

```
>> 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 = 15
*** 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+01|1.3e+02|1.1e+07| 1.107923e+04| 0:0:00|1.1e+07|1.0e+00|1.1e+00| chol 1 1
1|0.014|0.014|2.7e+01|1.3e+02|1.1e+07| 1.111669e+04| 0:0:00|1.1e+07|1.0e+00|9.9e-01| chol 1 1
2|0.131|0.131|2.4e+01|1.2e+02|1.0e+07| 1.118685e+04| 0:0:00|9.9e+06|1.0e+00|8.6e-01| chol 1 1
3|0.630|0.630|8.9e+00|4.3e+01|3.8e+06| 1.121511e+04| 0:0:00|3.7e+06|1.0e+00|3.2e-01| chol 1 1
4|0.147|0.147|7.8e+00|3.8e+01|3.4e+06| 1.149684e+04| 0:0:00|3.2e+06|9.8e-01|2.8e-01| chol 1 1
5|0.746|0.746|2.1e+00|1.0e+01|9.1e+05| 1.145801e+04| 0:0:00|8.0e+05|9.8e-01|7.4e-01| chol 1 1
6|0.387|0.387|1.5e+00|7.2e+00|7.3e+05| 1.247151e+04| 0:0:00|5.3e+05|9.4e-01|5.1e-01| chol 1 1
7|0.639|0.639|6.3e-01|3.1e+00|3.3e+05| 1.246242e+04| 0:0:00|2.0e+05|9.3e-01|2.1e-01| chol 1 1
8|0.693|0.693|3.8e-01|1.8e+00|2.5e+05| 1.468962e+04| 0:0:00|8.3e+04|8.3e-01|1.1e-01| chol 1 1
9|0.769|0.769|1.3e-01|6.1e-01|8.0e+04| 1.053959e+04| 0:0:00|7.3e+03|9.5e-01|4.3e-01| chol 1 1
10|0.753|0.753|5.1e-02|2.5e-01|2.9e+04| 6.064108e+03| 0:0:01|3.8e+02|1.1e+00|2.1e-01| chol 1 1
11|0.792|0.792|1.7e-02|8.2e-02|8.4e+03| 2.503910e+03| 0:0:01|1.7e+01|1.4e+00|8.7e-01| chol 1 1
12|0.982|0.982|3.3e-03|1.6e-02|1.6e+03| 4.903252e+02| 0:0:01|9.9e+00|1.7e+00|2.0e-01| chol 1 1
13|0.820|0.820|2.4e-03|1.2e-02|1.2e+03| 3.606558e+02| 0:0:01|4.0e+00|1.7e+00|1.5e-01| chol 1 1
14|1.000|1.000|1.4e-03|6.1e-03|6.0e+02| 1.582381e+02| 0:0:01|2.1e+00|1.7e+00|7.9e-01| chol 1 1
15|1.000|1.000|6.8e-04|3.4e-03|3.2e+02| 4.752559e+01| 0:0:01|1.1e+00|1.8e+00|4.2e-01| chol 1 1
16|1.000|1.000|3.5e-04|1.6e-03|1.5e+02|-3.196917e+00| 0:0:01|6.0e-01|1.8e+00|2.1e-01| chol 1 1
17|1.000|1.000|1.6e-04|8.2e-04|7.4e+01|-3.108874e+01| 0:0:01|2.9e-01|1.8e+00|1.1e-01| chol 1 1
```

```

05| chol 1 1
18|1.000|1.000|8.8e-05|3.5e-04|3.1e+01|-4.252394e+01| 0:0:01|1.4e-01|1.8e+00|4.4e-✓
06| chol 1 1
19|1.000|1.000|3.7e-05|1.5e-04|1.3e+01|-4.841096e+01| 0:0:01|6.0e-02|1.8e+00|1.8e-✓
06| chol 1 1
20|1.000|1.000|2.5e-05|6.7e-05|4.6e+00|-5.028979e+01| 0:0:01|2.5e-02|1.8e+00|6.9e-✓
07| chol 1 1
21|1.000|1.000|6.1e-06|4.2e-05|2.1e+00|-5.104074e+01| 0:0:01|8.4e-03|1.9e+00|3.3e-✓
07| chol 1 1
22|1.000|1.000|9.3e-06|2.9e-05|6.3e-01|-5.138777e+01| 0:0:01|4.2e-03|2.0e+00|1.1e-✓
07| chol 1 1
23|1.000|1.000|2.7e-06|2.5e-05|2.3e-01|-5.150115e+01| 0:0:01|1.3e-03|2.0e+00|4.0e-✓
08| chol 1 1
24|1.000|1.000|3.4e-07|1.2e-05|6.6e-02|-5.154209e+01| 0:0:01|5.0e-04|2.0e+00|1.1e-✓
08| chol 1 1
25|1.000|1.000|2.8e-07|4.8e-06|2.6e-02|-5.155403e+01| 0:0:01|1.4e-04|2.0e+00|4.5e-✓
09| chol 1 1
26|1.000|1.000|5.0e-07|1.9e-06|8.7e-03|-5.155870e+01| 0:0:01|5.6e-05|2.0e+00|1.5e-✓
09| chol 1 1
27|0.801|0.801|6.3e-07|1.0e-06|5.6e-03|-5.155985e+01| 0:0:01|2.6e-05|2.0e+00|9.6e-✓
10| chol 1 1
28|0.443|0.443|1.6e-06|7.3e-07|4.7e-03|-5.156022e+01| 0:0:01|2.0e-05|2.0e+00|7.9e-✓
10| chol 1 1
29|0.509|0.509|2.5e-06|4.8e-07|3.5e-03|-5.156073e+01| 0:0:01|1.5e-05|2.0e+00|5.5e-✓
10| chol 1 1
30|0.360|0.360|4.6e-06|4.4e-07|3.2e-03|-5.156095e+01| 0:0:01|1.2e-05|2.0e+00|4.5e-✓
10| chol 1 1
31|0.397|0.397|9.2e-06|3.8e-07|2.9e-03|-5.156120e+01| 0:0:01|1.0e-05|2.0e+00|3.4e-✓
10| chol 1 1
    stop: primal infeas has deteriorated too much, 2.5e-05  0, 0, 1
32|0.619|0.619|9.2e-06|3.8e-07|2.9e-03|-5.156120e+01| 0:0:01|1.0e-05|2.0e+00|3.4e-✓
10|

```

```

-----
number of iterations    = 32
primal objective value = -5.15603070e+01
dual   objective value = -5.15620966e+01
gap := trace(XZ)       = 2.88e-03
relative gap           = 5.47e-05
actual relative gap    = 1.72e-05
rel. primal infeas     = 9.18e-06
rel. dual   infeas     = 3.77e-07
norm(X), norm(y), norm(Z) = 2.1e+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)   = 0.80
CPU time per iteration = 0.02
termination code        = -7
DIMACS errors: 9.2e-06  0.0e+00  3.8e-07  0.0e+00  1.7e-05  2.8e-05
-----

```

ans =

51.5620

```

num. of constraints = 85
dim. of socp var = 86,   num. of socp blk = 1
dim. of linear var = 800
dim. of free var = 15
*** 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|1.7e+03|1.4e+10| 1.365739e+07| 0:0:00|1.4e+10|1.0e+00|1.✓
0e+00| chol 1 1
1|0.000|0.000|2.4e+00|1.7e+03|1.4e+10| 1.365902e+07| 0:0:00|1.4e+10|1.0e+00|1.✓
0e+00| chol 1 2
2|0.000|0.000|2.4e+00|1.7e+03|1.4e+10| 1.366183e+07| 0:0:00|1.4e+10|1.0e+00|1.✓
0e+00| chol 1 2
3|0.008|0.008|2.4e+00|1.7e+03|1.4e+10| 1.367805e+07| 0:0:00|1.4e+10|1.0e+00|9.9e-✓
01| chol 1 2
4|0.008|0.008|2.4e+00|1.7e+03|1.4e+10| 1.372076e+07| 0:0:00|1.4e+10|1.0e+00|9.9e-✓
01| chol 2 2
5|0.140|0.140|2.1e+00|1.5e+03|1.2e+10| 1.382382e+07| 0:0:00|1.2e+10|9.9e-01|8.5e-✓
01| chol 2 3
6|0.331|0.331|1.4e+00|1.0e+03|8.4e+09| 1.401766e+07| 0:0:00|8.0e+09|9.9e-01|5.8e-✓
01| chol 2 2
7|0.891|0.891|1.6e-01|1.1e+02|9.6e+08| 1.385753e+07| 0:0:00|8.5e+08|9.9e-01|6.6e-✓
02| chol 2 3
8|0.224|0.224|1.3e-01|9.7e+01|8.5e+08| 1.454309e+07| 0:0:00|6.8e+08|9.6e-01|5.4e-✓
02| chol 3 3
9|0.666|0.666|5.0e-02|3.6e+01|3.2e+08| 1.395908e+07| 0:0:00|2.2e+08|9.8e-01|2.0e-✓
02| chol 3 3
10|0.483|0.483|3.4e-02|2.4e+01|2.5e+08| 1.476434e+07| 0:0:00|1.2e+08|9.3e-01|1.3e-✓
02| chol 3 4
11|0.685|0.685|1.4e-02|1.0e+01|1.0e+08| 1.223514e+07| 0:0:00|3.0e+07|1.0e+00|5.8e-✓
03| chol 3 4
12|0.653|0.653|7.3e-03|5.3e+00|5.4e+07| 9.230484e+06| 0:0:00|7.9e+06|1.1e+00|3.3e-✓
03| chol 5 5
13|0.663|0.663|4.4e-03|2.9e+00|2.9e+07| 6.627617e+06| 0:0:00|2.1e+06|1.2e+00|1.9e-✓
03| chol 5 5
14|0.979|0.979|2.1e-02|1.4e+00|1.7e+07| 4.601304e+06| 0:0:00|1.4e+05|1.1e+00|9.4e-✓
04| chol 5 8
15|0.776|0.776|1.4e-02|7.0e-01|7.2e+06| 2.259655e+06| 0:0:00|2.5e+04|1.3e+00|5.3e-✓
04| chol 6 5
16|1.000|1.000|6.9e-03|4.4e-01|4.3e+06| 1.442524e+06| 0:0:00|8.8e+03|1.4e+00|3.6e-✓
04| chol 7 6
17|1.000|1.000|1.2e-02|2.5e-01|2.1e+06| 7.020572e+05| 0:0:00|6.3e+03|1.5e+00|2.1e-✓
04| chol 5 5
18|1.000|1.000|1.4e-02|1.6e-01|1.1e+06| 3.530411e+05| 0:0:00|3.2e+03|1.5e+00|1.4e-✓
04| chol 5 6
19|0.928|0.928|2.1e-02|1.1e-01|5.6e+05| 1.666625e+05| 0:0:00|1.9e+03|1.5e+00|9.7e-✓

```

```

05| chol^ 3 6
20|1.000|1.000|5.2e-02|8.6e-02|1.8e+05| 2.415936e+04| 0:0:00|9.6e+02|1.5e+00|7.4e-✓
05| chol 6 6
21|0.270|0.270|7.2e-02|1.0e-01|1.8e+05| 3.177474e+04| 0:0:00|8.0e+02|1.5e+00|8.6e-✓
05| chol 6 9
22|0.168|0.168|1.0e-01|1.2e-01|1.9e+05| 4.994374e+04| 0:0:00|7.4e+02|1.4e+00|1.0e-✓
04| chol 6 6
23|0.120|0.120|1.3e-01|1.5e-01|2.3e+05| 8.608370e+04| 0:0:00|7.2e+02|1.3e+00|1.2e-✓
04| chol 6 7
24|0.094|0.094|1.5e-01|1.9e-01|3.0e+05| 1.521372e+05| 0:0:00|7.4e+02|1.2e+00|1.4e-✓
04| chol 5 5
25|0.090|0.090|1.5e-01|2.3e-01|3.8e+05| 2.395420e+05| 0:0:00|7.4e+02|1.2e+00|1.6e-✓
04| chol 6 6
26|0.070|0.070|1.1e-01|2.4e-01|4.4e+05| 3.291550e+05| 0:0:01|7.2e+02|1.2e+00|1.7e-✓
04| chol 7 8
27|0.148|0.148|8.0e-02|3.0e-01|6.2e+05| 5.337841e+05| 0:0:01|7.5e+02|1.1e+00|2.0e-✓
04| chol 5 6
28|0.219|0.219|7.2e-02|4.0e-01|9.2e+05| 8.597221e+05| 0:0:01|8.2e+02|1.0e+00|2.3e-✓
04| chol 7 6
29|0.233|0.233|7.8e-02|4.8e-01|1.2e+06| 1.161793e+06| 0:0:01|9.2e+02|9.5e-01|2.6e-✓
04| chol 6 7
30|0.215|0.215|8.3e-02|5.4e-01|1.4e+06| 1.413521e+06| 0:0:01|1.0e+03|9.0e-01|2.8e-✓
04| chol 5 6
31|0.446|0.446|1.0e-01|7.0e-01|1.6e+06| 2.012509e+06| 0:0:01|1.3e+03|7.8e-01|3.2e-✓
04| chol 7 5
32|0.519|0.519|1.9e-01|7.8e-01|1.8e+06| 2.379457e+06| 0:0:01|1.4e+03|7.5e-01|3.3e-✓
04| chol 5 6
33|0.886|0.886|2.3e-01|9.2e-01|9.7e+05| 2.984712e+06| 0:0:01|1.6e+03|6.7e-01|3.5e-✓
04| chol 5 8
34|0.948|0.948|3.0e-01|9.6e-01|5.5e+05| 3.178955e+06| 0:0:01|7.9e+02|6.5e-01|3.6e-✓
04| chol 7 7
35|0.736|0.736|2.9e-01|9.7e-01|3.6e+05| 3.271778e+06| 0:0:01|5.0e+02|6.4e-01|3.6e-✓
04| chol 6 6
36|0.969|0.969|3.6e-01|9.9e-01|8.3e+04| 3.397250e+06| 0:0:01|2.6e+02|6.4e-01|3.6e-✓
04| chol 6 8
37|0.967|0.967|1.0e+00|1.0e+00|4.3e+04| 3.472450e+06| 0:0:01|6.6e+01|6.4e-01|3.7e-✓
04| chol 7 7
38|0.406|0.406|1.3e+00|1.0e+00|4.0e+04| 3.496537e+06| 0:0:01|5.1e+01|6.4e-01|3.7e-✓
04| chol10 9
39|0.566|0.566|2.1e+00|1.0e+00|2.8e+04| 3.550856e+06| 0:0:01|3.8e+01|6.3e-01|3.7e-✓
04| chol 8 9
40|0.392|0.392|2.8e+00|1.0e+00|2.6e+04| 3.583653e+06| 0:0:01|3.1e+01|6.3e-01|3.7e-✓
04| chol 7 9
41|0.184|0.184|2.8e+00|1.0e+00|2.6e+04| 3.607326e+06| 0:0:01|2.8e+01|6.3e-01|3.7e-✓
04| chol 7 10
42|0.372|0.372|3.5e+00|1.0e+00|2.4e+04| 3.658286e+06| 0:0:01|2.4e+01|6.3e-01|3.7e-✓
04| chol11 9
43|0.817|0.817|4.4e+00|1.0e+00|2.0e+04| 3.773930e+06| 0:0:01|1.8e+01|6.3e-01|3.8e-✓
04| chol 9 7
44|0.775|0.775|3.8e+00|1.0e+00|1.3e+04| 3.829549e+06| 0:0:01|1.5e+01|6.3e-01|3.8e-✓
04| chol 7 7
45|0.946|0.946|4.3e+00|1.0e+00|2.8e+03| 3.880543e+06| 0:0:01|9.5e+00|6.3e-01|3.8e-✓
04| chol 8 7
46|0.676|0.676|6.6e+00|1.1e+00|2.6e+03| 3.897422e+06| 0:0:01|4.4e+00|6.3e-01|3.8e-✓

```

```

04| chol 8 9
47|0.238|0.238|7.1e+00|1.1e+00|2.5e+03| 3.907130e+06| 0:0:01|3.8e+00|6.3e-01|3.8e-
04|
Stop: relative gap < infeasibility
-----
number of iterations    = 47
primal objective value = 4.12395140e+06
dual  objective value = -9.89339231e+04
gap := trace(XZ)        = 1.63e+06
relative gap            = 7.71e-01
actual relative gap     = 1.00e+00
rel. primal infeas      = 1.04e-01
rel. dual  infeas       = 7.00e-01
norm(X), norm(y), norm(Z) = 4.8e+09, 1.0e+05, 1.4e+05
norm(A), norm(b), norm(C) = 2.0e+05, 2.6e+05, 7.6e+01
Total CPU time (secs)    = 0.99
CPU time per iteration   = 0.02
termination code         = -1
DIMACS errors: 1.0e-01  0.0e+00  7.0e-01  0.0e+00  1.0e+00  3.9e-01
-----

ans =

1.6713e+06

Iteration    2    Total error is: 2.8531

num. of constraints = 85
dim. of socp var = 86,    num. of socp blk = 1
dim. of linear var = 800
dim. of free var = 15
*** 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|1.3e+02|3.3e+07| 3.196557e+04| 0:0:00|3.3e+07|1.0e+00|1.
0e+00| chol 1 1
1|0.001|0.001|2.5e+00|1.3e+02|3.3e+07| 3.201447e+04| 0:0:00|3.3e+07|1.0e+00|1.
0e+00| chol 1 1
2|0.062|0.062|2.3e+00|1.3e+02|3.1e+07| 3.206843e+04| 0:0:00|3.1e+07|1.0e+00|9.4e-
01| chol 1 1
3|0.148|0.148|2.0e+00|1.1e+02|2.7e+07| 3.223484e+04| 0:0:00|2.6e+07|1.0e+00|8.0e-
01| chol 1 1
4|0.747|0.747|5.1e-01|2.8e+01|6.8e+06| 3.207007e+04| 0:0:00|6.6e+06|1.0e+00|2.1e-
01| chol 1 1
5|0.628|0.628|1.9e-01|1.0e+01|2.6e+06| 3.147537e+04| 0:0:00|2.4e+06|1.0e+00|7.8e-
02| chol 1 1

```

```
6|0.083|0.083|1.9e-01|1.0e+01|2.7e+06| 3.323415e+04| 0:0:00|2.3e+06|9.8e-01|7.4e-✓  
02| chol 1 1  
7|0.429|0.429|1.2e-01|6.4e+00|1.7e+06| 3.416375e+04| 0:0:00|1.4e+06|9.6e-01|4.6e-✓  
02| chol 1 1  
8|0.586|0.586|6.7e-02|3.7e+00|1.2e+06| 3.841014e+04| 0:0:00|6.6e+05|8.9e-01|2.4e-✓  
02| chol 1 1  
9|0.846|0.846|1.3e-02|6.9e-01|2.4e+05| 3.065909e+04| 0:0:00|3.8e+04|9.8e-01|5.0e-✓  
03| chol 1 1  
10|0.427|0.427|9.8e-03|5.3e-01|1.9e+05| 2.860527e+04| 0:0:00|2.2e+04|9.8e-01|3.9e-✓  
03| chol 1 1  
11|0.675|0.675|3.7e-03|2.0e-01|5.6e+04| 1.312507e+04| 0:0:00|9.3e+02|1.3e+00|1.9e-✓  
03| chol 1 1  
12|0.813|0.813|1.0e-03|5.6e-02|1.4e+04| 4.691662e+03| 0:0:00|3.8e+01|1.5e+00|6.4e-✓  
04| chol 1 1  
13|1.000|1.000|3.8e-04|2.0e-02|5.8e+03| 2.115455e+03| 0:0:00|2.1e+01|1.6e+00|2.4e-✓  
04| chol 2 2  
14|0.792|0.792|2.1e-04|7.2e-03|2.0e+03| 7.059078e+02| 0:0:00|1.1e+01|1.7e+00|9.4e-✓  
05| chol 1 1  
15|0.992|0.992|9.9e-05|5.0e-03|1.4e+03| 4.558186e+02| 0:0:00|3.8e+00|1.8e+00|6.5e-✓  
05| chol 1 1  
16|1.000|1.000|6.5e-05|2.5e-03|6.7e+02| 1.987365e+02| 0:0:00|2.6e+00|1.8e+00|3.3e-✓  
05| chol 1 1  
17|1.000|1.000|2.5e-05|1.2e-03|3.2e+02| 6.331839e+01| 0:0:00|1.3e+00|1.8e+00|1.6e-✓  
05| chol 1 1  
18|1.000|1.000|1.3e-05|5.2e-04|1.4e+02|-1.991030e-03| 0:0:00|6.2e-01|1.8e+00|6.8e-✓  
06| chol 1 1  
19|1.000|1.000|4.8e-06|2.4e-04|6.2e+01|-2.609649e+01| 0:0:00|2.6e-01|1.8e+00|3.2e-✓  
06| chol 1 1  
20|1.000|1.000|2.2e-06|1.0e-04|2.4e+01|-3.691360e+01| 0:0:00|1.2e-01|1.9e+00|1.3e-✓  
06| chol 1 1  
21|1.000|1.000|9.1e-07|5.0e-05|9.2e+00|-4.165333e+01| 0:0:00|4.6e-02|1.9e+00|5.1e-✓  
07| chol 1 1  
22|1.000|1.000|6.7e-07|2.9e-05|2.3e+00|-4.346798e+01| 0:0:00|1.8e-02|1.9e+00|1.3e-✓  
07| chol 1 1  
23|0.978|0.978|3.2e-07|2.4e-05|7.7e-01|-4.394953e+01| 0:0:00|5.0e-03|1.9e+00|4.5e-✓  
08| chol 1 1  
24|1.000|1.000|9.9e-07|2.2e-05|3.6e-01|-4.409575e+01| 0:0:00|1.6e-03|1.9e+00|2.1e-✓  
08| chol 1 1  
25|0.340|0.340|1.9e-06|1.8e-05|3.1e-01|-4.413881e+01| 0:0:00|1.3e-03|1.9e+00|1.7e-✓  
08| chol 1 1  
26|0.340|0.340|3.2e-06|1.4e-05|2.7e-01|-4.418356e+01| 0:0:00|1.1e-03|1.9e+00|1.5e-✓  
08| chol 1 1  
27|0.286|0.286|4.7e-06|1.1e-05|2.6e-01|-4.421816e+01| 0:0:00|9.7e-04|1.9e+00|1.3e-✓  
08| chol 1 1  
28|0.218|0.218|6.5e-06|8.8e-06|2.5e-01|-4.424491e+01| 0:0:00|8.8e-04|1.9e+00|1.2e-✓  
08| chol 1 1  
29|0.179|0.179|8.5e-06|7.4e-06|2.5e-01|-4.426956e+01| 0:0:00|8.3e-04|1.9e+00|1.0e-✓  
08| chol 1 1  
30|0.391|0.391|1.1e-05|4.8e-06|2.3e-01|-4.431633e+01| 0:0:00|7.2e-04|1.9e+00|8.6e-✓  
09| chol 1 1  
31|0.249|0.249|1.4e-05|4.1e-06|2.5e-01|-4.433883e+01| 0:0:00|6.7e-04|1.8e+00|7.6e-✓  
09| chol 1 1  
32|0.156|0.156|1.6e-05|4.1e-06|2.7e-01|-4.435156e+01| 0:0:00|6.5e-04|1.8e+00|7.2e-✓  
09| chol 1 1
```

```

33|0.236|0.236|1.8e-05|3.8e-06|2.9e-01|-4.437511e+01| 0:0:00|6.4e-04|1.8e+00|6.5e-✓
09| chol 1 1
34|0.357|0.357|1.8e-05|3.2e-06|2.9e-01|-4.439928e+01| 0:0:00|6.2e-04|1.7e+00|6.4e-✓
09| chol 1 1
35|0.282|0.282|1.9e-05|2.9e-06|3.1e-01|-4.441010e+01| 0:0:00|6.1e-04|1.7e+00|6.6e-✓
09| chol 1 1
36|0.570|0.570|2.3e-05|1.9e-06|2.5e-01|-4.444624e+01| 0:0:00|6.1e-04|1.6e+00|5.8e-✓
09| chol 1 1
37|0.458|0.458|3.0e-05|1.5e-06|2.4e-01|-4.445574e+01| 0:0:00|5.6e-04|1.6e+00|5.9e-✓
09| chol 2 1
38|0.430|0.430|4.1e-05|1.3e-06|2.4e-01|-4.446711e+01| 0:0:00|5.3e-04|1.5e+00|5.7e-✓
09| chol 2 2
39|0.388|0.388|5.2e-05|1.3e-06|2.5e-01|-4.447099e+01| 0:0:00|4.9e-04|1.4e+00|6.1e-✓
09| chol 2 2
40|0.293|0.293|6.2e-05|1.3e-06|2.6e-01|-4.447359e+01| 0:0:01|4.7e-04|1.4e+00|6.3e-✓
09| chol 2 2
41|0.171|0.171|6.7e-05|1.3e-06|2.8e-01|-4.447419e+01| 0:0:01|4.7e-04|1.4e+00|6.3e-✓
09| chol 2 2
42|0.350|0.350|7.8e-05|1.2e-06|2.9e-01|-4.448170e+01| 0:0:01|4.7e-04|1.4e+00|5.8e-✓
09| chol 2 2
43|0.284|0.284|1.9e-04|9.4e-07|3.1e-01|-4.451167e+01| 0:0:01|4.8e-04|1.3e+00|4.2e-✓
09| chol 2 3
44|0.116|0.116|7.4e-04|8.5e-07|4.4e-01|-4.454200e+01| 0:0:01|5.1e-04|1.2e+00|3.0e-✓
09| chol 3 4
45|0.085|0.085|1.9e-03|8.5e-07|6.8e-01|-4.456468e+01| 0:0:01|5.4e-04|1.2e+00|2.8e-✓
09| chol 3 5
46|0.097|0.097|4.2e-03|9.0e-07|1.2e+00|-4.460096e+01| 0:0:01|6.1e-04|1.1e+00|2.9e-✓
09| chol 4 4
47|0.091|0.091|8.3e-03|9.8e-07|2.0e+00|-4.465787e+01| 0:0:01|7.2e-04|1.0e+00|3.3e-✓
09| chol 5 3
48|0.114|0.114|1.7e-02|1.2e-06|3.5e+00|-4.480430e+01| 0:0:01|9.4e-04|9.2e-01|4.3e-✓
09| chol 4 7
49|0.043|0.043|2.1e-02|1.3e-06|4.3e+00|-4.482726e+01| 0:0:01|1.1e-03|9.0e-01|5.3e-✓
09| chol 4 5
50|0.079|0.079|3.7e-02|1.7e-06|6.6e+00|-4.507931e+01| 0:0:01|1.4e-03|8.5e-01|7.8e-✓
09|

```

Stop: maximum number of iterations reached

```

-----
number of iterations      = 50
primal objective value = -4.49303237e+01
dual   objective value = -4.52283061e+01
gap := trace(XZ)         = 6.62e+00
relative gap              = 1.44e-01
actual relative gap       = 3.27e-03
rel. primal infeas        = 3.66e-02
rel. dual   infeas        = 1.74e-06
norm(X), norm(y), norm(Z) = 7.6e+06, 5.8e+01, 2.2e+01
norm(A), norm(b), norm(C) = 7.7e+03, 1.4e+03, 7.6e+01
Total CPU time (secs)    = 0.64
CPU time per iteration   = 0.01
termination code         = -6
DIMACS errors: 3.7e-02  0.0e+00  1.7e-06  0.0e+00  3.3e-03  7.3e-02
-----

```

ans =

45.1598

Iteration 3 Total error is: 0.027195

```
num. of constraints = 85
dim. of socp var = 86, num. of socp blk = 1
dim. of linear var = 800
dim. of free var = 15
*** 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|1.4e+02|3.2e+08| 3.206256e+05| 0:0:00|3.2e+08|1.0e+00|1.4e+00| chol 1 1 ✓
1|0.000|0.000|2.7e+00|1.4e+02|3.2e+08| 3.206875e+05| 0:0:00|3.2e+08|1.0e+00|1.4e+00| chol 1 1 ✓
2|0.001|0.001|2.7e+00|1.4e+02|3.2e+08| 3.208432e+05| 0:0:00|3.2e+08|1.0e+00|1.4e+00| chol 1 1 ✓
3|0.034|0.034|2.6e+00|1.4e+02|3.1e+08| 3.213767e+05| 0:0:00|3.1e+08|1.0e+00|9.7e-01| chol 1 1 ✓
4|0.024|0.024|2.6e+00|1.4e+02|3.1e+08| 3.231815e+05| 0:0:00|3.1e+08|1.0e+00|9.5e-01| chol 1 1 ✓
5|0.350|0.350|1.7e+00|9.0e+01|2.1e+08| 3.252970e+05| 0:0:00|2.0e+08|9.9e-01|6.2e-01| chol 1 1 ✓
6|0.480|0.480|9.1e-01|4.9e+01|1.1e+08| 3.305411e+05| 0:0:00|1.1e+08|9.8e-01|3.3e-01| chol 1 1 ✓
7|0.676|0.676|3.1e-01|1.6e+01|3.9e+07| 3.319702e+05| 0:0:00|3.5e+07|9.8e-01|1.1e-01| chol 1 1 ✓
8|0.482|0.482|1.8e-01|9.7e+00|2.5e+07| 3.498664e+05| 0:0:00|1.9e+07|9.5e-01|6.4e-02| chol 1 1 ✓
9|0.806|0.806|3.9e-02|2.1e+00|5.6e+06| 3.266826e+05| 0:0:00|3.3e+06|9.7e-01|1.4e-02| chol 2 2 ✓
10|0.526|0.526|2.8e-02|1.5e+00|4.8e+06| 3.607642e+05| 0:0:00|1.8e+06|9.0e-01|9.4e-03| chol 2 2 ✓
11|0.615|0.615|1.6e-02|8.7e-01|2.9e+06| 3.233452e+05| 0:0:00|6.4e+05|9.3e-01|5.6e-03| chol 2 2 ✓
12|0.783|0.783|6.7e-03|3.6e-01|1.1e+06| 2.070484e+05| 0:0:00|3.2e+04|1.1e+00|2.7e-03| chol 2 2 ✓
13|0.785|0.785|2.7e-03|1.4e-01|3.9e+05| 1.099776e+05| 0:0:00|1.7e+03|1.3e+00|1.2e-03| chol 3 3 ✓
14|1.000|1.000|3.8e-03|4.2e-02|1.2e+05| 4.257223e+04| 0:0:00|3.0e+02|1.5e+00|4.3e-04| chol 3 3 ✓
15|0.770|0.770|5.6e-03|2.2e-02|5.9e+04| 2.134397e+04| 0:0:00|2.0e+02|1.6e+00|2.4e-04| chol 3 4 ✓
16|1.000|1.000|3.7e-03|1.1e-02|2.8e+04| 1.038492e+04| 0:0:00|9.3e+01|1.7e+00|1.3e-04| ✓
```



```

04| chol 3 3
17|0.966|0.966|3.2e-03|3.7e-03|8.8e+03| 3.193449e+03| 0:0:00|4.9e+01|1.8e+00|4.5e-✓
05| chol 3 3
18|1.000|1.000|2.7e-03|2.6e-03|6.2e+03| 1.988520e+03| 0:0:00|1.6e+01|1.8e+00|3.1e-✓
05| chol 2 2
19|1.000|1.000|1.7e-03|1.5e-03|3.5e+03| 1.117432e+03| 0:0:00|1.2e+01|1.8e+00|1.7e-✓
05| chol 2 2
20|1.000|1.000|7.5e-04|8.3e-04|1.9e+03| 5.533756e+02| 0:0:00|6.8e+00|1.8e+00|9.2e-✓
06| chol 2 2
21|1.000|1.000|4.7e-04|4.4e-04|9.1e+02| 2.711631e+02| 0:0:00|3.7e+00|1.8e+00|4.5e-✓
06| chol 2 2
22|1.000|1.000|1.1e-04|2.2e-04|4.3e+02| 1.047506e+02| 0:0:00|1.8e+00|1.9e+00|2.1e-✓
06| chol 2 1
23|1.000|1.000|6.7e-05|8.5e-05|1.6e+02| 2.595669e+01| 0:0:00|8.5e-01|1.9e+00|8.6e-✓
07| chol 1 1
24|1.000|1.000|1.2e-05|4.1e-05|6.1e+01|-1.042055e+01| 0:0:00|3.2e-01|1.9e+00|3.3e-✓
07| chol 1 1
25|1.000|1.000|1.0e-05|2.4e-05|2.4e+01|-2.197867e+01| 0:0:00|1.2e-01|1.9e+00|1.4e-✓
07| chol 1 1
26|1.000|1.000|4.5e-06|1.8e-05|6.0e+00|-2.842686e+01| 0:0:00|4.8e-02|2.0e+00|3.6e-✓
08| chol 1 1
27|1.000|1.000|1.5e-06|1.6e-05|2.2e+00|-2.965133e+01| 0:0:00|1.3e-02|2.0e+00|1.3e-✓
08| chol 1 1
28|1.000|1.000|8.0e-07|1.4e-05|6.6e-01|-3.019031e+01| 0:0:00|4.6e-03|2.0e+00|4.0e-✓
09| chol 1 1
29|1.000|1.000|1.2e-06|1.3e-05|2.6e-01|-3.033735e+01| 0:0:00|1.4e-03|2.0e+00|1.6e-✓
09| chol 1 1
30|0.211|0.211|1.3e-06|1.1e-05|2.4e-01|-3.036280e+01| 0:0:00|1.3e-03|2.0e+00|1.4e-✓
09| chol 1 1
31|0.079|0.079|1.4e-06|1.0e-05|2.5e-01|-3.037800e+01| 0:0:00|1.2e-03|2.0e+00|1.3e-✓
09| chol 1 1
32|0.205|0.205|2.1e-06|8.4e-06|2.5e-01|-3.040751e+01| 0:0:00|1.1e-03|2.0e+00|1.3e-✓
09| chol 1 1
33|0.122|0.122|2.4e-06|7.5e-06|2.6e-01|-3.042993e+01| 0:0:00|1.0e-03|2.0e+00|1.1e-✓
09| chol 1 1
34|0.096|0.096|2.6e-06|6.9e-06|2.7e-01|-3.045243e+01| 0:0:00|9.6e-04|2.0e+00|9.7e-✓
10| chol 1 1
35|0.062|0.062|2.7e-06|6.6e-06|2.8e-01|-3.046923e+01| 0:0:00|9.4e-04|2.0e+00|8.3e-✓
10| chol 1 1
36|0.030|0.030|2.6e-06|6.5e-06|2.9e-01|-3.047241e+01| 0:0:00|9.3e-04|2.0e+00|8.6e-✓
10| chol 1 1
37|0.162|0.162|3.0e-06|5.6e-06|3.1e-01|-3.051586e+01| 0:0:00|8.8e-04|2.0e+00|5.2e-✓
10| chol 1 1
38|0.143|0.143|3.1e-06|4.8e-06|3.2e-01|-3.057280e+01| 0:0:00|8.6e-04|2.0e+00|0.✓
0e+00| chol 1 2
39|0.160|0.160|1.2e-05|4.1e-06|3.7e-01|-3.072845e+01| 0:0:00|8.5e-04|1.9e+00|0.✓
0e+00| chol 2 2
40|0.125|0.125|3.5e-05|3.7e-06|4.9e-01|-3.093309e+01| 0:0:00|8.6e-04|1.9e+00|0.✓
0e+00| chol 2 2
41|0.196|0.196|8.5e-05|3.1e-06|6.9e-01|-3.121917e+01| 0:0:01|9.2e-04|1.8e+00|0.✓
0e+00| chol 2 2
42|0.107|0.107|1.2e-04|2.8e-06|8.7e-01|-3.142276e+01| 0:0:01|1.0e-03|1.7e+00|0.✓
0e+00| chol 2 2
43|0.475|0.475|2.4e-04|1.6e-06|1.1e+00|-3.180759e+01| 0:0:01|1.3e-03|1.6e+00|6.0e-✓

```

```

11| chol 2 2
44|0.264|0.264|2.9e-04|1.2e-06|1.2e+00|-3.201131e+01| 0:0:01|1.6e-03|1.5e+00|0.✓
0e+00| chol 2 2
45|0.548|0.548|3.7e-04|5.7e-07|1.1e+00|-3.225609e+01| 0:0:01|1.9e-03|1.5e+00|8.1e-✓
12| chol 2 2
46|0.247|0.247|3.7e-04|4.4e-07|1.1e+00|-3.229303e+01| 0:0:01|1.9e-03|1.4e+00|8.5e-✓
11| chol 2 3
47|0.075|0.075|3.4e-04|4.7e-07|1.2e+00|-3.225843e+01| 0:0:01|1.9e-03|1.4e+00|3.4e-✓
10| chol 2 2
48|0.343|0.343|2.8e-04|4.2e-07|1.5e+00|-3.224216e+01| 0:0:01|2.1e-03|1.3e+00|7.2e-✓
10| chol
    SMW too ill-conditioned, switch to LU factor, 6.0e+25.
    switch to LU factor lu 3 3
49|0.296|0.296|2.3e-04|4.3e-07|1.7e+00|-3.221231e+01| 0:0:01|2.2e-03|1.2e+00|1.0e-✓
09| lu 2 2
50|0.283|0.283|1.6e-04|5.2e-07|2.1e+00|-3.201498e+01| 0:0:01|2.4e-03|1.1e+00|1.8e-✓
09|
    Stop: maximum number of iterations reached
-----
number of iterations      = 50
primal objective value    = -3.17805720e+01
dual   objective value    = -3.22493956e+01
gap := trace(XZ)          = 2.13e+00
relative gap              = 6.44e-02
actual relative gap       = 7.21e-03
rel. primal infeas        = 1.57e-04
rel. dual   infeas        = 5.22e-07
norm(X), norm(y), norm(Z) = 2.7e+05, 7.1e+01, 3.4e+01
norm(A), norm(b), norm(C) = 9.7e+03, 4.9e+03, 7.6e+01
Total CPU time (secs)     = 0.65
CPU time per iteration    = 0.01
termination code          = -6
DIMACS errors: 1.6e-04   0.0e+00   5.2e-07   0.0e+00   7.2e-03   3.3e-02
-----

ans =

    32.2176

Iteration    4    Total error is: 0.023033

num. of constraints = 85
dim. of socp var = 86,    num. of socp blk = 1
dim. of linear var = 800
dim. of free var = 15
*** 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|1.5e+02|6.4e+08| 6.279789e+05| 0:0:00|6.4e+08|1.0e+00|1.✓  
0e+00| chol 1 1  
1|0.000|0.000|2.7e+00|1.5e+02|6.4e+08| 6.280801e+05| 0:0:00|6.4e+08|1.0e+00|1.✓  
0e+00| chol 1 1  
2|0.001|0.001|2.7e+00|1.5e+02|6.4e+08| 6.283116e+05| 0:0:00|6.3e+08|1.0e+00|1.✓  
0e+00| chol 1 1  
3|0.022|0.022|2.7e+00|1.5e+02|6.2e+08| 6.292361e+05| 0:0:00|6.2e+08|1.0e+00|9.8e-✓  
01| chol 1 1  
4|0.017|0.017|2.6e+00|1.4e+02|6.2e+08| 6.322107e+05| 0:0:00|6.1e+08|1.0e+00|9.6e-✓  
01| chol 1 1  
5|0.256|0.256|2.0e+00|1.1e+02|4.7e+08| 6.368310e+05| 0:0:00|4.6e+08|9.9e-01|7.2e-✓  
01| chol 1 1  
6|0.422|0.422|1.2e+00|6.5e+01|2.9e+08| 6.475998e+05| 0:0:00|2.7e+08|9.8e-01|4.3e-✓  
01| chol 1 1  
7|0.782|0.782|2.7e-01|1.5e+01|6.6e+07| 6.450161e+05| 0:0:00|5.9e+07|9.8e-01|9.7e-✓  
02| chol 1 1  
8|0.378|0.378|1.9e-01|1.0e+01|4.9e+07| 6.831176e+05| 0:0:00|3.9e+07|9.5e-01|6.5e-✓  
02| chol 1 2  
9|0.774|0.774|4.7e-02|2.6e+00|1.3e+07| 6.467639e+05| 0:0:00|8.1e+06|9.7e-01|1.7e-✓  
02| chol 2 2  
10|0.520|0.520|3.3e-02|1.8e+00|1.1e+07| 7.048296e+05| 0:0:00|4.4e+06|9.1e-01|1.1e-✓  
02| chol 2 2  
11|0.636|0.636|1.7e-02|9.6e-01|5.9e+06| 6.304579e+05| 0:0:00|1.5e+06|9.4e-01|6.0e-✓  
03| chol 2 2  
12|0.808|0.808|7.1e-03|3.9e-01|2.3e+06| 4.249096e+05| 0:0:00|7.5e+04|1.1e+00|2.8e-✓  
03| chol 2 3  
13|0.784|0.784|3.0e-03|1.5e-01|8.4e+05| 2.306372e+05| 0:0:00|4.0e+03|1.3e+00|1.3e-✓  
03| chol 3 4  
14|0.896|0.896|6.0e-03|6.4e-02|3.6e+05| 1.175928e+05| 0:0:00|1.0e+03|1.4e+00|6.1e-✓  
04| chol 3 4  
15|1.000|1.000|6.4e-03|3.0e-02|1.6e+05| 5.732982e+04| 0:0:00|4.7e+02|1.5e+00|3.1e-✓  
04| chol 3 3  
16|1.000|1.000|4.4e-03|8.1e-03|3.7e+04| 1.315100e+04| 0:0:00|2.2e+02|1.7e+00|9.2e-✓  
05| chol 3 3  
17|0.756|0.756|3.0e-03|4.5e-03|2.0e+04| 6.701164e+03| 0:0:00|9.9e+01|1.8e+00|5.1e-✓  
05| chol 3 3  
18|0.672|0.672|2.2e-03|3.8e-03|1.8e+04| 5.552823e+03| 0:0:00|5.8e+01|1.8e+00|4.3e-✓  
05| chol 2 2  
19|0.916|0.916|1.8e-03|2.9e-03|1.3e+04| 4.403334e+03| 0:0:00|3.6e+01|1.8e+00|3.2e-✓  
05| chol 2 2  
20|0.787|0.787|1.1e-03|1.9e-03|8.5e+03| 2.596787e+03| 0:0:00|2.7e+01|1.8e+00|2.1e-✓  
05| chol 2 3  
21|1.000|1.000|1.1e-03|1.1e-03|4.8e+03| 1.576392e+03| 0:0:00|1.7e+01|1.8e+00|1.3e-✓  
05| chol 3 2  
22|1.000|1.000|6.3e-04|5.5e-04|2.2e+03| 6.655733e+02| 0:0:00|9.4e+00|1.8e+00|5.9e-✓  
06| chol 2 2  
23|1.000|1.000|4.8e-04|3.0e-04|1.1e+03| 3.299661e+02| 0:0:00|4.4e+00|1.9e+00|3.0e-✓  
06| chol 2 2  
24|0.955|0.955|2.1e-04|1.8e-04|6.1e+02| 1.566205e+02| 0:0:00|2.3e+00|1.9e+00|1.6e-✓  
06| chol 2 2  
25|1.000|1.000|1.7e-04|9.8e-05|3.3e+02| 8.538949e+01| 0:0:00|1.2e+00|1.9e+00|9.0e-✓  
07| chol 2 2
```

```

26|1.000|1.000|5.3e-05|5.1e-05|1.3e+02| 1.226217e+01| 0:0:00|6.8e-01|1.9e+00|3.5e-✓
07| chol 2 2
27|1.000|1.000|4.4e-05|2.7e-05|6.5e+01|-5.599044e+00| 0:0:00|2.6e-01|1.9e+00|1.8e-✓
07| chol 2 1
28|1.000|1.000|1.3e-05|1.8e-05|2.3e+01|-2.087998e+01| 0:0:00|1.3e-01|1.9e+00|6.5e-✓
08| chol 1 1
29|1.000|1.000|8.6e-06|1.4e-05|7.4e+00|-2.550470e+01| 0:0:00|4.6e-02|2.0e+00|2.3e-✓
08| chol 1 1
30|1.000|1.000|2.3e-06|1.2e-05|2.0e+00|-2.747201e+01| 0:0:00|1.6e-02|2.0e+00|6.1e-✓
09| chol 1 1
31|1.000|1.000|5.1e-07|1.0e-05|7.9e-01|-2.787492e+01| 0:0:00|4.2e-03|2.0e+00|2.5e-✓
09| chol 1 1
32|0.847|0.847|1.7e-07|9.3e-06|2.7e-01|-2.807343e+01| 0:0:00|2.1e-03|2.0e+00|8.6e-✓
10| chol 1 1
33|0.918|0.918|1.4e-07|5.0e-06|8.2e-02|-2.815607e+01| 0:0:00|7.2e-04|2.0e+00|2.6e-✓
10| chol 1 1
34|0.518|0.518|2.2e-07|3.6e-06|6.2e-02|-2.816911e+01| 0:0:00|4.4e-04|2.0e+00|1.9e-✓
10| chol 1 1
35|0.092|0.092|3.4e-07|3.4e-06|6.2e-02|-2.817284e+01| 0:0:00|4.1e-04|2.0e+00|1.8e-✓
10| chol 1 1
36|0.036|0.036|5.0e-07|3.3e-06|6.3e-02|-2.817564e+01| 0:0:00|4.0e-04|2.0e+00|1.6e-✓
10|

```

Stop: steps too short consecutively

```

-----
number of iterations    = 36
primal objective value = -2.81620356e+01
dual   objective value = -2.81892504e+01
gap := trace(XZ)       = 6.26e-02
relative gap           = 2.15e-03
actual relative gap    = 4.75e-04
rel. primal infeas     = 5.03e-07
rel. dual   infeas     = 3.26e-06
norm(X), norm(y), norm(Z) = 1.0e+03, 7.5e+01, 3.9e+01
norm(A), norm(b), norm(C) = 1.1e+04, 9.6e+03, 7.6e+01
Total CPU time (secs)   = 0.49
CPU time per iteration = 0.01
termination code        = -5
DIMACS errors: 5.0e-07  0.0e+00  3.3e-06  0.0e+00  4.7e-04  1.1e-03
-----

```

ans =

28.1883

Iteration 5 Total error is: 0.021667

```

num. of constraints = 85
dim. of socp var   = 86,   num. of socp blk = 1
dim. of linear var = 800
dim. of free var   = 15
*** 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|1.5e+02|7.4e+08| 7.268264e+05| 0:0:00|7.4e+08|1.0e+00|1.✓
0e+00| chol 1 1
1|0.000|0.000|2.7e+00|1.5e+02|7.4e+08| 7.269392e+05| 0:0:00|7.4e+08|1.0e+00|1.✓
0e+00| chol 1 1
2|0.000|0.000|2.7e+00|1.5e+02|7.4e+08| 7.272013e+05| 0:0:00|7.4e+08|1.0e+00|1.✓
0e+00| chol 1 1
3|0.021|0.021|2.6e+00|1.5e+02|7.2e+08| 7.282488e+05| 0:0:00|7.2e+08|1.0e+00|9.8e-✓
01| chol 1 1
4|0.016|0.016|2.6e+00|1.5e+02|7.2e+08| 7.316465e+05| 0:0:00|7.1e+08|1.0e+00|9.7e-✓
01| chol 1 1
5|0.225|0.225|2.0e+00|1.2e+02|5.7e+08| 7.375003e+05| 0:0:00|5.5e+08|9.9e-01|7.5e-✓
01| chol 1 1
6|0.404|0.404|1.2e+00|7.2e+01|3.6e+08| 7.509078e+05| 0:0:00|3.4e+08|9.8e-01|4.6e-✓
01| chol 1 1
7|0.798|0.798|2.6e-01|1.5e+01|7.6e+07| 7.477888e+05| 0:0:00|6.8e+07|9.8e-01|9.7e-✓
02| chol 1 1
8|0.386|0.386|1.8e-01|1.0e+01|5.6e+07| 7.906378e+05| 0:0:00|4.4e+07|9.5e-01|6.4e-✓
02| chol 2 2
9|0.765|0.765|4.7e-02|2.7e+00|1.5e+07| 7.499977e+05| 0:0:00|9.6e+06|9.7e-01|1.7e-✓
02| chol 2 2
10|0.526|0.526|3.2e-02|1.9e+00|1.2e+07| 8.120710e+05| 0:0:00|5.1e+06|9.1e-01|1.1e-✓
02| chol 2 2
11|0.658|0.658|1.5e-02|8.9e-01|5.9e+06| 6.856434e+05| 0:0:00|1.5e+06|9.7e-01|5.6e-✓
03| chol 2 2
12|0.811|0.811|6.3e-03|3.7e-01|2.4e+06| 4.590639e+05| 0:0:00|7.7e+04|1.1e+00|2.6e-✓
03| chol 3 3
13|0.794|0.794|2.8e-03|1.4e-01|8.7e+05| 2.454619e+05| 0:0:00|4.1e+03|1.3e+00|1.2e-✓
03| chol 3 4
14|0.867|0.867|7.7e-03|6.8e-02|4.3e+05| 1.384576e+05| 0:0:00|1.3e+03|1.4e+00|6.2e-✓
04| chol 3 3
15|1.000|1.000|6.1e-03|3.3e-02|2.0e+05| 7.057624e+04| 0:0:00|5.4e+02|1.5e+00|3.3e-✓
04| chol 3 3
16|0.962|0.962|5.2e-03|6.1e-03|2.9e+04| 9.330055e+03| 0:0:00|2.8e+02|1.7e+00|6.8e-✓
05| chol 3 3
17|0.693|0.693|3.3e-03|4.7e-03|2.3e+04| 7.280191e+03| 0:0:00|1.1e+02|1.8e+00|5.3e-✓
05| chol 3 3
18|0.625|0.625|2.4e-03|4.1e-03|2.0e+04| 6.377536e+03| 0:0:00|6.9e+01|1.8e+00|4.5e-✓
05| chol 2 2
19|0.229|0.229|2.2e-03|3.9e-03|2.1e+04| 5.948778e+03| 0:0:00|6.3e+01|1.8e+00|4.3e-✓
05| chol 2 2
20|0.920|0.920|2.1e-03|3.1e-03|1.6e+04| 5.313087e+03| 0:0:00|4.2e+01|1.8e+00|3.5e-✓
05| chol 4 2
21|0.991|0.991|1.4e-03|1.6e-03|7.7e+03| 2.498029e+03| 0:0:00|3.0e+01|1.8e+00|1.8e-✓
05| chol 2 3
22|1.000|1.000|1.1e-03|9.2e-04|4.0e+03| 1.323182e+03| 0:0:00|1.5e+01|1.8e+00|1.0e-✓
05| chol 2 2
23|0.964|0.964|7.4e-04|5.5e-04|2.3e+03| 6.860877e+02| 0:0:00|8.3e+00|1.9e+00|5.8e-✓

```

```

06| chol 2 2
24|1.000|1.000|6.4e-04|3.5e-04|1.3e+03| 4.245496e+02| 0:0:00|4.6e+00|1.9e+00|3.5e-✓
06| chol 2 2
25|0.896|0.896|3.8e-04|2.1e-04|7.5e+02| 1.982391e+02| 0:0:00|2.9e+00|1.9e+00|1.9e-✓
06| chol 2 2
26|0.988|0.988|3.0e-04|1.3e-04|4.6e+02| 1.282586e+02| 0:0:00|1.6e+00|1.9e+00|1.1e-✓
06| chol 2 2
27|0.776|0.776|1.3e-04|9.8e-05|2.9e+02| 5.701873e+01| 0:0:00|1.1e+00|1.9e+00|6.8e-✓
07| chol 2 2
28|1.000|1.000|1.2e-04|5.1e-05|1.7e+02| 3.455885e+01| 0:0:00|6.0e-01|1.9e+00|4.1e-✓
07| chol 2 2
29|0.947|0.947|4.7e-05|3.3e-05|7.8e+01|-1.916080e+00| 0:0:00|3.6e-01|1.9e+00|1.8e-✓
07| chol 2 2
30|1.000|1.000|4.5e-05|1.8e-05|4.0e+01|-1.129594e+01| 0:0:00|1.5e-01|1.9e+00|9.6e-✓
08| chol 2 2
31|1.000|1.000|2.1e-05|1.4e-05|1.4e+01|-2.047019e+01| 0:0:00|7.9e-02|1.9e+00|3.4e-✓
08| chol 1 2
32|1.000|1.000|1.3e-05|1.0e-05|5.3e+00|-2.289907e+01| 0:0:00|2.8e-02|2.0e+00|1.4e-✓
08| chol 1 1
33|1.000|1.000|4.3e-06|8.8e-06|1.7e+00|-2.410940e+01| 0:0:00|1.1e-02|2.0e+00|4.5e-✓
09| chol 1 1
34|1.000|1.000|1.7e-06|7.6e-06|6.1e-01|-2.445865e+01| 0:0:00|3.7e-03|2.0e+00|1.6e-✓
09| chol 1 1
35|1.000|1.000|4.8e-07|6.7e-06|2.2e-01|-2.460147e+01| 0:0:00|1.3e-03|2.0e+00|5.8e-✓
10| chol 1 1
36|0.479|0.479|1.1e-06|5.1e-06|1.7e-01|-2.465547e+01| 0:0:00|9.1e-04|2.0e+00|4.2e-✓
10| chol 1 1
37|0.169|0.169|1.6e-06|4.6e-06|1.8e-01|-2.468996e+01| 0:0:01|8.2e-04|2.0e+00|3.4e-✓
10| chol 2 1
38|0.253|0.253|3.0e-06|3.7e-06|1.8e-01|-2.472177e+01| 0:0:01|7.1e-04|2.0e+00|3.0e-✓
10| chol 1 1
39|0.141|0.141|3.3e-06|3.3e-06|1.9e-01|-2.473930e+01| 0:0:01|6.7e-04|2.0e+00|2.7e-✓
10| chol 1 1
40|0.234|0.234|4.1e-06|2.7e-06|2.1e-01|-2.478015e+01| 0:0:01|6.1e-04|2.0e+00|1.3e-✓
10| chol 2 2
41|0.084|0.084|4.8e-06|2.5e-06|2.2e-01|-2.480012e+01| 0:0:01|6.0e-04|2.0e+00|8.1e-✓
11| chol 2 2
42|0.274|0.274|1.1e-05|1.8e-06|2.2e-01|-2.488768e+01| 0:0:01|5.7e-04|2.0e+00|0.✓
0e+00| chol 2 2
43|0.149|0.149|1.8e-05|1.6e-06|2.4e-01|-2.494997e+01| 0:0:01|5.6e-04|1.9e+00|0.✓
0e+00| chol 2 2
44|0.026|0.026|1.8e-05|1.5e-06|2.5e-01|-2.497038e+01| 0:0:01|5.6e-04|1.9e+00|0.✓
0e+00| chol 2 2
45|0.013|0.013|1.7e-05|1.5e-06|2.6e-01|-2.498656e+01| 0:0:01|5.6e-04|1.9e+00|0.✓
0e+00| chol 2 3
46|0.093|0.093|2.4e-05|1.4e-06|3.2e-01|-2.511672e+01| 0:0:01|5.8e-04|1.9e+00|0.✓
0e+00| chol 2 3
47|0.072|0.072|5.2e-05|1.4e-06|4.2e-01|-2.530111e+01| 0:0:01|6.0e-04|1.8e+00|0.✓
0e+00| chol
SMW too ill-conditioned, switch to LU factor, 4.7e+26.
switch to LU factor lu 3 3
48|0.033|0.033|7.9e-05|1.4e-06|5.3e-01|-2.543904e+01| 0:0:01|6.3e-04|1.8e+00|0.✓
0e+00| lu 3 3
49|0.121|0.121|2.3e-04|1.3e-06|9.9e-01|-2.602880e+01| 0:0:01|7.5e-04|1.5e+00|0.✓

```

```

0e+00| lu 4 4
50|0.206|0.206|5.8e-04|1.3e-06|2.1e+00|-2.693673e+01| 0:0:01|1.1e-03|1.3e+00|0.✓
0e+00|
Stop: maximum number of iterations reached
-----
number of iterations = 50
primal objective value = -2.82270473e+01
dual objective value = -2.56464160e+01
gap := trace(XZ) = 2.12e+00
relative gap = 7.58e-02
actual relative gap = -4.70e-02
rel. primal infeas = 5.77e-04
rel. dual infeas = 1.27e-06
norm(X), norm(y), norm(Z) = 4.6e+05, 7.5e+01, 3.9e+01
norm(A), norm(b), norm(C) = 1.1e+04, 1.2e+04, 7.6e+01
Total CPU time (secs) = 0.72
CPU time per iteration = 0.01
termination code = -6
DIMACS errors: 5.8e-04 0.0e+00 1.3e-06 0.0e+00 -4.7e-02 3.9e-02
-----

ans =

25.6279

Iteration 6 Total error is: 0.020626

num. of constraints = 85
dim. of socp var = 86, num. of socp blk = 1
dim. of linear var = 800
dim. of free var = 15
*** 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|2.6e+00|1.6e+02|8.4e+08| 8.342560e+05| 0:0:00|8.4e+08|1.0e+00|1.✓
0e+00| chol 1 1
1|0.000|0.000|2.6e+00|1.6e+02|8.4e+08| 8.343823e+05| 0:0:00|8.4e+08|1.0e+00|1.✓
0e+00| chol 1 1
2|0.000|0.000|2.6e+00|1.6e+02|8.4e+08| 8.346711e+05| 0:0:00|8.4e+08|1.0e+00|1.✓
0e+00| chol 1 1
3|0.020|0.020|2.6e+00|1.5e+02|8.3e+08| 8.358477e+05| 0:0:00|8.3e+08|1.0e+00|9.8e-✓
01| chol 1 1
4|0.015|0.015|2.6e+00|1.5e+02|8.3e+08| 8.396432e+05| 0:0:00|8.2e+08|1.0e+00|9.7e-✓
01| chol 1 1
5|0.211|0.211|2.1e+00|1.2e+02|6.7e+08| 8.464341e+05| 0:0:00|6.5e+08|9.9e-01|7.7e-✓
01| chol 1 1

```

```
6|0.396|0.396|1.3e+00|7.6e+01|4.2e+08| 8.618274e+05| 0:0:00|4.0e+08|9.8e-01|4.8e-✓  
01| chol 1 1  
7|0.805|0.805|2.6e-01|1.5e+01|8.8e+07| 8.580029e+05| 0:0:00|7.8e+07|9.8e-01|9.7e-✓  
02| chol 1 1  
8|0.386|0.386|1.8e-01|1.1e+01|6.4e+07| 9.056541e+05| 0:0:00|5.1e+07|9.5e-01|6.4e-✓  
02| chol 3 2  
9|0.756|0.756|4.8e-02|2.9e+00|1.8e+07| 8.614962e+05| 0:0:00|1.2e+07|9.7e-01|1.8e-✓  
02| chol 2 2  
10|0.530|0.530|3.2e-02|1.9e+00|1.4e+07| 9.277926e+05| 0:0:00|6.1e+06|9.1e-01|1.1e-✓  
02| chol 2 2  
11|0.663|0.663|1.5e-02|9.0e-01|6.7e+06| 7.768967e+05| 0:0:00|1.7e+06|9.7e-01|5.6e-✓  
03| chol 2 2  
12|0.817|0.817|6.3e-03|3.7e-01|2.7e+06| 5.257415e+05| 0:0:00|8.9e+04|1.1e+00|2.6e-✓  
03| chol 3 3  
13|0.796|0.796|2.8e-03|1.4e-01|1.0e+06| 2.822143e+05| 0:0:00|4.8e+03|1.3e+00|1.2e-✓  
03| chol 3 5  
14|0.839|0.839|8.3e-03|7.4e-02|5.3e+05| 1.672877e+05| 0:0:00|1.7e+03|1.4e+00|6.5e-✓  
04| chol 5 4  
15|1.000|1.000|6.2e-03|3.7e-02|2.5e+05| 8.839745e+04| 0:0:00|6.4e+02|1.5e+00|3.6e-✓  
04| chol 4 3  
16|0.983|0.983|5.7e-03|6.7e-03|3.5e+04| 1.096546e+04| 0:0:00|3.4e+02|1.7e+00|7.3e-✓  
05| chol 4 4  
17|0.643|0.643|3.6e-03|5.2e-03|2.7e+04| 8.643528e+03| 0:0:00|1.5e+02|1.8e+00|5.7e-✓  
05| chol 3 3  
18|0.604|0.604|2.7e-03|4.3e-03|2.4e+04| 7.179202e+03| 0:0:00|9.0e+01|1.8e+00|4.7e-✓  
05| chol 3 3  
19|0.716|0.716|2.5e-03|3.7e-03|2.0e+04| 6.531375e+03| 0:0:00|5.8e+01|1.8e+00|4.0e-✓  
05| chol 2 2  
20|0.592|0.592|1.7e-03|2.8e-03|1.5e+04| 4.478945e+03| 0:0:00|4.6e+01|1.8e+00|3.0e-✓  
05| chol 3 3  
21|0.982|0.982|1.6e-03|1.9e-03|9.5e+03| 3.212311e+03| 0:0:00|3.0e+01|1.8e+00|2.1e-✓  
05| chol 3 2  
22|0.970|0.970|1.1e-03|9.4e-04|4.4e+03| 1.359400e+03| 0:0:00|1.9e+01|1.9e+00|1.0e-✓  
05| chol 3 3  
23|1.000|1.000|9.4e-04|5.7e-04|2.4e+03| 7.967565e+02| 0:0:00|8.7e+00|1.9e+00|6.2e-✓  
06| chol 2 2  
24|0.861|0.861|6.7e-04|3.7e-04|1.5e+03| 4.164464e+02| 0:0:00|5.5e+00|1.9e+00|3.7e-✓  
06| chol 2 2  
25|0.994|0.994|5.8e-04|2.4e-04|9.1e+02| 2.867070e+02| 0:0:00|3.1e+00|1.9e+00|2.3e-✓  
06| chol 2 2  
26|0.743|0.743|3.6e-04|1.7e-04|6.1e+02| 1.426803e+02| 0:0:00|2.2e+00|1.9e+00|1.5e-✓  
06| chol 2 2  
27|0.965|0.965|3.2e-04|1.1e-04|3.9e+02| 1.103563e+02| 0:0:00|1.3e+00|1.9e+00|9.3e-✓  
07| chol 2 2  
28|0.732|0.732|1.6e-04|8.7e-05|2.7e+02| 4.869169e+01| 0:0:00|9.5e-01|1.9e+00|5.9e-✓  
07| chol 2 2  
29|1.000|1.000|1.5e-04|4.9e-05|1.6e+02| 3.072610e+01| 0:0:00|5.6e-01|1.9e+00|3.5e-✓  
07| chol 2 2  
30|0.859|0.859|6.6e-05|3.6e-05|9.3e+01| 2.015584e+00| 0:0:00|3.6e-01|1.9e+00|1.9e-✓  
07| chol 2 2  
31|1.000|1.000|6.7e-05|2.0e-05|4.9e+01|-7.467953e+00| 0:0:00|1.9e-01|1.9e+00|1.1e-✓  
07| chol 2 2  
32|1.000|1.000|3.4e-05|1.5e-05|2.0e+01|-1.783124e+01| 0:0:00|9.8e-02|1.9e+00|4.4e-✓  
08| chol 2 2
```



```

33|1.000|1.000|2.3e-05|1.1e-05|9.4e+00|-2.067044e+01| 0:0:00|4.2e-02|2.0e+00|2.1e-✓
08| chol 1 1
34|1.000|1.000|9.5e-06|8.7e-06|3.7e+00|-2.260036e+01| 0:0:00|2.0e-02|2.0e+00|8.4e-✓
09| chol 1 1
35|1.000|1.000|5.4e-06|7.1e-06|1.5e+00|-2.324752e+01| 0:0:00|7.9e-03|2.0e+00|3.4e-✓
09| chol 1 1
36|1.000|1.000|1.6e-06|6.2e-06|5.2e-01|-2.357200e+01| 0:0:00|3.2e-03|2.0e+00|1.2e-✓
09| chol 1 1
37|0.773|0.773|1.2e-06|5.6e-06|2.8e-01|-2.365037e+01| 0:0:00|1.6e-03|2.0e+00|6.4e-✓
10| chol 1 1
38|0.815|0.815|6.5e-07|5.1e-06|1.6e-01|-2.369974e+01| 0:0:00|7.8e-04|2.0e+00|3.7e-✓
10| chol 1 1
39|0.289|0.289|1.2e-06|4.3e-06|1.5e-01|-2.372911e+01| 0:0:00|6.6e-04|2.0e+00|3.1e-✓
10| chol 1 1
40|0.286|0.286|2.2e-06|3.5e-06|1.5e-01|-2.376720e+01| 0:0:01|5.6e-04|2.0e+00|2.3e-✓
10| chol 1 1
41|0.204|0.204|3.1e-06|3.0e-06|1.6e-01|-2.379409e+01| 0:0:01|5.2e-04|2.0e+00|2.0e-✓
10| chol 1 1
42|0.050|0.050|3.2e-06|2.9e-06|1.7e-01|-2.380234e+01| 0:0:01|5.1e-04|2.0e+00|1.8e-✓
10| chol 1 1
43|0.155|0.155|3.5e-06|2.6e-06|2.0e-01|-2.382341e+01| 0:0:01|4.9e-04|2.0e+00|1.4e-✓
10| chol 1 1
44|0.124|0.124|4.0e-06|2.3e-06|2.0e-01|-2.384824e+01| 0:0:01|4.8e-04|2.0e+00|6.5e-✓
11| chol 2 2
45|0.095|0.095|4.7e-06|2.1e-06|2.1e-01|-2.386725e+01| 0:0:01|4.8e-04|2.0e+00|4.0e-✓
11| chol 2 2
46|0.170|0.170|6.8e-06|1.8e-06|2.2e-01|-2.390631e+01| 0:0:01|4.8e-04|2.0e+00|0.✓
0e+00| chol 2 2
47|0.165|0.165|1.0e-05|1.5e-06|2.4e-01|-2.395631e+01| 0:0:01|4.8e-04|2.0e+00|0.✓
0e+00| chol 2 2
48|0.030|0.030|8.7e-06|1.5e-06|2.5e-01|-2.399417e+01| 0:0:01|4.8e-04|1.9e+00|0.✓
0e+00| chol 2 2
49|0.153|0.153|2.5e-05|1.3e-06|3.2e-01|-2.425104e+01| 0:0:01|5.1e-04|1.8e+00|0.✓
0e+00| chol

```

SMW too ill-conditioned, switch to LU factor, 5.7e+26.

switch to LU factor lu 5 7

```

50|0.058|0.058|9.1e-05|1.3e-06|5.2e-01|-2.459203e+01| 0:0:01|5.5e-04|1.7e+00|0.✓
0e+00|

```

Stop: maximum number of iterations reached

```

-----
number of iterations      = 50
primal objective value    = -2.52033367e+01
dual   objective value    = -2.39807319e+01
gap := trace(XZ)          = 5.23e-01
relative gap              = 2.04e-02
actual relative gap       = -2.44e-02
rel. primal infeas        = 9.08e-05
rel. dual   infeas        = 1.27e-06
norm(X), norm(y), norm(Z) = 1.5e+05, 7.8e+01, 4.3e+01
norm(A), norm(b), norm(C) = 1.2e+04, 1.3e+04, 7.6e+01
Total CPU time (secs)     = 0.63
CPU time per iteration    = 0.01
termination code          = -6
DIMACS errors: 9.1e-05  0.0e+00  1.3e-06  0.0e+00  -2.4e-02  1.0e-02

```

-----

ans =

23.9786

Iteration 7 Total error is: 0.019974

num. of constraints = 85  
 dim. of socp var = 86, num. of socp blk = 1  
 dim. of linear var = 800  
 dim. of free var = 15  
 \*\*\* convert ublk to linear blk

\*\*\*\*\*  
 SDPT3: homogeneous self-dual path-following algorithms  
 \*\*\*\*\*

version	predcorr	gam	expon	it	pstep	dstep	pinfeas	dinfeas	gap	mean(obj)	cputime	kap	tau	theta
HKM	1	0.000	1											

-----

0	0.000	0.000	2.6e+00	1.6e+02	9.1e+08	8.981002e+05	0:0:00	9.1e+08	1.0e+00	1.0e+00	chol 1 1			
1	0.000	0.000	2.6e+00	1.6e+02	9.1e+08	8.982335e+05	0:0:00	9.1e+08	1.0e+00	1.0e+00	chol 1 1			
2	0.000	0.000	2.6e+00	1.6e+02	9.1e+08	8.985400e+05	0:0:00	9.1e+08	1.0e+00	1.0e+00	chol 1 1			
3	0.021	0.021	2.5e+00	1.6e+02	8.9e+08	8.997816e+05	0:0:00	8.9e+08	1.0e+00	9.8e-01	chol 1 1			
4	0.014	0.014	2.5e+00	1.6e+02	8.9e+08	9.038192e+05	0:0:00	8.8e+08	1.0e+00	9.7e-01	chol 1 1			
5	0.186	0.186	2.1e+00	1.3e+02	7.4e+08	9.116001e+05	0:0:00	7.2e+08	9.9e-01	7.9e-01	chol 1 1			
6	0.389	0.389	1.3e+00	8.3e+01	4.8e+08	9.287458e+05	0:0:00	4.5e+08	9.8e-01	5.0e-01	chol 1 1			
7	0.814	0.814	2.5e-01	1.6e+01	9.4e+07	9.245062e+05	0:0:00	8.4e+07	9.8e-01	9.6e-01	chol 1 1			
8	0.393	0.393	1.7e-01	1.1e+01	6.8e+07	9.742053e+05	0:0:00	5.4e+07	9.5e-01	6.3e-01	chol 2 2			
9	0.745	0.745	4.8e-02	3.1e+00	2.0e+07	9.291784e+05	0:0:00	1.3e+07	9.7e-01	1.8e-01	chol 2 2			
10	0.538	0.538	3.2e-02	2.0e+00	1.5e+07	9.949644e+05	0:0:00	6.6e+06	9.2e-01	1.1e-01	chol 2 2			
11	0.680	0.680	1.4e-02	8.7e-01	6.5e+06	7.978664e+05	0:0:00	1.6e+06	9.9e-01	5.3e-01	chol 2 2			
12	0.822	0.822	5.6e-03	3.6e-01	2.7e+06	5.400229e+05	0:0:00	8.5e+04	1.1e+00	2.5e-01	chol 3 3			
13	0.789	0.789	2.8e-03	1.4e-01	1.0e+06	2.896321e+05	0:0:00	6.1e+03	1.3e+00	1.1e-01	chol 4 4			
14	0.840	0.840	1.0e-02	7.7e-02	5.8e+05	1.789718e+05	0:0:00	2.0e+03	1.4e+00	6.4e-01	chol 3 4			
15	1.000	1.000	6.7e-03	3.9e-02	2.7e+05	9.449324e+04	0:0:00	6.6e+02	1.5e+00	3.6e-01				

```
04| chol 4 3
16|1.000|1.000|5.9e-03|7.2e-03|3.7e+04| 1.131185e+04| 0:0:00|3.6e+02|1.7e+00|7.5e-✓
05| chol 3 4
17|0.651|0.651|3.5e-03|5.3e-03|2.7e+04| 8.487453e+03| 0:0:00|1.6e+02|1.8e+00|5.6e-✓
05| chol 3 3
18|0.505|0.505|2.9e-03|4.6e-03|2.4e+04| 7.169011e+03| 0:0:00|1.0e+02|1.8e+00|4.8e-✓
05| chol 3 3
19|0.769|0.769|2.6e-03|3.8e-03|2.0e+04| 6.443087e+03| 0:0:00|5.9e+01|1.8e+00|4.0e-✓
05| chol 3 3
20|0.564|0.564|1.9e-03|2.9e-03|1.6e+04| 4.450464e+03| 0:0:00|4.7e+01|1.8e+00|3.1e-✓
05| chol 3 3
21|0.947|0.947|1.9e-03|2.1e-03|1.0e+04| 3.459081e+03| 0:0:00|3.1e+01|1.8e+00|2.2e-✓
05| chol 3 3
22|0.933|0.933|1.4e-03|1.1e-03|5.0e+03| 1.501087e+03| 0:0:00|2.1e+01|1.9e+00|1.2e-✓
05| chol 3 3
23|1.000|1.000|1.1e-03|7.1e-04|2.8e+03| 9.070330e+02| 0:0:00|9.9e+00|1.9e+00|7.6e-✓
06| chol 4 2
24|0.781|0.781|8.0e-04|5.0e-04|1.9e+03| 5.169187e+02| 0:0:00|6.6e+00|1.9e+00|5.1e-✓
06| chol 2 2
25|0.993|0.993|7.2e-04|3.2e-04|1.1e+03| 3.627086e+02| 0:0:00|3.9e+00|1.9e+00|3.3e-✓
06| chol 2 2
26|0.729|0.729|5.0e-04|2.3e-04|7.7e+02| 1.765123e+02| 0:0:00|2.8e+00|1.9e+00|2.2e-✓
06| chol 2 2
27|0.968|0.968|4.6e-04|1.5e-04|4.9e+02| 1.468718e+02| 0:0:00|1.6e+00|1.9e+00|1.4e-✓
06| chol 2 2
28|0.623|0.623|2.9e-04|1.3e-04|3.8e+02| 6.901589e+01| 0:0:00|1.3e+00|1.9e+00|9.8e-✓
07| chol 2 2
29|0.989|0.989|2.7e-04|7.9e-05|2.4e+02| 6.022765e+01| 0:0:00|8.1e-01|1.9e+00|6.3e-✓
07| chol 2 2
30|0.687|0.687|1.6e-04|6.4e-05|1.7e+02| 2.018860e+01| 0:0:00|6.0e-01|1.9e+00|4.0e-✓
07| chol 2 2
31|0.963|0.963|1.5e-04|4.0e-05|1.1e+02| 1.547332e+01| 0:0:00|3.7e-01|1.9e+00|2.5e-✓
07| chol 2 2
32|0.752|0.752|7.2e-05|3.1e-05|7.5e+01|-3.143812e+00| 0:0:00|2.7e-01|1.9e+00|1.5e-✓
07| chol 2 2
33|0.997|0.997|7.2e-05|1.8e-05|4.2e+01|-8.444422e+00| 0:0:00|1.5e-01|1.9e+00|8.9e-✓
08| chol 2 2
34|0.989|0.989|4.0e-05|1.2e-05|1.8e+01|-1.683846e+01| 0:0:00|8.5e-02|1.9e+00|3.9e-✓
08| chol 2 2
35|1.000|1.000|3.4e-05|9.5e-06|9.3e+00|-1.900087e+01| 0:0:00|3.7e-02|1.9e+00|2.1e-✓
08| chol 2 2
36|1.000|1.000|1.9e-05|7.7e-06|4.0e+00|-2.075240e+01| 0:0:01|1.9e-02|2.0e+00|9.1e-✓
09| chol 2 2
37|0.984|0.984|1.3e-05|6.5e-06|1.9e+00|-2.128285e+01| 0:0:01|8.7e-03|2.0e+00|4.3e-✓
09| chol 1 1
38|0.963|0.963|4.9e-06|5.5e-06|9.8e-01|-2.161811e+01| 0:0:01|4.3e-03|2.0e+00|2.1e-✓
09| chol 1 1
39|0.853|0.853|4.0e-06|4.7e-06|5.4e-01|-2.173168e+01| 0:0:01|2.4e-03|2.0e+00|1.2e-✓
09| chol 1 1
40|0.846|0.846|2.7e-06|4.2e-06|2.1e-01|-2.185016e+01| 0:0:01|1.4e-03|2.0e+00|4.4e-✓
10| chol 1 1
41|0.239|0.239|2.7e-06|3.8e-06|2.1e-01|-2.188393e+01| 0:0:01|1.2e-03|2.0e+00|3.7e-✓
10| chol 1 1
42|0.246|0.246|2.9e-06|3.3e-06|2.2e-01|-2.192452e+01| 0:0:01|9.9e-04|2.0e+00|3.1e-✓
```

```

10| chol 1 2
43|0.042|0.042|3.0e-06|3.3e-06|2.4e-01|-2.193346e+01| 0:0:01|9.7e-04|2.0e+00|2.8e-✓
10| chol 1 1
44|0.177|0.177|3.3e-06|2.9e-06|2.7e-01|-2.196908e+01| 0:0:01|8.9e-04|2.0e+00|2.0e-✓
10| chol 1 2
45|0.143|0.143|4.0e-06|2.7e-06|3.1e-01|-2.200871e+01| 0:0:01|8.5e-04|2.0e+00|1.1e-✓
10| chol 2 1
46|0.177|0.177|4.7e-06|2.2e-06|3.2e-01|-2.204503e+01| 0:0:01|8.2e-04|2.0e+00|3.0e-✓
11| chol 2 3
47|0.031|0.031|4.9e-06|2.2e-06|3.3e-01|-2.205907e+01| 0:0:01|8.2e-04|2.0e+00|0.✓
0e+00| chol 2 2
48|0.136|0.136|6.9e-06|1.9e-06|3.6e-01|-2.213833e+01| 0:0:01|8.1e-04|1.9e+00|0.✓
0e+00| chol 2 2
49|0.135|0.135|1.4e-05|1.7e-06|4.4e-01|-2.238738e+01| 0:0:01|8.3e-04|1.9e+00|0.✓
0e+00| chol
    SMW too ill-conditioned, switch to LU factor, 3.0e+26.
    switch to LU factor lu 3 3
50|0.062|0.062|4.9e-05|1.6e-06|6.7e-01|-2.274815e+01| 0:0:01|8.8e-04|1.8e+00|0.✓
0e+00|
    Stop: maximum number of iterations reached
-----
number of iterations      = 50
primal objective value = -2.33971004e+01
dual   objective value = -2.20991960e+01
gap := trace(XZ)         = 6.69e-01
relative gap              = 2.82e-02
actual relative gap       = -2.79e-02
rel. primal infeas        = 4.93e-05
rel. dual   infeas        = 1.60e-06
norm(X), norm(y), norm(Z) = 1.2e+05, 8.0e+01, 4.5e+01
norm(A), norm(b), norm(C) = 1.3e+04, 1.5e+04, 7.6e+01
Total CPU time (secs)    = 0.69
CPU time per iteration   = 0.01
termination code         = -6
DIMACS errors: 4.9e-05  0.0e+00  1.6e-06  0.0e+00  -2.8e-02  1.4e-02
-----

ans =

    22.0971

Iteration    8    Total error is: 0.019172
The total representation error of the testing signals is: 0.0241
>>

```