```
>> 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  = 20
 *** 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|2.5e+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|0.034|0.034|2.4e+01|1.3e+02|1.1e+07| 1.110348e+04| 0:0:00|1.1e+07|1.0e+00|9.7e-↙
01| chol 1  1
 2|0.027|0.027|2.3e+01|1.3e+02|1.1e+07| 1.116401e+04| 0:0:00|1.1e+07|1.0e+00|9.4e-↙
01| chol 1  1
 3|0.177|0.177|1.9e+01|1.1e+02|9.2e+06| 1.129639e+04| 0:0:00|8.9e+06|9.9e-01|7.8e-↙
01| chol 1  1
 4|0.586|0.586|8.3e+00|4.5e+01|4.0e+06| 1.144414e+04| 0:0:00|3.8e+06|9.8e-01|3.3e-↙
01| chol 1  1
 5|0.709|0.709|2.5e+00|1.4e+01|1.2e+06| 1.147652e+04| 0:0:00|1.1e+06|9.8e-01|1.0e-↙
01| chol 1  1
 6|0.226|0.226|2.0e+00|1.1e+01|1.0e+06| 1.170309e+04| 0:0:00|8.7e+05|9.7e-01|8.1e-↙
02| chol 1  1
 7|0.894|0.894|2.6e-01|1.4e+00|1.4e+05| 1.093962e+04| 0:0:00|7.3e+04|1.0e+00|1.0e-↙
02| chol 1  1
 8|0.279|0.279|2.4e-01|1.3e+00|1.6e+05| 1.220193e+04| 0:0:00|5.8e+04|9.2e-01|9.0e-↙
03| chol 1  1
 9|0.527|0.527|1.7e-01|9.2e-01|1.2e+05| 1.192579e+04| 0:0:00|2.9e+04|8.9e-01|6.1e-↙
03| chol 1  1
10|0.893|0.893|7.7e-02|4.2e-01|6.0e+04| 9.214600e+03| 0:0:00|1.7e+03|9.4e-01|2.9e-↙
03| chol 1  1
11|0.778|0.778|3.1e-02|1.7e-01|2.2e+04| 4.991146e+03| 0:0:01|9.5e+01|1.1e+00|1.4e-↙
03| chol 1  1
12|1.000|1.000|8.5e-03|4.5e-02|5.6e+03| 1.652193e+03| 0:0:01|6.1e+00|1.4e+00|4.5e-↙
04| chol 1  1
13|1.000|1.000|3.8e-03|1.9e-02|2.2e+03| 6.674334e+02| 0:0:01|7.6e+00|1.5e+00|2.2e-↙
04| chol 1  1
14|0.768|0.768|1.9e-03|8.1e-03|8.6e+02| 2.261977e+02| 0:0:01|4.0e+00|1.6e+00|9.8e-↙
05| chol 1  1
15|0.875|0.875|1.1e-03|6.3e-03|7.0e+02| 1.535782e+02| 0:0:01|1.8e+00|1.6e+00|7.4e-↙
05| chol 1  1
16|0.910|0.910|8.2e-04|4.2e-03|4.5e+02| 8.376429e+01| 0:0:01|1.2e+00|1.7e+00|5.0e-↙
05| chol 1  1
17|1.000|1.000|3.4e-04|1.9e-03|1.9e+02| 3.320841e+00| 0:0:01|7.7e-01|1.7e+00|2.3e-↙
```

```
05| chol 1  1
18|1.000|1.000|3.5e-04|9.3e-04|9.0e+01|-2.537991e+01| 0:0:01|3.4e-01|1.7e+00|1.1e-↙
05| chol 1  1
19|1.000|1.000|8.8e-05|4.5e-04|4.1e+01|-4.086203e+01| 0:0:01|1.6e-01|1.8e+00|5.3e-↙
06| chol 1  1
20|1.000|1.000|8.0e-05|1.8e-04|1.5e+01|-4.735114e+01| 0:0:01|7.6e-02|1.8e+00|2.1e-↙
06| chol 1  1
21|1.000|1.000|1.4e-05|7.9e-05|5.8e+00|-5.011395e+01| 0:0:01|2.9e-02|1.8e+00|8.1e-↙
07| chol 1  1
22|1.000|1.000|7.1e-06|3.9e-05|2.2e+00|-5.096291e+01| 0:0:01|1.1e-02|1.9e+00|3.3e-↙
07| chol 1  1
23|1.000|1.000|4.9e-06|2.8e-05|9.3e-01|-5.132116e+01| 0:0:01|4.0e-03|1.9e+00|1.5e-↙
07| chol 1  1
24|1.000|1.000|3.6e-06|2.2e-05|2.4e-01|-5.149230e+01| 0:0:01|1.9e-03|2.0e+00|4.1e-↙
08| chol 1  1
25|1.000|1.000|6.3e-07|1.1e-05|1.0e-01|-5.153350e+01| 0:0:01|5.2e-04|2.0e+00|1.8e-↙
08| chol 1  1
26|1.000|1.000|1.5e-06|5.4e-06|3.3e-02|-5.155128e+01| 0:0:01|2.2e-04|2.0e+00|5.7e-↙
09| chol 1  1
27|0.764|0.764|1.5e-06|3.0e-06|1.7e-02|-5.155653e+01| 0:0:01|1.1e-04|2.0e+00|2.9e-↙
09| chol 1  1
28|0.928|0.928|8.9e-06|1.3e-06|7.2e-03|-5.155977e+01| 0:0:01|4.2e-05|2.0e+00|1.2e-↙
09| chol 1  1
29|0.905|0.905|9.8e-06|7.2e-07|3.9e-03|-5.156118e+01| 0:0:01|1.8e-05|2.0e+00|5.9e-↙
10| chol 1  1
30|0.807|0.807|1.0e-05|3.2e-07|2.3e-03|-5.156178e+01| 0:0:01|1.0e-05|2.0e+00|3.3e-↙
10| chol 1  1
31|0.630|0.630|6.3e-06|1.9e-07|1.4e-03|-5.156215e+01| 0:0:01|6.9e-06|2.0e+00|1.9e-↙
10| chol 1  1
32|0.492|0.492|4.5e-06|1.5e-07|1.1e-03|-5.156226e+01| 0:0:01|4.9e-06|2.0e+00|1.5e-↙
10| chol 1  1
33|0.388|0.388|3.9e-06|1.3e-07|1.1e-03|-5.156232e+01| 0:0:01|4.0e-06|1.9e+00|1.2e-↙
10| chol 1  1
34|0.253|0.253|5.1e-06|1.2e-07|1.1e-03|-5.156237e+01| 0:0:01|3.6e-06|1.9e+00|1.1e-↙
10|
  Stop: progress is too slow
-------------------------------------------------------------------
 number of iterations   = 34
 primal objective value = -5.15620998e+01
 dual   objective value = -5.15626434e+01
 gap := trace(XZ)       = 1.10e-03
 relative gap           = 2.09e-05
 actual relative gap    = 5.22e-06
 rel. primal infeas     = 5.09e-06
 rel. dual   infeas     = 1.21e-07
 norm(X), norm(y), norm(Z) = 3.6e+02, 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)  = 0.78
 CPU time per iteration = 0.02
 termination code       = -5
 DIMACS errors: 5.1e-06  0.0e+00  1.2e-07  0.0e+00  5.2e-06  1.1e-05
-------------------------------------------------------------------

ans =
```

```
   51.5626


 num. of constraints = 85
 dim. of socp   var  = 86,   num. of socp blk  =  1
 dim. of linear var  = 800
 dim. of free   var  = 20
 *** 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|2.9e+00|5.1e+03|1.9e+10| 1.925664e+07| 0:0:00|1.9e+10|1.0e+00|1.↙
0e+00| chol 1  1
 1|0.000|0.000|2.9e+00|5.1e+03|1.9e+10| 1.925429e+07| 0:0:00|1.9e+10|1.0e+00|1.↙
0e+00| chol 1  2
 2|0.001|0.001|2.9e+00|5.1e+03|1.9e+10| 1.926536e+07| 0:0:00|1.9e+10|1.0e+00|1.↙
0e+00| chol 1  2
 3|0.002|0.002|2.9e+00|5.1e+03|1.9e+10| 1.927521e+07| 0:0:00|1.9e+10|1.0e+00|1.↙
0e+00| chol 1  2
 4|0.043|0.043|2.8e+00|4.8e+03|1.9e+10| 1.932330e+07| 0:0:00|1.9e+10|1.0e+00|9.6e-↙
01| chol 2  2
 5|0.119|0.119|2.5e+00|4.3e+03|1.7e+10| 1.941990e+07| 0:0:00|1.6e+10|1.0e+00|8.5e-↙
01| chol 2  2
 6|0.530|0.530|1.2e+00|2.1e+03|8.0e+09| 1.945000e+07| 0:0:00|7.8e+09|9.9e-01|4.0e-↙
01| chol 4  2
 7|0.659|0.659|4.1e-01|7.2e+02|2.8e+09| 1.937473e+07| 0:0:00|2.7e+09|9.9e-01|1.4e-↙
01| chol 2  3
 8|0.114|0.114|3.7e-01|6.5e+02|2.6e+09| 1.956820e+07| 0:0:00|2.4e+09|9.9e-01|1.3e-↙
01| chol 2  2
 9|0.667|0.667|1.3e-01|2.3e+02|9.7e+08| 1.956355e+07| 0:0:00|8.1e+08|9.8e-01|4.5e-↙
02| chol 3  4
10|0.414|0.414|9.4e-02|1.6e+02|7.6e+08| 2.104269e+07| 0:0:00|5.1e+08|9.4e-01|3.0e-↙
02| chol 4  4
11|0.580|0.580|5.5e-02|9.5e+01|5.1e+08| 2.259713e+07| 0:0:00|2.4e+08|8.8e-01|1.7e-↙
02| chol 4  6
12|0.785|0.785|2.1e-02|3.7e+01|2.2e+08| 2.073069e+07| 0:0:00|5.1e+07|8.9e-01|6.4e-↙
03| chol 4  5
13|0.844|0.844|1.0e-02|1.7e+01|1.1e+08| 1.639671e+07| 0:0:00|6.1e+06|9.3e-01|3.2e-↙
03| chol 4  4
14|0.734|0.734|4.4e-03|6.8e+00|3.7e+07| 8.470669e+06| 0:0:00|2.9e+05|1.1e+00|1.5e-↙
03| chol 6  6
15|0.786|0.786|2.6e-03|3.0e+00|1.6e+07| 4.674870e+06| 0:0:00|5.8e+04|1.3e+00|7.7e-↙
04| chol 4  5
16|0.794|0.794|1.7e-03|2.0e+00|1.1e+07| 3.497436e+06| 0:0:00|2.8e+04|1.3e+00|5.4e-↙
04| chol 4  4
17|1.000|1.000|9.7e-04|1.3e+00|6.7e+06| 2.191418e+06| 0:0:00|1.5e+04|1.4e+00|3.5e-↙
```

```
04| chol 4  4
18|1.000|1.000|6.0e-04|8.2e-01|4.2e+06| 1.350197e+06| 0:0:00|9.9e+03|1.4e+00|2.3e-↙
04| chol 4  4
19|1.000|1.000|4.8e-04|4.4e-01|2.0e+06| 6.014929e+05| 0:0:00|6.4e+03|1.4e+00|1.2e-↙
04| chol 4  4
20|1.000|1.000|5.3e-04|2.9e-01|1.2e+06| 2.884279e+05| 0:0:00|3.3e+03|1.4e+00|8.0e-↙
05| chol 4  5
21|1.000|1.000|5.3e-04|2.0e-01|6.0e+05| 7.450934e+04| 0:0:00|1.9e+03|1.3e+00|5.2e-↙
05| chol 4  4
22|1.000|1.000|6.7e-04|1.4e-01|2.6e+05|-4.485745e+04| 0:0:00|9.5e+02|1.3e+00|3.6e-↙
05| chol 4  4
23|1.000|1.000|7.6e-04|1.1e-01|1.0e+05|-7.514506e+04| 0:0:00|3.7e+02|1.3e+00|2.8e-↙
05| chol 4  4
24|0.564|0.564|6.3e-04|9.6e-02|7.7e+04|-6.624701e+04| 0:0:00|2.3e+02|1.3e+00|2.5e-↙
05| chol 4  4
25|1.000|1.000|1.0e-03|8.6e-02|2.3e+04|-7.807818e+04| 0:0:00|1.1e+02|1.3e+00|2.2e-↙
05| chol 4  4
26|0.129|0.129|9.5e-04|8.4e-02|2.4e+04|-7.599837e+04| 0:0:00|9.8e+01|1.3e+00|2.2e-↙
05| chol 4  4
27|0.568|0.568|7.4e-04|8.0e-02|1.6e+04|-7.317107e+04| 0:0:01|6.1e+01|1.3e+00|2.1e-↙
05| chol 6  4
28|0.779|0.779|5.9e-04|8.0e-02|1.1e+04|-7.399765e+04| 0:0:01|3.1e+01|1.3e+00|2.1e-↙
05| chol 5  5
29|0.642|0.642|7.1e-04|8.0e-02|7.4e+03|-7.499275e+04| 0:0:01|2.1e+01|1.3e+00|2.1e-↙
05| chol 5  6
30|0.113|0.113|1.0e-03|8.0e-02|7.2e+03|-7.515184e+04| 0:0:01|2.0e+01|1.3e+00|2.1e-↙
05| chol 4  5
31|0.193|0.193|2.3e-03|8.1e-02|7.1e+03|-7.558916e+04| 0:0:01|1.8e+01|1.3e+00|2.1e-↙
05| chol 5  5
32|0.050|0.050|3.4e-03|8.1e-02|7.3e+03|-7.606560e+04| 0:0:01|1.8e+01|1.3e+00|2.1e-↙
05| chol 5  6
33|0.015|0.015|3.9e-03|8.1e-02|7.3e+03|-7.610579e+04| 0:0:01|1.7e+01|1.3e+00|2.1e-↙
05| chol 7  6
34|0.087|0.087|8.0e-03|8.3e-02|8.0e+03|-7.724261e+04| 0:0:01|1.7e+01|1.3e+00|2.1e-↙
05| chol 6  7
35|0.006|0.006|8.4e-03|8.3e-02|8.2e+03|-7.618424e+04| 0:0:01|1.7e+01|1.3e+00|2.1e-↙
05| chol 8 10
36|0.018|0.018|1.4e-02|8.6e-02|9.8e+03|-7.440583e+04| 0:0:01|1.7e+01|1.3e+00|2.2e-↙
05| chol 5  9
37|0.009|0.009|2.1e-02|8.9e-02|1.2e+04|-7.441336e+04| 0:0:01|1.7e+01|1.3e+00|2.3e-↙
05| chol 7  6
38|0.014|0.014|3.9e-02|9.4e-02|1.7e+04|-7.535584e+04| 0:0:01|1.7e+01|1.3e+00|2.3e-↙
05| chol 6  8
39|0.019|0.019|7.4e-02|1.0e-01|2.9e+04|-7.801550e+04| 0:0:01|1.8e+01|1.2e+00|2.5e-↙
05| chol 7  7
40|0.006|0.006|7.8e-02|1.0e-01|3.1e+04|-7.869619e+04| 0:0:01|1.7e+01|1.2e+00|2.5e-↙
05| chol 7  8
41|0.015|0.015|1.2e-01|1.1e-01|4.7e+04|-8.295783e+04| 0:0:01|1.9e+01|1.2e+00|2.6e-↙
05| chol 7 10
42|0.003|0.003|1.3e-01|1.2e-01|5.1e+04|-8.378295e+04| 0:0:01|1.9e+01|1.2e+00|2.7e-↙
05| chol 9  7
43|0.025|0.025|1.9e-01|1.3e-01|8.4e+04|-8.849519e+04| 0:0:01|2.2e+01|1.1e+00|2.8e-↙
05| chol 6  6
44|0.006|0.006|1.9e-01|1.4e-01|9.5e+04|-8.133494e+04| 0:0:01|2.2e+01|1.1e+00|2.9e-↙
```

```
05| chol 7  9
45|0.017|0.017|2.1e-01|1.6e-01|1.3e+05|-6.440752e+04| 0:0:01|2.5e+01|1.0e+00|3.1e-↙
05| chol 6  7
46|0.023|0.023|2.2e-01|1.8e-01|2.0e+05|-3.466156e+04| 0:0:01|2.9e+01|9.6e-01|3.4e-↙
05| chol 6  7
47|0.050|0.050|2.9e-01|2.4e-01|4.0e+05| 5.222841e+03| 0:0:01|4.2e+01|8.3e-01|4.0e-↙
05| chol 6  8
48|0.072|0.072|3.6e-01|3.1e-01|6.9e+05| 4.943226e+04| 0:0:01|6.8e+01|7.6e-01|4.6e-↙
05| chol 7  8
49|0.018|0.018|3.2e-01|3.0e-01|6.6e+05| 9.492755e+04| 0:0:01|7.4e+01|7.9e-01|4.7e-↙
05| chol 6  6
50|0.085|0.085|2.9e-01|3.4e-01|8.1e+05| 2.037975e+05| 0:0:01|1.2e+02|7.8e-01|5.3e-↙
05|
  Stop: maximum number of iterations reached
-----------------------------------------------------------------
 number of iterations   = 50
 primal objective value =  7.80271189e+04
 dual   objective value = -2.26022409e+05
 gap := trace(XZ)       = 1.05e+04
 relative gap           = 6.93e-02
 actual relative gap    = 1.00e+00
 rel. primal infeas     = 5.88e-04
 rel. dual   infeas     = 7.97e-02
 norm(X), norm(y), norm(Z) = 9.9e+06, 2.3e+05, 3.2e+05
 norm(A), norm(b), norm(C) = 6.7e+05, 3.6e+05, 7.6e+01
 Total CPU time (secs)  = 1.05
 CPU time per iteration = 0.02
 termination code       = -6
 DIMACS errors: 5.9e-04  0.0e+00  8.0e-02  0.0e+00  1.0e+00  3.5e-02
-----------------------------------------------------------------

ans =

   7.1003e+05

Iteration   2   Total error is: 0.73675

 num. of constraints = 85
 dim. of socp   var  = 86,   num. of socp blk  =  1
 dim. of linear var  = 800
 dim. of free   var  = 20
 *** 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|2.4e+00|1.5e+02|9.2e+07| 8.956874e+04| 0:0:00|9.2e+07|1.0e+00|1.↙
0e+00| chol 1  1
```

```
 1|0.001|0.001|2.4e+00|1.5e+02|9.2e+07| 8.959141e+04| 0:0:00|9.2e+07|1.0e+00|1.↙
0e+00| chol 1  1
 2|0.004|0.004|2.4e+00|1.5e+02|9.1e+07| 8.971052e+04| 0:0:00|9.1e+07|1.0e+00|1.↙
0e+00| chol 1  1
 3|0.009|0.009|2.3e+00|1.5e+02|9.1e+07| 8.993148e+04| 0:0:00|9.1e+07|1.0e+00|9.9e-↙
01| chol 1  1
 4|0.089|0.089|2.2e+00|1.4e+02|8.5e+07| 9.066934e+04| 0:0:00|8.3e+07|9.9e-01|9.1e-↙
01| chol 1  1
 5|0.346|0.346|1.4e+00|9.0e+01|5.7e+07| 9.182481e+04| 0:0:00|5.5e+07|9.9e-01|6.0e-↙
01| chol 1  1
 6|0.758|0.758|3.6e-01|2.3e+01|1.5e+07| 9.189404e+04| 0:0:00|1.3e+07|9.9e-01|1.5e-↙
01| chol 1  1
 7|0.798|0.798|7.5e-02|4.7e+00|3.1e+06| 8.877737e+04| 0:0:00|2.5e+06|1.0e+00|3.2e-↙
02| chol 1  1
 8|0.289|0.289|5.9e-02|3.7e+00|2.6e+06| 9.109180e+04| 0:0:00|1.9e+06|9.8e-01|2.4e-↙
02| chol 1  1
 9|0.405|0.405|4.4e-02|2.8e+00|2.2e+06| 9.897760e+04| 0:0:00|1.2e+06|9.2e-01|1.7e-↙
02| chol 1  1
10|0.606|0.606|2.9e-02|1.9e+00|1.8e+06| 1.125936e+05| 0:0:00|6.0e+05|8.4e-01|1.0e-↙
02| chol 1  2
11|0.837|0.837|1.0e-02|6.5e-01|6.5e+05| 8.628644e+04| 0:0:00|4.5e+04|9.1e-01|4.0e-↙
03| chol 2  2
12|0.819|0.819|4.8e-03|3.0e-01|3.1e+05| 6.056665e+04| 0:0:00|4.6e+03|1.0e+00|2.0e-↙
03| chol 2  2
13|0.794|0.794|1.9e-03|1.2e-01|1.1e+05| 2.971641e+04| 0:0:00|2.4e+02|1.2e+00|9.8e-↙
04| chol 2  2
14|1.000|1.000|7.1e-04|4.4e-02|3.9e+04| 1.246020e+04| 0:0:00|1.1e+02|1.4e+00|4.1e-↙
04| chol 2  2
15|1.000|1.000|4.3e-04|1.6e-02|1.3e+04| 4.386105e+03| 0:0:00|4.7e+01|1.5e+00|1.7e-↙
04| chol 2  2
16|0.793|0.793|4.2e-04|8.7e-03|6.6e+03| 2.264679e+03| 0:0:00|2.5e+01|1.6e+00|9.4e-↙
05| chol 2  2
17|1.000|1.000|3.1e-04|5.0e-03|3.7e+03| 1.235888e+03| 0:0:00|1.1e+01|1.7e+00|5.5e-↙
05| chol 2  2
18|1.000|1.000|1.7e-04|2.1e-03|1.5e+03| 4.772456e+02| 0:0:00|6.3e+00|1.7e+00|2.4e-↙
05| chol 2  2
19|1.000|1.000|1.3e-04|9.4e-04|6.6e+02| 1.825203e+02| 0:0:00|2.7e+00|1.7e+00|1.1e-↙
05| chol 2  2
20|1.000|1.000|6.8e-05|4.3e-04|2.9e+02| 5.943467e+01| 0:0:00|1.2e+00|1.8e+00|4.9e-↙
06| chol 1  1
21|1.000|1.000|4.8e-05|1.8e-04|1.2e+02| 3.332325e+00| 0:0:00|5.4e-01|1.8e+00|2.0e-↙
06| chol 1  1
22|1.000|1.000|2.2e-05|7.3e-05|4.2e+01|-2.008606e+01| 0:0:00|2.2e-01|1.8e+00|7.2e-↙
07| chol 1  1
23|1.000|1.000|9.8e-06|4.6e-05|2.5e+01|-2.560424e+01| 0:0:00|9.0e-02|1.7e+00|3.9e-↙
07| chol 1  1
24|0.390|0.390|7.1e-06|4.1e-05|2.2e+01|-2.692362e+01| 0:0:00|7.6e-02|1.7e+00|3.2e-↙
07| chol 1  1
25|1.000|1.000|7.2e-06|2.8e-05|1.3e+01|-3.013410e+01| 0:0:00|3.8e-02|1.7e+00|2.0e-↙
07| chol 1  1
26|0.952|0.952|1.2e-05|1.9e-05|3.9e+00|-3.322507e+01| 0:0:00|2.4e-02|1.7e+00|5.8e-↙
08| chol 1  2
27|0.984|0.984|3.2e-05|1.7e-05|1.9e+00|-3.421166e+01| 0:0:00|7.6e-03|1.7e+00|2.7e-↙
08| chol 2  2
```

```
28|0.996|0.996|3.2e-05|1.4e-05|9.1e-01|-3.476709e+01| 0:0:00|3.5e-03|1.6e+00|1.2e-↙
08| chol 2  2
29|0.996|0.996|4.9e-05|1.3e-05|3.6e-01|-3.518890e+01| 0:0:00|1.7e-03|1.6e+00|4.1e-↙
09| chol 2  2
30|0.326|0.326|1.2e-04|1.1e-05|4.5e-01|-3.556669e+01| 0:0:00|1.4e-03|1.6e+00|2.0e-↙
09| chol 2  2
31|0.241|0.241|1.3e-04|9.7e-06|5.1e-01|-3.576784e+01| 0:0:00|1.2e-03|1.6e+00|1.3e-↙
09| chol 2  2
32|0.214|0.214|1.2e-04|8.8e-06|5.7e-01|-3.594958e+01| 0:0:01|1.2e-03|1.5e+00|1.0e-↙
09| chol 2  2
33|0.267|0.267|1.1e-04|7.8e-06|5.9e-01|-3.610466e+01| 0:0:01|1.1e-03|1.5e+00|8.6e-↙
10| chol 2  2
34|0.314|0.314|1.1e-04|6.8e-06|6.2e-01|-3.624454e+01| 0:0:01|1.1e-03|1.5e+00|1.1e-↙
09| chol 2  2
35|0.093|0.093|1.1e-04|6.4e-06|7.4e-01|-3.635426e+01| 0:0:01|1.1e-03|1.5e+00|5.7e-↙
10| chol 2  2
36|0.204|0.204|1.1e-04|5.3e-06|8.5e-01|-3.652544e+01| 0:0:01|1.1e-03|1.5e+00|9.6e-↙
10| chol 2  2
37|0.146|0.146|1.0e-04|4.8e-06|9.9e-01|-3.663330e+01| 0:0:01|1.2e-03|1.4e+00|7.1e-↙
10| chol 2  2
38|0.174|0.174|9.8e-05|4.3e-06|1.2e+00|-3.678806e+01| 0:0:01|1.3e-03|1.4e+00|1.0e-↙
09| chol 2  2
39|0.124|0.124|9.4e-05|4.1e-06|1.4e+00|-3.685466e+01| 0:0:01|1.4e-03|1.4e+00|1.5e-↙
09| chol 1  2
40|0.034|0.034|9.2e-05|4.3e-06|1.6e+00|-3.685306e+01| 0:0:01|1.4e-03|1.3e+00|1.4e-↙
09| chol 2  2
41|0.302|0.302|8.6e-05|3.8e-06|2.2e+00|-3.696259e+01| 0:0:01|1.9e-03|1.2e+00|1.9e-↙
09| chol 2  2
42|0.313|0.313|1.8e-04|4.1e-06|4.4e+00|-3.688645e+01| 0:0:01|2.7e-03|8.6e-01|4.1e-↙
09| chol 2  2
43|0.335|0.335|2.9e-04|4.7e-06|7.3e+00|-3.657859e+01| 0:0:01|3.7e-03|6.9e-01|8.6e-↙
09| chol 2  2
44|0.066|0.066|2.9e-04|5.1e-06|8.3e+00|-3.654240e+01| 0:0:01|3.8e-03|6.8e-01|9.2e-↙
09| chol 2  2
45|0.063|0.063|3.0e-04|5.5e-06|9.3e+00|-3.653408e+01| 0:0:01|4.0e-03|6.7e-01|9.6e-↙
09| chol 2  2
46|0.130|0.130|3.3e-04|5.8e-06|1.0e+01|-3.656851e+01| 0:0:01|4.5e-03|6.6e-01|1.0e-↙
08| chol 2  2
47|0.256|0.256|3.9e-04|5.7e-06|1.2e+01|-3.673429e+01| 0:0:01|5.5e-03|6.2e-01|1.1e-↙
08| chol 2  2
48|0.197|0.197|4.6e-04|5.6e-06|1.2e+01|-3.704335e+01| 0:0:01|5.9e-03|6.2e-01|1.1e-↙
08| chol 2  2
49|0.352|0.352|9.2e-04|4.4e-06|1.1e+01|-3.816154e+01| 0:0:01|6.6e-03|6.4e-01|9.5e-↙
09| chol 3  2
50|0.354|0.354|1.5e-03|3.6e-06|9.5e+00|-3.946016e+01| 0:0:01|6.5e-03|6.8e-01|9.6e-↙
09|
  Stop: maximum number of iterations reached
-----------------------------------------------------------------
 number of iterations   = 50
 primal objective value = -3.88705972e+01
 dual   objective value = -4.00497152e+01
 gap := trace(XZ)       = 9.50e+00
 relative gap           = 2.35e-01
 actual relative gap    = 1.48e-02
```

```
 rel. primal infeas     = 1.49e-03
 rel. dual   infeas     = 3.57e-06
 norm(X), norm(y), norm(Z) = 5.8e+05, 6.2e+01, 2.5e+01
 norm(A), norm(b), norm(C) = 1.0e+04, 3.0e+03, 7.6e+01
 Total CPU time (secs)  = 0.79
 CPU time per iteration = 0.02
 termination code       = -6
 DIMACS errors: 1.5e-03  0.0e+00  3.6e-06  0.0e+00  1.5e-02  1.2e-01
------------------------------------------------------------------

ans =

   39.9597

Iteration   3   Total error is: 0.025537

 num. of constraints = 85
 dim. of socp   var  = 86,   num. of socp blk  =  1
 dim. of linear var  = 800
 dim. of free   var  = 20
 *** 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|2.5e+00|1.5e+02|2.8e+08| 2.719761e+05| 0:0:00|2.8e+08|1.0e+00|1.↙
0e+00| chol 1  1
 1|0.000|0.000|2.5e+00|1.5e+02|2.8e+08| 2.719516e+05| 0:0:00|2.8e+08|1.0e+00|1.↙
0e+00| chol 1  1
 2|0.005|0.005|2.5e+00|1.5e+02|2.7e+08| 2.721809e+05| 0:0:00|2.7e+08|1.0e+00|1.↙
0e+00| chol 1  1
 3|0.005|0.005|2.5e+00|1.5e+02|2.7e+08| 2.725036e+05| 0:0:00|2.7e+08|1.0e+00|9.9e-↙
01| chol 1  1
 4|0.069|0.069|2.3e+00|1.4e+02|2.6e+08| 2.737050e+05| 0:0:00|2.5e+08|1.0e+00|9.3e-↙
01| chol 1  1
 5|0.222|0.222|1.8e+00|1.1e+02|2.0e+08| 2.758946e+05| 0:0:00|2.0e+08|9.9e-01|7.3e-↙
01| chol 1  1
 6|0.633|0.633|6.9e-01|4.2e+01|7.8e+07| 2.765492e+05| 0:0:00|7.4e+07|9.9e-01|2.7e-↙
01| chol 1  1
 7|0.870|0.870|9.2e-02|5.7e+00|1.1e+07| 2.694794e+05| 0:0:00|9.0e+06|1.0e+00|3.7e-↙
02| chol 1  1
 8|0.201|0.201|7.9e-02|4.9e+00|9.6e+06| 2.781057e+05| 0:0:00|7.4e+06|9.8e-01|3.1e-↙
02| chol 1  2
 9|0.330|0.330|6.3e-02|3.9e+00|8.7e+06| 3.020737e+05| 0:0:00|5.3e+06|9.3e-01|2.3e-↙
02| chol 1  2
10|0.610|0.610|3.5e-02|2.2e+00|5.5e+06| 3.145676e+05| 0:0:00|2.3e+06|8.9e-01|1.2e-↙
02| chol 2  2
11|0.803|0.803|1.4e-02|8.7e-01|2.4e+06| 2.753977e+05| 0:0:00|4.1e+05|9.1e-01|5.1e-↙
```

```
03| chol 2  2
12|0.858|0.858|6.9e-03|4.2e-01|1.2e+06| 2.097934e+05| 0:0:00|3.9e+04|9.5e-01|2.6e-↙
03| chol 2  2
13|0.780|0.780|3.0e-03|1.8e-01|4.9e+05| 1.171440e+05| 0:0:00|2.2e+03|1.1e+00|1.3e-↙
03| chol 2  2
14|0.999|0.999|1.0e-03|6.2e-02|1.7e+05| 5.126865e+04| 0:0:00|2.1e+02|1.3e+00|5.4e-↙
04| chol 2  2
15|1.000|1.000|8.9e-04|3.7e-02|9.2e+04| 3.001624e+04| 0:0:00|2.2e+02|1.4e+00|3.4e-↙
04| chol 2  2
16|0.837|0.837|1.1e-03|7.1e-03|1.5e+04| 4.685753e+03| 0:0:00|1.3e+02|1.6e+00|7.4e-↙
05| chol 2  2
17|0.804|0.804|8.6e-04|5.3e-03|1.2e+04| 3.594223e+03| 0:0:00|4.3e+01|1.7e+00|5.6e-↙
05| chol 2  2
18|1.000|1.000|5.1e-04|3.2e-03|6.8e+03| 2.158630e+03| 0:0:00|2.0e+01|1.7e+00|3.4e-↙
05| chol 2  2
19|1.000|1.000|2.4e-04|1.4e-03|2.9e+03| 8.293740e+02| 0:0:00|1.2e+01|1.7e+00|1.5e-↙
05| chol 2  2
20|1.000|1.000|2.2e-04|6.6e-04|1.3e+03| 3.785387e+02| 0:0:00|5.1e+00|1.7e+00|7.1e-↙
06| chol 2  2
21|1.000|1.000|9.7e-05|2.9e-04|5.4e+02| 1.282920e+02| 0:0:00|2.4e+00|1.8e+00|3.0e-↙
06| chol 2  2
22|1.000|1.000|6.6e-05|1.3e-04|2.2e+02| 3.804286e+01| 0:0:00|1.0e+00|1.8e+00|1.3e-↙
06| chol 1  1
23|1.000|1.000|2.1e-05|5.5e-05|7.9e+01|-8.108327e+00| 0:0:00|4.2e-01|1.8e+00|4.6e-↙
07| chol 1  1
24|0.924|0.924|1.1e-05|3.1e-05|3.2e+01|-2.165965e+01| 0:0:00|1.7e-01|1.9e+00|2.0e-↙
07| chol 1  1
25|1.000|1.000|6.5e-06|2.1e-05|8.1e+00|-2.914158e+01| 0:0:00|5.7e-02|1.9e+00|5.4e-↙
08| chol 1  1
26|1.000|1.000|5.1e-06|1.8e-05|2.4e+00|-3.076885e+01| 0:0:00|1.6e-02|2.0e+00|1.7e-↙
08| chol 1  1
27|1.000|1.000|1.8e-06|1.6e-05|9.1e-01|-3.123639e+01| 0:0:00|5.0e-03|2.0e+00|6.4e-↙
09| chol 1  1
28|1.000|1.000|1.1e-06|1.4e-05|2.5e-01|-3.142940e+01| 0:0:00|1.9e-03|2.0e+00|1.8e-↙
09| chol 1  1
29|0.259|0.259|9.1e-07|1.2e-05|2.4e-01|-3.149867e+01| 0:0:00|1.6e-03|2.0e+00|1.3e-↙
09| chol 1  1
30|0.092|0.092|2.1e-06|1.2e-05|2.5e-01|-3.154491e+01| 0:0:00|1.5e-03|2.0e+00|9.5e-↙
10| chol 1  2
31|0.188|0.188|7.2e-06|9.8e-06|2.9e-01|-3.171260e+01| 0:0:00|1.3e-03|1.9e+00|0.↙
0e+00| chol 2  2
32|0.171|0.171|1.7e-05|8.5e-06|3.5e-01|-3.187900e+01| 0:0:00|1.2e-03|1.9e+00|0.↙
0e+00| chol 2  2
33|0.077|0.077|2.1e-05|8.0e-06|4.1e-01|-3.202632e+01| 0:0:01|1.2e-03|1.9e+00|0.↙
0e+00| chol 2  2
34|0.393|0.393|5.3e-05|5.7e-06|5.3e-01|-3.226273e+01| 0:0:01|1.1e-03|1.9e+00|1.2e-↙
10| chol 2  2
35|0.108|0.108|6.0e-05|5.2e-06|6.4e-01|-3.246514e+01| 0:0:01|1.1e-03|1.8e+00|0.↙
0e+00| chol 2  3
36|0.228|0.228|7.8e-05|4.1e-06|6.9e-01|-3.261100e+01| 0:0:01|1.1e-03|1.8e+00|0.↙
0e+00| chol 2  2
37|0.168|0.168|8.6e-05|3.5e-06|7.2e-01|-3.273359e+01| 0:0:01|1.2e-03|1.8e+00|0.↙
0e+00| chol 2  2
38|0.130|0.130|9.0e-05|3.1e-06|7.4e-01|-3.280715e+01| 0:0:01|1.2e-03|1.8e+00|0.↙
```

```
0e+00| chol 2  2
39|0.116|0.116|9.0e-05|2.8e-06|7.7e-01|-3.286675e+01| 0:0:01|1.3e-03|1.7e+00|0.↙
0e+00| chol 2  2
40|0.247|0.247|9.4e-05|2.1e-06|7.8e-01|-3.297037e+01| 0:0:01|1.3e-03|1.7e+00|4.3e-↙
11| chol 2  2
41|0.053|0.053|8.9e-05|2.1e-06|8.3e-01|-3.301835e+01| 0:0:01|1.4e-03|1.7e+00|0.↙
0e+00| chol 2  2
42|0.102|0.102|9.1e-05|1.9e-06|8.6e-01|-3.307506e+01| 0:0:01|1.4e-03|1.7e+00|3.2e-↙
11| chol 2  2
43|0.024|0.024|8.7e-05|1.9e-06|8.9e-01|-3.308083e+01| 0:0:01|1.4e-03|1.6e+00|0.↙
0e+00| chol 2  2
44|0.177|0.177|8.1e-05|1.6e-06|9.9e-01|-3.316605e+01| 0:0:01|1.5e-03|1.6e+00|0.↙
0e+00| chol 2  2
45|0.062|0.062|6.7e-05|1.6e-06|1.2e+00|-3.317635e+01| 0:0:01|1.6e-03|1.5e+00|3.2e-↙
12| chol 2  2
46|0.252|0.252|1.4e-04|1.6e-06|2.1e+00|-3.329295e+01| 0:0:01|2.0e-03|1.2e+00|1.7e-↙
10| chol
  SMW too ill-conditioned, switch to LU factor, 4.5e+25.
  switch to LU factor lu  2  2
47|0.111|0.111|2.1e-04|1.6e-06|3.1e+00|-3.327759e+01| 0:0:01|2.3e-03|1.1e+00|5.0e-↙
10| lu  2  3
48|0.351|0.351|4.6e-04|1.8e-06|7.5e+00|-3.299929e+01| 0:0:01|3.4e-03|7.4e-01|2.2e-↙
09| lu  2  2
49|0.449|0.449|5.8e-04|2.0e-06|1.2e+01|-3.239185e+01| 0:0:01|5.2e-03|5.9e-01|4.7e-↙
09| lu  2  2
50|0.104|0.104|5.9e-04|2.2e-06|1.4e+01|-3.233707e+01| 0:0:01|5.6e-03|5.8e-01|4.9e-↙
09|
  Stop: maximum number of iterations reached
-----------------------------------------------------------------
 number of iterations   = 50
 primal objective value = -3.13408842e+01
 dual   objective value = -3.33332574e+01
 gap := trace(XZ)       = 1.39e+01
 relative gap           = 4.17e-01
 actual relative gap    = 3.03e-02
 rel. primal infeas     = 5.94e-04
 rel. dual   infeas     = 2.20e-06
 norm(X), norm(y), norm(Z) = 6.3e+05, 6.9e+01, 3.3e+01
 norm(A), norm(b), norm(C) = 1.3e+04, 5.0e+03, 7.6e+01
 Total CPU time (secs)  = 0.82
 CPU time per iteration = 0.02
 termination code       = -6
 DIMACS errors: 5.9e-04  0.0e+00  2.2e-06  0.0e+00  3.0e-02  2.1e-01
-----------------------------------------------------------------

ans =

   33.0816

Iteration   4   Total error is: 0.023328

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

```
 dim. of free   var  = 20
 *** 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|2.5e+00|1.6e+02|3.2e+08| 3.131199e+05| 0:0:00|3.2e+08|1.0e+00|1.↙
0e+00| chol 1  1
 1|0.000|0.000|2.5e+00|1.6e+02|3.2e+08| 3.130907e+05| 0:0:00|3.2e+08|1.0e+00|1.↙
0e+00| chol 1  1
 2|0.004|0.004|2.5e+00|1.6e+02|3.2e+08| 3.133491e+05| 0:0:00|3.2e+08|1.0e+00|1.↙
0e+00| chol 1  1
 3|0.004|0.004|2.5e+00|1.6e+02|3.2e+08| 3.137040e+05| 0:0:00|3.1e+08|1.0e+00|9.9e-↙
01| chol 1  1
 4|0.061|0.061|2.4e+00|1.5e+02|3.0e+08| 3.150801e+05| 0:0:00|3.0e+08|1.0e+00|9.3e-↙
01| chol 1  1
 5|0.210|0.210|1.9e+00|1.2e+02|2.4e+08| 3.176078e+05| 0:0:00|2.4e+08|9.9e-01|7.4e-↙
01| chol 1  1
 6|0.624|0.624|7.3e-01|4.6e+01|9.4e+07| 3.184595e+05| 0:0:00|8.9e+07|9.9e-01|2.9e-↙
01| chol 1  1
 7|0.877|0.877|9.2e-02|5.8e+00|1.2e+07| 3.104884e+05| 0:0:00|1.0e+07|1.0e+00|3.7e-↙
02| chol 1  1
 8|0.186|0.186|8.1e-02|5.1e+00|1.1e+07| 3.215511e+05| 0:0:00|8.6e+06|9.8e-01|3.1e-↙
02| chol 1  2
 9|0.321|0.321|6.6e-02|4.1e+00|1.0e+07| 3.509428e+05| 0:0:00|6.3e+06|9.2e-01|2.4e-↙
02| chol 1  1
10|0.622|0.622|3.5e-02|2.2e+00|6.2e+06| 3.609807e+05| 0:0:00|2.6e+06|8.9e-01|1.2e-↙
02| chol 2  2
11|0.804|0.804|1.4e-02|9.0e-01|2.8e+06| 3.173206e+05| 0:0:00|4.7e+05|9.1e-01|5.1e-↙
03| chol 2  4
12|0.762|0.762|7.8e-03|4.8e-01|1.6e+06| 2.489510e+05| 0:0:00|9.1e+04|9.5e-01|2.9e-↙
03| chol 2  2
13|0.770|0.770|3.3e-03|2.0e-01|6.0e+05| 1.390471e+05| 0:0:00|5.1e+03|1.1e+00|1.5e-↙
03| chol 2  2
14|0.916|0.916|1.3e-03|7.7e-02|2.3e+05| 6.735306e+04| 0:0:00|3.0e+02|1.3e+00|6.4e-↙
04| chol 2  2
15|1.000|1.000|1.1e-03|3.8e-02|1.1e+05| 3.461540e+04| 0:0:00|2.9e+02|1.4e+00|3.5e-↙
04| chol 3  2
16|0.869|0.869|1.1e-03|8.2e-03|2.0e+04| 6.202809e+03| 0:0:00|1.5e+02|1.6e+00|8.3e-↙
05| chol 3  2
17|0.523|0.523|6.7e-04|7.2e-03|1.8e+04| 5.247884e+03| 0:0:00|8.5e+01|1.6e+00|7.3e-↙
05| chol 2  2
18|0.911|0.911|7.1e-04|4.6e-03|1.1e+04| 3.661340e+03| 0:0:00|3.5e+01|1.7e+00|4.7e-↙
05| chol 2  2
19|1.000|1.000|2.6e-04|2.3e-03|5.4e+03| 1.597861e+03| 0:0:00|1.9e+01|1.7e+00|2.4e-↙
05| chol 2  2
20|1.000|1.000|3.1e-04|1.2e-03|2.8e+03| 8.807313e+02| 0:0:00|9.7e+00|1.7e+00|1.3e-↙
05| chol 2  2
```

```
21|1.000|1.000|1.8e-04|5.3e-04|1.2e+03| 3.138019e+02| 0:0:00|5.1e+00|1.8e+00|5.5e-↙
06| chol 2  2
22|1.000|1.000|1.1e-04|2.3e-04|4.8e+02| 1.172842e+02| 0:0:00|2.1e+00|1.8e+00|2.3e-↙
06| chol 2  2
23|1.000|1.000|4.8e-05|9.9e-05|1.9e+02| 2.542047e+01| 0:0:00|8.9e-01|1.8e+00|9.3e-↙
07| chol 1  1
24|1.000|1.000|2.7e-05|4.3e-05|6.7e+01|-9.667287e+00| 0:0:00|3.5e-01|1.8e+00|3.4e-↙
07| chol 1  1
25|1.000|1.000|7.5e-06|2.7e-05|2.9e+01|-2.191831e+01| 0:0:00|1.2e-01|1.9e+00|1.5e-↙
07| chol 1  1
26|1.000|1.000|9.0e-06|1.8e-05|7.1e+00|-2.841646e+01| 0:0:00|5.4e-02|1.9e+00|4.1e-↙
08| chol 1  1
27|1.000|1.000|5.9e-06|1.6e-05|2.6e+00|-2.972202e+01| 0:0:00|1.4e-02|2.0e+00|1.5e-↙
08| chol 1  1
28|1.000|1.000|3.4e-06|1.4e-05|9.2e-01|-3.020496e+01| 0:0:00|5.3e-03|2.0e+00|5.5e-↙
09| chol 1  1
29|1.000|1.000|1.7e-06|1.3e-05|2.4e-01|-3.041481e+01| 0:0:00|2.0e-03|2.0e+00|1.4e-↙
09| chol 1  1
30|0.167|0.167|2.4e-06|1.2e-05|2.6e-01|-3.050835e+01| 0:0:00|1.7e-03|2.0e+00|9.9e-↙
10| chol 2  2
31|0.128|0.128|6.8e-06|1.1e-05|3.1e-01|-3.069980e+01| 0:0:01|1.6e-03|1.9e+00|0.↙
0e+00| chol 2  2
32|0.228|0.228|2.1e-05|9.0e-06|3.8e-01|-3.092963e+01| 0:0:01|1.4e-03|1.9e+00|0.↙
0e+00| chol 2  2
33|0.111|0.111|2.8e-05|8.5e-06|4.5e-01|-3.116916e+01| 0:0:01|1.4e-03|1.9e+00|0.↙
0e+00| chol 2  2
34|0.504|0.504|6.9e-05|5.9e-06|5.6e-01|-3.149454e+01| 0:0:01|1.2e-03|1.9e+00|1.9e-↙
10| chol 2  2
35|0.096|0.096|8.0e-05|5.5e-06|6.9e-01|-3.175806e+01| 0:0:01|1.2e-03|1.8e+00|0.↙
0e+00| chol 2  2
36|0.264|0.264|1.1e-04|4.1e-06|7.5e-01|-3.195389e+01| 0:0:01|1.2e-03|1.8e+00|0.↙
0e+00| chol 2  2
37|0.114|0.114|1.1e-04|3.7e-06|7.9e-01|-3.207460e+01| 0:0:01|1.3e-03|1.8e+00|0.↙
0e+00| chol 3  2
38|0.109|0.109|1.2e-04|3.4e-06|8.1e-01|-3.216238e+01| 0:0:01|1.3e-03|1.8e+00|0.↙
0e+00| chol 2  2
39|0.070|0.070|1.2e-04|3.2e-06|8.4e-01|-3.220998e+01| 0:0:01|1.3e-03|1.7e+00|0.↙
0e+00| chol 2  2
40|0.047|0.047|1.2e-04|3.1e-06|8.6e-01|-3.223732e+01| 0:0:01|1.3e-03|1.7e+00|0.↙
0e+00| chol 2  2
41|0.170|0.170|1.2e-04|2.6e-06|8.9e-01|-3.236316e+01| 0:0:01|1.4e-03|1.7e+00|0.↙
0e+00| chol 2  2
42|0.175|0.175|1.2e-04|2.2e-06|9.0e-01|-3.244762e+01| 0:0:01|1.5e-03|1.7e+00|0.↙
0e+00| chol 2  3
43|0.045|0.045|1.2e-04|2.2e-06|9.6e-01|-3.250158e+01| 0:0:01|1.5e-03|1.7e+00|0.↙
0e+00| chol 2  2
44|0.165|0.165|1.2e-04|1.9e-06|1.0e+00|-3.260074e+01| 0:0:01|1.6e-03|1.6e+00|2.8e-↙
11| chol 2  2
45|0.026|0.026|1.1e-04|1.9e-06|1.0e+00|-3.260289e+01| 0:0:01|1.6e-03|1.6e+00|0.↙
0e+00| chol 2  2
46|0.221|0.221|1.0e-04|1.6e-06|1.2e+00|-3.272154e+01| 0:0:01|1.8e-03|1.5e+00|0.↙
0e+00| chol 4  3
47|0.122|0.122|1.1e-04|1.6e-06|1.8e+00|-3.272603e+01| 0:0:01|2.0e-03|1.3e+00|3.5e-↙
10| chol 2  2
```

```
48|0.213|0.213|2.5e-04|1.7e-06|3.3e+00|-3.288096e+01| 0:0:01|2.5e-03|1.1e+00|1.8e-↙
10| chol
  SMW too ill-conditioned, switch to LU factor, 4.6e+25.
  switch to LU factor lu  3  3
49|0.176|0.176|3.4e-04|1.7e-06|5.3e+00|-3.284576e+01| 0:0:01|3.1e-03|9.1e-01|8.3e-↙
10| lu  3  3
50|0.447|0.447|5.9e-04|1.9e-06|1.2e+01|-3.234097e+01| 0:0:01|5.0e-03|6.4e-01|3.2e-↙
09|
  Stop: maximum number of iterations reached
-----------------------------------------------------------------
 number of iterations   = 50
 primal objective value = -3.18757131e+01
 dual   objective value = -3.28062211e+01
 gap := trace(XZ)       = 1.19e+01
 relative gap           = 3.57e-01
 actual relative gap    = 1.42e-02
 rel. primal infeas     = 5.92e-04
 rel. dual   infeas     = 1.86e-06
 norm(X), norm(y), norm(Z) = 6.4e+05, 6.9e+01, 3.3e+01
 norm(A), norm(b), norm(C) = 1.4e+04, 5.8e+03, 7.6e+01
 Total CPU time (secs)  = 0.83
 CPU time per iteration = 0.02
 termination code       = -6
 DIMACS errors: 5.9e-04  0.0e+00  1.9e-06  0.0e+00  1.4e-02  1.8e-01
-----------------------------------------------------------------

ans =

   32.4675

Iteration   5   Total error is: 0.023123

 num. of constraints = 85
 dim. of socp   var  = 86,   num. of socp blk  =  1
 dim. of linear var  = 800
 dim. of free   var  = 20
 *** 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|2.5e+00|1.7e+02|3.7e+08| 3.669058e+05| 0:0:00|3.7e+08|1.0e+00|1.↙
0e+00| chol 1  1
 1|0.000|0.000|2.5e+00|1.7e+02|3.7e+08| 3.668702e+05| 0:0:00|3.7e+08|1.0e+00|1.↙
0e+00| chol 1  1
 2|0.004|0.004|2.5e+00|1.7e+02|3.7e+08| 3.671613e+05| 0:0:00|3.7e+08|1.0e+00|1.↙
0e+00| chol 1  1
 3|0.004|0.004|2.5e+00|1.7e+02|3.7e+08| 3.675469e+05| 0:0:00|3.7e+08|1.0e+00|9.9e-↙
```

```
01| chol 1  1
 4|0.055|0.055|2.4e+00|1.6e+02|3.5e+08| 3.690887e+05| 0:0:00|3.5e+08|1.0e+00|9.4e-↙
01| chol 1  1
 5|0.199|0.199|1.9e+00|1.3e+02|2.9e+08| 3.719270e+05| 0:0:00|2.8e+08|9.9e-01|7.6e-↙
01| chol 1  1
 6|0.611|0.611|7.6e-01|5.2e+01|1.2e+08| 3.729363e+05| 0:0:00|1.1e+08|9.9e-01|3.0e-↙
01| chol 1  1
 7|0.879|0.879|9.5e-02|6.5e+00|1.5e+07| 3.639956e+05| 0:0:00|1.3e+07|1.0e+00|3.8e-↙
02| chol 1  1
 8|0.184|0.184|8.3e-02|5.7e+00|1.4e+07| 3.767293e+05| 0:0:00|1.1e+07|9.8e-01|3.2e-↙
02| chol 1  2
 9|0.312|0.312|6.8e-02|4.7e+00|1.3e+07| 4.124243e+05| 0:0:00|7.8e+06|9.2e-01|2.5e-↙
02| chol 2  2
10|0.624|0.624|3.6e-02|2.4e+00|7.4e+06| 4.218197e+05| 0:0:00|3.2e+06|8.9e-01|1.3e-↙
02| chol 2  2
11|0.804|0.804|1.5e-02|1.0e+00|3.4e+06| 3.790840e+05| 0:0:00|6.1e+05|9.0e-01|5.3e-↙
03| chol 2  2
12|0.593|0.593|9.4e-03|6.4e-01|2.2e+06| 3.172243e+05| 0:0:00|2.3e+05|9.3e-01|3.5e-↙
03| chol 3  2
13|0.767|0.767|4.1e-03|2.7e-01|8.5e+05| 1.796935e+05| 0:0:00|1.2e+04|1.1e+00|1.8e-↙
03| chol 3  3
14|0.861|0.861|1.8e-03|1.1e-01|3.5e+05| 9.831764e+04| 0:0:00|8.6e+02|1.3e+00|8.1e-↙
04| chol 3  2
15|1.000|1.000|1.0e-03|5.7e-02|1.8e+05| 5.726193e+04| 0:0:00|4.0e+02|1.4e+00|4.6e-↙
04| chol 2  2
16|0.970|0.970|8.9e-04|1.2e-02|3.4e+04| 1.075129e+04| 0:0:00|2.1e+02|1.6e+00|1.1e-↙
04| chol 2  2
17|0.880|0.880|8.1e-04|8.6e-03|2.3e+04| 7.606088e+03| 0:0:00|6.9e+01|1.6e+00|8.1e-↙
05| chol 2  2
18|1.000|1.000|6.9e-04|5.0e-03|1.3e+04| 4.228440e+03| 0:0:00|3.8e+01|1.7e+00|4.7e-↙
05| chol 2  2
19|1.000|1.000|3.5e-04|2.4e-03|6.1e+03| 1.847473e+03| 0:0:00|2.2e+01|1.7e+00|2.3e-↙
05| chol 2  2
20|1.000|1.000|2.9e-04|1.2e-03|2.9e+03| 9.033876e+02| 0:0:00|1.1e+01|1.7e+00|1.2e-↙
05| chol 2  2
21|1.000|1.000|1.4e-04|5.0e-04|1.2e+03| 3.164268e+02| 0:0:00|5.2e+00|1.8e+00|4.8e-↙
06| chol 2  2
22|1.000|1.000|1.1e-04|2.2e-04|5.1e+02| 1.294076e+02| 0:0:00|2.2e+00|1.8e+00|2.1e-↙
06| chol 2  2
23|1.000|1.000|4.5e-05|9.7e-05|2.0e+02| 2.837743e+01| 0:0:00|9.5e-01|1.8e+00|8.5e-↙
07| chol 2  2
24|1.000|1.000|2.8e-05|4.5e-05|7.8e+01|-5.618635e+00| 0:0:00|3.8e-01|1.8e+00|3.4e-↙
07| chol 1  1
25|1.000|1.000|7.6e-06|2.7e-05|3.4e+01|-1.989722e+01| 0:0:00|1.4e-01|1.9e+00|1.6e-↙
07| chol 1  1
26|1.000|1.000|9.6e-06|1.8e-05|8.7e+00|-2.752151e+01| 0:0:00|6.5e-02|1.9e+00|4.4e-↙
08| chol 1  1
27|1.000|1.000|5.8e-06|1.6e-05|3.0e+00|-2.923060e+01| 0:0:00|1.7e-02|2.0e+00|1.6e-↙
08| chol 1  1
28|1.000|1.000|3.0e-06|1.4e-05|1.1e+00|-2.979871e+01| 0:0:00|6.4e-03|2.0e+00|5.8e-↙
09| chol 1  1
29|1.000|1.000|1.3e-06|1.3e-05|2.6e-01|-3.005627e+01| 0:0:00|2.4e-03|2.0e+00|1.3e-↙
09| chol 1  1
30|0.250|0.250|1.3e-06|1.1e-05|2.6e-01|-3.014374e+01| 0:0:00|1.9e-03|2.0e+00|9.4e-↙
```

```
10| chol 1  1
31|0.052|0.052|1.8e-06|1.1e-05|2.9e-01|-3.023788e+01| 0:0:01|1.9e-03|2.0e+00|3.4e-↙
10| chol 2  2
32|0.160|0.160|8.6e-06|9.4e-06|3.6e-01|-3.038976e+01| 0:0:01|1.7e-03|2.0e+00|0.↙
0e+00| chol 2  2
33|0.120|0.120|1.5e-05|8.5e-06|4.5e-01|-3.065998e+01| 0:0:01|1.6e-03|1.9e+00|0.↙
0e+00| chol 2  2
34|0.340|0.340|4.0e-05|6.2e-06|5.8e-01|-3.099076e+01| 0:0:01|1.4e-03|1.9e+00|0.↙
0e+00| chol 2  2
35|0.170|0.170|4.9e-05|5.5e-06|6.6e-01|-3.127480e+01| 0:0:01|1.4e-03|1.8e+00|0.↙
0e+00| chol 2  2
36|0.350|0.350|7.2e-05|4.2e-06|6.6e-01|-3.146946e+01| 0:0:01|1.4e-03|1.8e+00|1.2e-↙
11| chol 2  2
37|0.188|0.188|7.5e-05|3.7e-06|6.7e-01|-3.157464e+01| 0:0:01|1.4e-03|1.8e+00|0.↙
0e+00| chol 2  2
38|0.200|0.200|7.8e-05|3.3e-06|6.6e-01|-3.168889e+01| 0:0:01|1.4e-03|1.8e+00|0.↙
0e+00| chol 2  2
39|0.152|0.152|8.0e-05|3.0e-06|6.4e-01|-3.174269e+01| 0:0:01|1.4e-03|1.8e+00|0.↙
0e+00| chol 2  2
40|0.213|0.213|7.9e-05|2.7e-06|6.4e-01|-3.181480e+01| 0:0:01|1.3e-03|1.8e+00|6.6e-↙
11| chol 2  2
41|0.384|0.384|8.6e-05|2.3e-06|5.5e-01|-3.194988e+01| 0:0:01|1.3e-03|1.8e+00|0.↙
0e+00| chol 2  2
42|0.370|0.370|8.8e-05|2.0e-06|4.8e-01|-3.202462e+01| 0:0:01|1.2e-03|1.7e+00|0.↙
0e+00| chol 2  2
43|0.097|0.097|8.3e-05|2.0e-06|4.8e-01|-3.203749e+01| 0:0:01|1.2e-03|1.7e+00|9.2e-↙
11| chol 2  2
44|0.133|0.133|7.7e-05|2.0e-06|5.3e-01|-3.206193e+01| 0:0:01|1.2e-03|1.7e+00|2.7e-↙
10| chol 2  2
45|0.067|0.067|8.5e-05|1.9e-06|6.3e-01|-3.212277e+01| 0:0:01|1.2e-03|1.7e+00|2.2e-↙
10| chol 2  2
46|0.055|0.055|8.6e-05|1.8e-06|6.8e-01|-3.218374e+01| 0:0:01|1.2e-03|1.7e+00|5.0e-↙
11| chol 2  2
47|0.110|0.110|8.8e-05|1.6e-06|7.1e-01|-3.225322e+01| 0:0:01|1.2e-03|1.7e+00|0.↙
0e+00| chol 2  2
48|0.018|0.018|8.6e-05|1.6e-06|7.4e-01|-3.226301e+01| 0:0:01|1.2e-03|1.6e+00|0.↙
0e+00| chol 2  2
49|0.165|0.165|8.6e-05|1.4e-06|8.6e-01|-3.238445e+01| 0:0:01|1.3e-03|1.6e+00|0.↙
0e+00| chol 2  2
50|0.042|0.042|8.4e-05|1.5e-06|1.0e+00|-3.239665e+01| 0:0:01|1.4e-03|1.5e+00|0.↙
0e+00|
  Stop: maximum number of iterations reached
-----------------------------------------------------------------
 number of iterations   = 50
 primal objective value = -3.28773899e+01
 dual   objective value = -3.19159051e+01
 gap := trace(XZ)       = 1.02e+00
 relative gap           = 3.05e-02
 actual relative gap    = -1.46e-02
 rel. primal infeas     = 8.41e-05
 rel. dual   infeas     = 1.46e-06
 norm(X), norm(y), norm(Z) = 1.4e+05, 7.0e+01, 3.4e+01
 norm(A), norm(b), norm(C) = 1.5e+04, 6.8e+03, 7.6e+01
 Total CPU time (secs)  = 0.85
```

```
 CPU time per iteration = 0.02
 termination code       = -6
 DIMACS errors: 8.4e-05  0.0e+00  1.5e-06  0.0e+00  -1.5e-02  1.5e-02
------------------------------------------------------------------

ans =

   31.8634

Iteration   6   Total error is: 0.022965

 num. of constraints = 85
 dim. of socp   var  = 86,   num. of socp blk  =  1
 dim. of linear var  = 800
 dim. of free   var  = 20
 *** 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|2.5e+00|1.7e+02|4.2e+08| 4.126066e+05| 0:0:00|4.2e+08|1.0e+00|1.↙
0e+00| chol 1  1
 1|0.000|0.000|2.5e+00|1.7e+02|4.2e+08| 4.125651e+05| 0:0:00|4.2e+08|1.0e+00|1.↙
0e+00| chol 1  1
 2|0.004|0.004|2.5e+00|1.7e+02|4.2e+08| 4.128853e+05| 0:0:00|4.2e+08|1.0e+00|1.↙
0e+00| chol 1  1
 3|0.004|0.004|2.5e+00|1.7e+02|4.2e+08| 4.132948e+05| 0:0:00|4.2e+08|1.0e+00|9.9e-↙
01| chol 1  1
 4|0.055|0.055|2.4e+00|1.6e+02|4.0e+08| 4.149600e+05| 0:0:00|3.9e+08|1.0e+00|9.4e-↙
01| chol 1  1
 5|0.193|0.193|1.9e+00|1.3e+02|3.3e+08| 4.180502e+05| 0:0:00|3.2e+08|9.9e-01|7.7e-↙
01| chol 1  1
 6|0.600|0.600|7.9e-01|5.4e+01|1.3e+08| 4.192688e+05| 0:0:00|1.3e+08|9.9e-01|3.1e-↙
01| chol 1  1
 7|0.878|0.878|9.8e-02|6.7e+00|1.7e+07| 4.095445e+05| 0:0:00|1.5e+07|1.0e+00|3.9e-↙
02| chol 1  1
 8|0.189|0.189|8.5e-02|5.9e+00|1.6e+07| 4.229695e+05| 0:0:00|1.2e+07|9.8e-01|3.3e-↙
02| chol 1  2
 9|0.309|0.309|7.0e-02|4.8e+00|1.5e+07| 4.623708e+05| 0:0:00|9.2e+06|9.2e-01|2.6e-↙
02| chol 2  2
10|0.620|0.620|3.7e-02|2.5e+00|8.5e+06| 4.730781e+05| 0:0:00|3.8e+06|8.9e-01|1.3e-↙
02| chol 2  2
11|0.799|0.799|1.5e-02|1.1e+00|4.0e+06| 4.316745e+05| 0:0:00|7.7e+05|9.0e-01|5.5e-↙
03| chol 2  2
12|0.523|0.523|1.0e-02|7.1e-01|2.8e+06| 3.701369e+05| 0:0:00|3.4e+05|9.2e-01|3.8e-↙
03| chol 2  3
13|0.767|0.767|4.6e-03|3.0e-01|1.0e+06| 2.112814e+05| 0:0:00|1.8e+04|1.1e+00|1.9e-↙
03| chol 3  2
```

```
14|0.835|0.835|2.0e-03|1.2e-01|4.4e+05| 1.203667e+05| 0:0:00|1.6e+03|1.2e+00|9.0e-↙
04| chol 4  2
15|1.000|1.000|1.0e-03|6.1e-02|2.2e+05| 6.939785e+04| 0:0:00|4.5e+02|1.4e+00|4.9e-↙
04| chol 4  2
16|1.000|1.000|9.4e-04|1.8e-02|5.6e+04| 1.847032e+04| 0:0:00|2.6e+02|1.5e+00|1.6e-↙
04| chol 2  3
17|0.794|0.794|9.3e-04|9.3e-03|2.7e+04| 9.369353e+03| 0:0:00|1.2e+02|1.6e+00|8.8e-↙
05| chol 2  2
18|0.685|0.685|5.6e-04|7.2e-03|2.2e+04| 6.965138e+03| 0:0:00|6.7e+01|1.6e+00|6.8e-↙
05| chol 2  2
19|0.984|0.984|4.7e-04|4.5e-03|1.3e+04| 4.400844e+03| 0:0:00|3.8e+01|1.7e+00|4.3e-↙
05| chol 2  2
20|1.000|1.000|3.0e-04|2.0e-03|5.8e+03| 1.797687e+03| 0:0:00|2.3e+01|1.7e+00|2.0e-↙
05| chol 2  2
21|1.000|1.000|2.7e-04|1.1e-03|2.9e+03| 9.207931e+02| 0:0:00|1.0e+01|1.7e+00|1.0e-↙
05| chol 2  2
22|1.000|1.000|1.5e-04|4.7e-04|1.3e+03| 3.444785e+02| 0:0:00|5.3e+00|1.8e+00|4.6e-↙
06| chol 2  2
23|1.000|1.000|1.2e-04|2.0e-04|5.0e+02| 1.240738e+02| 0:0:00|2.3e+00|1.8e+00|1.9e-↙
06| chol 2  2
24|1.000|1.000|5.0e-05|8.9e-05|2.0e+02| 2.947385e+01| 0:0:00|9.3e-01|1.8e+00|7.6e-↙
07| chol 1  2
25|1.000|1.000|2.7e-05|4.0e-05|7.7e+01|-5.849523e+00| 0:0:00|3.8e-01|1.8e+00|3.0e-↙
07| chol 1  1
26|1.000|1.000|9.9e-06|2.4e-05|3.2e+01|-2.002918e+01| 0:0:00|1.4e-01|1.9e+00|1.4e-↙
07| chol 1  1
27|1.000|1.000|1.0e-05|1.7e-05|8.6e+00|-2.714412e+01| 0:0:00|6.2e-02|1.9e+00|3.8e-↙
08| chol 1  1
28|1.000|1.000|5.9e-06|1.5e-05|3.1e+00|-2.876195e+01| 0:0:00|1.7e-02|2.0e+00|1.4e-↙
08| chol 1  1
29|1.000|1.000|3.3e-06|1.3e-05|1.1e+00|-2.934166e+01| 0:0:00|6.5e-03|2.0e+00|5.1e-↙
09| chol 1  1
30|1.000|1.000|1.4e-06|1.1e-05|3.0e-01|-2.958225e+01| 0:0:00|2.4e-03|2.0e+00|1.4e-↙
09| chol 1  1
31|0.236|0.236|1.5e-06|1.0e-05|3.0e-01|-2.968253e+01| 0:0:00|2.0e-03|2.0e+00|9.5e-↙
10| chol 1  1
32|0.060|0.060|2.5e-06|9.8e-06|3.4e-01|-2.979169e+01| 0:0:00|1.9e-03|2.0e+00|3.4e-↙
10| chol 2  2
33|0.223|0.223|1.1e-05|8.2e-06|4.0e-01|-2.998049e+01| 0:0:00|1.6e-03|1.9e+00|0.↙
0e+00| chol 2  2
34|0.098|0.098|1.5e-05|7.7e-06|4.6e-01|-3.020748e+01| 0:0:00|1.6e-03|1.9e+00|0.↙
0e+00| chol 2  2
35|0.398|0.398|4.1e-05|5.7e-06|5.6e-01|-3.049594e+01| 0:0:01|1.4e-03|1.9e+00|9.1e-↙
11| chol 2  2
36|0.210|0.210|4.8e-05|5.1e-06|6.0e-01|-3.076949e+01| 0:0:01|1.3e-03|1.9e+00|0.↙
0e+00| chol 2  2
37|0.452|0.452|6.6e-05|4.0e-06|6.0e-01|-3.093910e+01| 0:0:01|1.3e-03|1.8e+00|1.2e-↙
10| chol 2  2
38|0.267|0.267|8.4e-05|3.0e-06|6.8e-01|-3.120956e+01| 0:0:01|1.3e-03|1.8e+00|0.↙
0e+00| chol 2  2
39|0.053|0.053|8.6e-05|2.9e-06|7.1e-01|-3.127001e+01| 0:0:01|1.3e-03|1.8e+00|0.↙
0e+00| chol 2  2
40|0.112|0.112|8.9e-05|2.6e-06|7.6e-01|-3.138132e+01| 0:0:01|1.3e-03|1.8e+00|0.↙
0e+00| chol 2  2
```

```
41|0.190|0.190|1.1e-04|2.2e-06|8.3e-01|-3.157543e+01| 0:0:01|1.4e-03|1.7e+00|0.↙
0e+00| chol 2  2
42|0.050|0.050|1.1e-04|2.1e-06|8.7e-01|-3.161842e+01| 0:0:01|1.4e-03|1.7e+00|0.↙
0e+00| chol 2  2
43|0.051|0.051|1.1e-04|2.1e-06|9.3e-01|-3.167661e+01| 0:0:01|1.4e-03|1.7e+00|0.↙
0e+00| chol 2  2
44|0.136|0.136|1.1e-04|1.8e-06|1.0e+00|-3.179297e+01| 0:0:01|1.5e-03|1.7e+00|0.↙
0e+00| chol 3  2
45|0.064|0.064|1.0e-04|1.8e-06|1.1e+00|-3.181051e+01| 0:0:01|1.5e-03|1.6e+00|0.↙
0e+00| chol 2  2
46|0.202|0.202|1.0e-04|1.5e-06|1.2e+00|-3.194911e+01| 0:0:01|1.7e-03|1.6e+00|0.↙
0e+00| chol
  SMW too ill-conditioned, switch to LU factor, 6.1e+25.
  switch to LU factor lu  2  4
47|0.043|0.043|9.4e-05|1.5e-06|1.4e+00|-3.194721e+01| 0:0:01|1.8e-03|1.5e+00|7.5e-↙
11| lu  4  3
48|0.195|0.195|1.6e-04|1.5e-06|2.3e+00|-3.207037e+01| 0:0:01|2.1e-03|1.3e+00|3.6e-↙
10| lu  3  3
49|0.180|0.180|2.8e-04|1.6e-06|4.2e+00|-3.208319e+01| 0:0:01|2.7e-03|1.0e+00|6.4e-↙
10| lu  3  3
50|0.073|0.073|3.2e-04|1.6e-06|5.5e+00|-3.204625e+01| 0:0:01|3.0e-03|9.7e-01|9.3e-↙
10|
  Stop: maximum number of iterations reached
-----------------------------------------------------------------
 number of iterations   = 50
 primal objective value = -3.23978014e+01
 dual   objective value = -3.16947042e+01
 gap := trace(XZ)       = 5.50e+00
 relative gap           = 1.66e-01
 actual relative gap    = -1.08e-02
 rel. primal infeas     = 3.18e-04
 rel. dual   infeas     = 1.63e-06
 norm(X), norm(y), norm(Z) = 4.4e+05, 7.0e+01, 3.4e+01
 norm(A), norm(b), norm(C) = 1.6e+04, 7.5e+03, 7.6e+01
 Total CPU time (secs)  = 0.75
 CPU time per iteration = 0.01
 termination code       = -6
 DIMACS errors: 3.2e-04  0.0e+00  1.6e-06  0.0e+00  -1.1e-02  8.5e-02
-----------------------------------------------------------------

ans =

   31.4944

Iteration   7   Total error is: 0.02281

 num. of constraints = 85
 dim. of socp   var  = 86,   num. of socp blk  =  1
 dim. of linear var  = 800
 dim. of free   var  = 20
 *** 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|2.7e+00|1.8e+02|5.1e+08| 5.061906e+05| 0:0:00|5.1e+08|1.0e+00|1.↙
0e+00| chol 1  1
 1|0.000|0.000|2.7e+00|1.8e+02|5.1e+08| 5.061386e+05| 0:0:00|5.1e+08|1.0e+00|1.↙
0e+00| chol 1  1
 2|0.003|0.003|2.7e+00|1.8e+02|5.1e+08| 5.065129e+05| 0:0:00|5.1e+08|1.0e+00|1.↙
0e+00| chol 1  1
 3|0.003|0.003|2.7e+00|1.8e+02|5.1e+08| 5.069740e+05| 0:0:00|5.1e+08|1.0e+00|9.9e-↙
01| chol 1  1
 4|0.048|0.048|2.5e+00|1.7e+02|4.9e+08| 5.089167e+05| 0:0:00|4.9e+08|1.0e+00|9.5e-↙
01| chol 1  1
 5|0.184|0.184|2.1e+00|1.4e+02|4.1e+08| 5.125007e+05| 0:0:00|4.0e+08|9.9e-01|7.8e-↙
01| chol 1  1
 6|0.584|0.584|8.9e-01|6.1e+01|1.7e+08| 5.139937e+05| 0:0:00|1.7e+08|9.9e-01|3.3e-↙
01| chol 1  1
 7|0.878|0.878|1.1e-01|7.6e+00|2.2e+07| 5.026388e+05| 0:0:00|1.9e+07|1.0e+00|4.2e-↙
02| chol 1  1
 8|0.162|0.162|9.9e-02|6.7e+00|2.1e+07| 5.159133e+05| 0:0:00|1.6e+07|9.8e-01|3.6e-↙
02| chol 1  2
 9|0.399|0.399|7.0e-02|4.8e+00|1.6e+07| 5.490828e+05| 0:0:00|1.1e+07|9.4e-01|2.5e-↙
02| chol 2  2
10|0.476|0.476|4.8e-02|3.3e+00|1.3e+07| 5.899153e+05| 0:0:00|6.1e+06|8.9e-01|1.6e-↙
02| chol 2  2
11|0.866|0.866|1.5e-02|1.0e+00|4.4e+06| 5.165903e+05| 0:0:00|6.7e+05|9.1e-01|5.0e-↙
03| chol 3  2
12|0.812|0.812|7.6e-03|5.1e-01|2.4e+06| 3.981276e+05| 0:0:00|9.8e+04|9.6e-01|2.7e-↙
03| chol 3  3
13|0.774|0.774|3.4e-03|2.2e-01|9.4e+05| 2.238671e+05| 0:0:00|5.7e+03|1.1e+00|1.4e-↙
03| chol 2  2
14|0.946|0.946|1.5e-03|9.3e-02|3.9e+05| 1.174867e+05| 0:0:00|6.0e+02|1.3e+00|6.6e-↙
04| chol 2  3
15|1.000|1.000|1.0e-03|5.1e-02|2.0e+05| 6.574307e+04| 0:0:00|5.0e+02|1.4e+00|3.9e-↙
04| chol 3  3
16|0.966|0.966|1.1e-03|9.5e-03|3.3e+04| 1.002983e+04| 0:0:00|2.5e+02|1.6e+00|8.3e-↙
05| chol 2  2
17|0.794|0.794|8.1e-04|7.2e-03|2.5e+04| 7.810001e+03| 0:0:00|8.9e+01|1.6e+00|6.4e-↙
05| chol 2  2
18|1.000|1.000|6.0e-04|4.5e-03|1.5e+04| 4.929387e+03| 0:0:00|4.2e+01|1.7e+00|4.0e-↙
05| chol 2  2
19|0.935|0.935|2.6e-04|2.2e-03|7.2e+03| 2.140558e+03| 0:0:00|2.7e+01|1.7e+00|2.0e-↙
05| chol 2  2
20|1.000|1.000|3.1e-04|1.3e-03|4.0e+03| 1.277686e+03| 0:0:00|1.3e+01|1.7e+00|1.2e-↙
05| chol 2  2
21|1.000|1.000|1.8e-04|5.4e-04|1.6e+03| 4.676093e+02| 0:0:00|7.3e+00|1.8e+00|4.9e-↙
06| chol 2  2
22|1.000|1.000|1.0e-04|2.3e-04|6.7e+02| 1.746033e+02| 0:0:00|3.0e+00|1.8e+00|2.0e-↙
06| chol 2  2
23|1.000|1.000|4.8e-05|9.0e-05|2.4e+02| 4.173330e+01| 0:0:00|1.2e+00|1.8e+00|7.4e-↙
```

```
07| chol 2  2
24|1.000|1.000|2.4e-05|4.3e-05|9.4e+01|-1.182876e-02| 0:0:00|4.4e-01|1.8e+00|3.0e-↙
07| chol 1  1
25|1.000|1.000|1.0e-05|2.6e-05|4.0e+01|-1.694435e+01| 0:0:00|1.7e-01|1.9e+00|1.4e-↙
07| chol 1  1
26|1.000|1.000|9.7e-06|1.8e-05|9.8e+00|-2.627553e+01| 0:0:00|7.8e-02|1.9e+00|3.6e-↙
08| chol 1  1
27|1.000|1.000|4.6e-06|1.6e-05|3.8e+00|-2.814425e+01| 0:0:00|2.0e-02|2.0e+00|1.4e-↙
08| chol 1  1
28|1.000|1.000|2.1e-06|1.4e-05|1.1e+00|-2.898917e+01| 0:0:00|7.9e-03|2.0e+00|4.1e-↙
09| chol 1  1
29|1.000|1.000|5.0e-07|1.3e-05|2.8e-01|-2.923484e+01| 0:0:00|2.3e-03|2.0e+00|1.1e-↙
09| chol 1  1
30|0.427|0.427|2.7e-07|1.0e-05|2.2e-01|-2.928525e+01| 0:0:00|1.6e-03|2.0e+00|7.6e-↙
10| chol 1  1
31|0.080|0.080|8.1e-07|9.4e-06|2.3e-01|-2.933190e+01| 0:0:00|1.5e-03|2.0e+00|5.5e-↙
10| chol 2  2
32|0.127|0.127|3.5e-06|8.5e-06|2.6e-01|-2.945092e+01| 0:0:01|1.4e-03|2.0e+00|0.↙
0e+00| chol 2  2
33|0.155|0.155|8.0e-06|7.4e-06|3.1e-01|-2.957437e+01| 0:0:01|1.2e-03|2.0e+00|0.↙
0e+00| chol 2  2
34|0.107|0.107|1.2e-05|6.8e-06|3.6e-01|-2.973087e+01| 0:0:01|1.2e-03|1.9e+00|0.↙
0e+00| chol 2  2
35|0.252|0.252|2.9e-05|5.6e-06|4.4e-01|-2.997936e+01| 0:0:01|1.1e-03|1.9e+00|0.↙
0e+00| chol 2  2
36|0.136|0.136|3.7e-05|5.1e-06|5.1e-01|-3.019295e+01| 0:0:01|1.1e-03|1.9e+00|0.↙
0e+00| chol 2  2
37|0.261|0.261|5.5e-05|4.2e-06|5.4e-01|-3.034879e+01| 0:0:01|1.1e-03|1.9e+00|0.↙
0e+00| chol 2  2
38|0.235|0.235|6.4e-05|3.6e-06|5.6e-01|-3.049496e+01| 0:0:01|1.1e-03|1.9e+00|0.↙
0e+00| chol 2  2
39|0.217|0.217|6.9e-05|3.2e-06|5.6e-01|-3.063278e+01| 0:0:01|1.1e-03|1.8e+00|0.↙
0e+00| chol 2  2
40|0.161|0.161|7.1e-05|2.9e-06|5.6e-01|-3.069999e+01| 0:0:01|1.1e-03|1.8e+00|0.↙
0e+00| chol 2  2
41|0.198|0.198|7.4e-05|2.6e-06|5.6e-01|-3.077519e+01| 0:0:01|1.1e-03|1.8e+00|0.↙
0e+00| chol 2  2
42|0.384|0.384|7.9e-05|2.2e-06|5.1e-01|-3.091659e+01| 0:0:01|1.1e-03|1.8e+00|0.↙
0e+00| chol 2  2
43|0.534|0.534|8.5e-05|1.9e-06|4.4e-01|-3.103828e+01| 0:0:01|1.1e-03|1.8e+00|0.↙
0e+00| chol 2  2
44|0.098|0.098|8.1e-05|1.9e-06|4.3e-01|-3.104672e+01| 0:0:01|1.0e-03|1.8e+00|1.6e-↙
11| chol 2  2
45|0.232|0.232|7.1e-05|1.8e-06|4.6e-01|-3.106273e+01| 0:0:01|1.0e-03|1.8e+00|2.3e-↙
10| chol 2  2
46|0.027|0.027|7.9e-05|1.8e-06|5.2e-01|-3.109287e+01| 0:0:01|1.0e-03|1.8e+00|2.3e-↙
10| chol 2  2
47|0.020|0.020|7.8e-05|1.8e-06|5.5e-01|-3.113017e+01| 0:0:01|1.0e-03|1.7e+00|8.2e-↙
11| chol 2  2
48|0.096|0.096|8.6e-05|1.6e-06|6.4e-01|-3.125140e+01| 0:0:01|1.0e-03|1.7e+00|0.↙
0e+00| chol 2  2
49|0.067|0.067|8.3e-05|1.5e-06|7.0e-01|-3.130034e+01| 0:0:01|1.1e-03|1.7e+00|0.↙
0e+00| chol 2  2
50|0.112|0.112|8.9e-05|1.4e-06|8.3e-01|-3.140522e+01| 0:0:01|1.1e-03|1.6e+00|0.↙
```

```
0e+00|
  Stop: maximum number of iterations reached
-----------------------------------------------------------------
 number of iterations   = 50
 primal objective value = -3.19360375e+01
 dual   objective value = -3.08743955e+01
 gap := trace(XZ)       = 8.27e-01
 relative gap           = 2.55e-02
 actual relative gap    = -1.66e-02
 rel. primal infeas     = 8.88e-05
 rel. dual   infeas     = 1.40e-06
 norm(X), norm(y), norm(Z) = 1.3e+05, 7.1e+01, 3.5e+01
 norm(A), norm(b), norm(C) = 1.8e+04, 8.9e+03, 7.6e+01
 Total CPU time (secs)  = 0.77
 CPU time per iteration = 0.02
 termination code       = -6
 DIMACS errors: 8.9e-05  0.0e+00  1.4e-06  0.0e+00  -1.7e-02  1.3e-02
-----------------------------------------------------------------

ans =

   30.8237

Iteration   8   Total error is: 0.022586
The total representation error of the testing signals is: 0.021387
>>
```