-02|2.0e+00|7.6e-↙
09| chol 2  2
38|0.926|0.926|6.6e-06|7.0e-06|2.5e+00|-9.013970e+00| 0:0:00|8.9e-03|2.0e+00|6.3e-↙
09| chol 2  2
39|0.730|0.730|5.7e-06|6.1e-06|1.6e+00|-1.049047e+01| 0:0:00|6.4e-03|2.0e+00|5.0e-↙
09| chol 2  2
40|0.868|0.868|5.6e-06|5.4e-06|9.6e-01|-1.003259e+01| 0:0:01|3.9e-03|2.0e+00|4.3e-↙
09| chol 2  2
41|0.786|0.786|5.3e-06|4.8e-06|5.9e-01|-1.046412e+01| 0:0:01|2.5e-03|2.0e+00|3.8e-↙
09| chol 2  2
42|0.671|0.671|5.3e-06|4.4e-06|4.2e-01|-1.051225e+01| 0:0:01|1.7e-03|2.0e+00|3.6e-↙
09| chol 2  2
43|0.048|0.048|5.4e-06|4.4e-06|5.5e-01|-1.060780e+01| 0:0:01|1.7e-03|2.0e+00|3.6e-↙
09| chol 3  2
44|0.044|0.044|5.5e-06|4.4e-06|7.0e-01|-1.067901e+01| 0:0:01|1.7e-03|2.0e+00|3.5e-↙
09| chol 2  2
45|0.224|0.224|6.0e-06|3.9e-06|9.9e-01|-1.096641e+01| 0:0:01|1.6e-03|2.0e+00|3.5e-↙
09| chol 2  2
46|0.417|0.417|6.7e-06|3.1e-06|1.2e+00|-1.133896e+01| 0:0:01|1.9e-03|2.0e+00|3.4e-↙
09| chol 2  2
```

```
47|0.653|0.653|7.5e-06|2.7e-06|9.8e-01|-1.169775e+01| 0:0:01|2.3e-03|2.0e+00|3.5e-↙
09| chol 2  2
48|0.830|0.830|7.7e-06|2.6e-06|6.3e-01|-1.193485e+01| 0:0:01|2.2e-03|2.0e+00|3.5e-↙
09| chol 3  2
49|0.362|0.362|7.5e-06|2.6e-06|5.8e-01|-1.197074e+01| 0:0:01|1.9e-03|2.0e+00|3.5e-↙
09| chol 2  2
50|0.374|0.374|7.3e-06|2.6e-06|5.6e-01|-1.198389e+01| 0:0:01|1.7e-03|2.0e+00|3.5e-↙
09|
  Stop: maximum number of iterations reached
-----------------------------------------------------------------
 number of iterations   = 50
 primal objective value = -3.56194942e+00
 dual   objective value = -2.04058274e+01
 gap := trace(XZ)       = 5.59e-01
 relative gap           = 4.31e-02
 actual relative gap    = 6.75e-01
 rel. primal infeas     = 7.34e-06
 rel. dual   infeas     = 2.58e-06
 norm(X), norm(y), norm(Z) = 1.3e+05, 1.0e+02, 7.2e+01
 norm(A), norm(b), norm(C) = 1.6e+05, 2.6e+05, 7.6e+01
 Total CPU time (secs)  = 0.64
 CPU time per iteration = 0.01
 termination code       = -6
 DIMACS errors: 7.3e-06  0.0e+00  2.6e-06  0.0e+00  6.7e-01  2.2e-02
-----------------------------------------------------------------

ans =

   20.4044

Iteration   7   Total error is: 0.014414

 num. of constraints = 85
 dim. of socp   var  = 86,   num. of socp blk  =  1
 dim. of linear var  = 800
 dim. of free   var  =  5
 *** convert ublk to linear blk
******************************************************************************↙
********
   SDPT3: homogeneous self-dual path-following algorithms
******************************************************************************↙
********
 version  predcorr  gam  expon
   HKM      1      0.000   1
it pstep dstep pinfeas dinfeas  gap     mean(obj)    cputime    kap   tau    theta
------------------------------------------------------------------------------↙
--------
 0|0.000|0.000|2.1e+00|1.4e+03|9.3e+09| 9.169708e+06| 0:0:00|9.3e+09|1.0e+00|1.↙
0e+00| chol 1  1
 1|0.000|0.000|2.1e+00|1.4e+03|9.3e+09| 9.169875e+06| 0:0:00|9.3e+09|1.0e+00|1.↙
0e+00| chol 1  1
 2|0.000|0.000|2.1e+00|1.4e+03|9.3e+09| 9.170993e+06| 0:0:00|9.3e+09|1.0e+00|1.↙
0e+00| chol 1  1
 3|0.001|0.001|2.1e+00|1.4e+03|9.3e+09| 9.174369e+06| 0:0:00|9.3e+09|1.0e+00|1.↙
```

```
0e+00| chol 1  1
 4|0.009|0.009|2.1e+00|1.4e+03|9.2e+09| 9.185056e+06| 0:0:00|9.2e+09|1.0e+00|9.9e-↙
01| chol 1  1
 5|0.126|0.126|1.8e+00|1.2e+03|8.1e+09| 9.201534e+06| 0:0:00|8.0e+09|1.0e+00|8.7e-↙
01| chol 1  1
 6|0.395|0.395|1.1e+00|7.6e+02|4.9e+09| 9.208554e+06| 0:0:00|4.9e+09|1.0e+00|5.3e-↙
01| chol 1  1
 7|0.744|0.744|2.9e-01|2.0e+02|1.3e+09| 9.124645e+06| 0:0:00|1.2e+09|1.0e+00|1.4e-↙
01| chol 2  2
 8|0.450|0.450|1.6e-01|1.1e+02|7.2e+08| 9.049558e+06| 0:0:00|6.8e+08|1.0e+00|7.7e-↙
02| chol 2  3
 9|0.250|0.250|1.3e-01|8.7e+01|6.0e+08| 9.356818e+06| 0:0:00|5.2e+08|9.9e-01|6.0e-↙
02| chol 3  3
10|0.654|0.654|4.9e-02|3.3e+01|2.4e+08| 9.192028e+06| 0:0:00|1.8e+08|9.9e-01|2.3e-↙
02| chol 3  3
11|0.551|0.551|2.7e-02|1.8e+01|1.4e+08| 9.145933e+06| 0:0:00|8.1e+07|9.9e-01|1.3e-↙
02| chol 4  3
12|0.789|0.789|6.4e-03|4.4e+00|3.2e+07| 6.125539e+06| 0:0:00|2.6e+06|1.2e+00|3.6e-↙
03| chol 4  3
13|0.458|0.458|4.4e-03|3.0e+00|2.3e+07| 5.223290e+06| 0:0:00|1.3e+06|1.2e+00|2.5e-↙
03| chol 3  3
14|0.793|0.793|1.8e-03|1.2e+00|9.2e+06| 2.978098e+06| 0:0:00|7.8e+04|1.4e+00|1.2e-↙
03| chol 3  4
15|0.701|0.701|1.1e-03|7.3e-01|5.7e+06| 2.050014e+06| 0:0:00|2.8e+04|1.5e+00|7.9e-↙
04| chol 3  4
16|1.000|1.000|6.3e-04|4.2e-01|3.4e+06| 1.284199e+06| 0:0:00|8.4e+03|1.6e+00|4.7e-↙
04| chol 3  5
17|1.000|1.000|3.2e-04|2.0e-01|1.5e+06| 5.878933e+05| 0:0:00|5.7e+03|1.7e+00|2.4e-↙
04| chol 3  3
18|1.000|1.000|2.7e-04|9.9e-02|7.3e+05| 2.574945e+05| 0:0:00|2.8e+03|1.7e+00|1.2e-↙
04| chol 3  3
19|1.000|1.000|2.8e-04|3.6e-02|2.4e+05| 7.427824e+04| 0:0:00|1.4e+03|1.7e+00|4.3e-↙
05| chol 3  3
20|0.808|0.808|2.5e-04|1.9e-02|1.2e+05| 3.903878e+04| 0:0:00|5.9e+02|1.8e+00|2.4e-↙
05| chol 3  3
21|0.564|0.564|1.5e-04|1.5e-02|9.6e+04| 2.825565e+04| 0:0:00|3.7e+02|1.8e+00|2.0e-↙
05| chol 3  3
22|1.000|1.000|1.3e-04|9.0e-03|5.6e+04| 1.811172e+04| 0:0:00|1.9e+02|1.8e+00|1.2e-↙
05| chol 3  3
23|0.998|0.998|7.0e-05|4.4e-03|2.7e+04| 7.381348e+03| 0:0:00|1.1e+02|1.9e+00|5.9e-↙
06| chol 3  3
24|1.000|1.000|6.2e-05|2.5e-03|1.5e+04| 4.341020e+03| 0:0:00|5.6e+01|1.9e+00|3.3e-↙
06| chol 3  3
25|1.000|1.000|4.5e-05|1.0e-03|5.7e+03| 1.607533e+03| 0:0:00|3.1e+01|1.9e+00|1.4e-↙
06| chol 3  3
26|1.000|1.000|3.8e-05|4.7e-04|2.2e+03| 6.429104e+02| 0:0:00|1.2e+01|1.9e+00|6.3e-↙
07| chol 2  2
27|1.000|1.000|3.1e-05|2.4e-04|9.9e+02| 2.762162e+02| 0:0:00|4.7e+00|2.0e+00|3.4e-↙
07| chol 2  2
28|1.000|1.000|2.7e-05|1.2e-04|3.2e+02| 9.474215e+01| 0:0:00|2.2e+00|2.0e+00|1.6e-↙
07| chol 2  2
29|1.000|1.000|2.2e-05|7.0e-05|1.3e+02| 2.983623e+01| 0:0:00|7.1e-01|2.0e+00|9.5e-↙
08| chol 2  2
30|1.000|1.000|1.9e-05|4.6e-05|5.3e+01| 1.028244e+01| 0:0:00|2.9e-01|2.0e+00|6.1e-↙
```

```
08| chol 2  2
31|0.972|0.972|1.6e-05|3.2e-05|2.5e+01|-4.538246e+00| 0:0:00|1.2e-01|2.0e+00|4.1e-↙
08| chol 2  2
32|0.954|0.954|1.5e-05|2.5e-05|1.4e+01|-2.943929e+00| 0:0:00|5.9e-02|2.0e+00|3.1e-↙
08| chol 2  2
33|0.443|0.443|1.2e-05|2.1e-05|1.2e+01|-1.167877e+01| 0:0:00|4.6e-02|2.0e+00|2.5e-↙
08| chol 2  2
34|0.896|0.896|1.2e-05|1.7e-05|8.6e+00|-5.170361e+00| 0:0:00|2.9e-02|2.0e+00|2.0e-↙
08| chol 2  2
35|0.507|0.507|9.9e-06|1.4e-05|7.2e+00|-1.159635e+01| 0:0:00|2.4e-02|2.0e+00|1.6e-↙
08| chol 2  2
36|0.923|0.923|9.8e-06|1.2e-05|4.6e+00|-7.800700e+00| 0:0:01|1.7e-02|2.0e+00|1.3e-↙
08| chol 2  2
37|0.718|0.718|8.5e-06|9.8e-06|3.1e+00|-1.054875e+01| 0:0:01|1.2e-02|2.0e+00|1.0e-↙
08| chol 2  2
38|0.893|0.893|7.9e-06|8.3e-06|2.0e+00|-9.241841e+00| 0:0:01|7.4e-03|2.0e+00|8.7e-↙
09| chol 2  2
39|0.440|0.440|7.1e-06|7.6e-06|1.8e+00|-1.096520e+01| 0:0:01|6.1e-03|2.0e+00|7.5e-↙
09| chol 2  2
40|0.847|0.847|7.0e-06|6.5e-06|1.3e+00|-9.840512e+00| 0:0:01|4.4e-03|2.0e+00|6.5e-↙
09| chol 2  2
41|0.761|0.761|6.5e-06|5.7e-06|8.4e-01|-1.059564e+01| 0:0:01|3.2e-03|2.0e+00|5.6e-↙
09| chol 2  2
42|0.859|0.859|6.6e-06|5.2e-06|4.8e-01|-1.049858e+01| 0:0:01|2.1e-03|2.0e+00|5.4e-↙
09| chol 2  2
43|0.032|0.032|6.7e-06|5.2e-06|6.0e-01|-1.060001e+01| 0:0:01|2.0e-03|2.0e+00|5.3e-↙
09| chol 2  2
44|0.045|0.045|6.9e-06|5.2e-06|7.5e-01|-1.066314e+01| 0:0:01|2.0e-03|2.0e+00|5.3e-↙
09| chol 2  2
45|0.169|0.169|7.3e-06|4.9e-06|1.0e+00|-1.086538e+01| 0:0:01|1.9e-03|2.0e+00|5.3e-↙
09| chol 3  2
46|0.394|0.394|8.0e-06|4.3e-06|1.2e+00|-1.120899e+01| 0:0:01|2.1e-03|2.0e+00|5.3e-↙
09| chol 2  2
47|0.617|0.617|8.8e-06|4.0e-06|1.1e+00|-1.155334e+01| 0:0:01|2.5e-03|2.0e+00|5.3e-↙
09| chol 2  2
48|0.770|0.770|9.0e-06|3.8e-06|6.8e-01|-1.182564e+01| 0:0:01|2.5e-03|2.0e+00|5.3e-↙
09| chol 2  2
49|0.246|0.246|9.0e-06|3.8e-06|6.9e-01|-1.184892e+01| 0:0:01|2.2e-03|2.0e+00|5.3e-↙
09| chol 2  2
50|0.287|0.287|8.8e-06|3.8e-06|7.1e-01|-1.185166e+01| 0:0:01|2.0e-03|2.0e+00|5.3e-↙
09|
  Stop: maximum number of iterations reached
-----------------------------------------------------------------
 number of iterations   = 50
 primal objective value =  4.83949124e-01
 dual   objective value = -2.41872653e+01
 gap := trace(XZ)       = 7.07e-01
 relative gap           = 5.30e-02
 actual relative gap    = 9.61e-01
 rel. primal infeas     = 8.84e-06
 rel. dual   infeas     = 3.83e-06
 norm(X), norm(y), norm(Z) = 1.2e+05, 1.1e+02, 7.7e+01
 norm(A), norm(b), norm(C) = 1.6e+05, 2.5e+05, 7.6e+01
 Total CPU time (secs)  = 0.67
```

```
 CPU time per iteration = 0.01
 termination code       = -6
 DIMACS errors: 8.8e-06  0.0e+00  3.8e-06  0.0e+00  9.6e-01  2.8e-02
------------------------------------------------------------------

ans =

   24.1854

Iteration   8   Total error is: 0.014467
The total representation error of the testing signals is: 0.025582
>>
```