

```
>> demo_Polynomial_Dictionary_Learning
```

```
Starting to train the dictionary
```

```
solving the quadratic problem with YALMIP...
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```
num. of constraints = 25
dim. of socp var = 26, num. of socp blk = 1
dim. of linear var = 800
2 linear variables from unrestricted variable.
```

```
*** 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|2.0e+00|5.1e+01|1.3e+06| 1.128176e+04| 0:0:00|1.3e+06|1.0e+00|1.0e+00| ✓
chol 1 1
1|0.838|0.838|3.3e-01|8.1e+00|2.1e+05| 1.035363e+04| 0:0:00|1.7e+05|1.0e+00|1.6e-01| ✓
chol 1 1
2|0.117|0.117|3.4e-01|8.3e+00|2.5e+05| 1.173327e+04| 0:0:00|1.6e+05|9.6e-01|1.6e-01| ✓
chol 1 1
3|0.753|0.753|3.4e-01|8.4e+00|4.7e+05| 2.124642e+04| 0:0:00|9.3e+04|6.5e-01|1.1e-01| ✓
chol 1 1
4|0.707|0.707|8.9e-02|2.2e+00|1.0e+05| 1.232346e+04| 0:0:00|2.7e+03|8.3e-01|3.6e-02| ✓
chol 1 1
5|0.790|0.790|4.4e-02|1.1e+00|5.6e+04| 9.753553e+03| 0:0:00|5.7e+02|8.5e-01|1.8e-02| ✓
chol 1 1
6|0.884|0.884|1.9e-02|4.7e-01|2.3e+04| 5.406801e+03| 0:0:00|3.3e+01|9.8e-01|9.2e-03| ✓
chol 1 1
7|0.982|0.982|1.4e-03|3.5e-02|1.4e+03| 3.610442e+02| 0:0:00|1.8e+01|1.3e+00|8.6e-04| ✓
chol 1 1
8|0.692|0.692|9.7e-04|2.4e-02|9.5e+02| 2.585874e+02| 0:0:00|7.0e+00|1.3e+00|6.0e-04| ✓
chol 1 1
9|0.750|0.750|7.2e-04|1.8e-02|7.0e+02| 1.855364e+02| 0:0:00|2.8e+00|1.3e+00|4.4e-04| ✓
chol 1 1
10|1.000|1.000|4.2e-04|1.0e-02|4.1e+02| 1.054560e+02| 0:0:00|1.1e+00|1.3e+00|2.6e-04| ✓
chol 1 1
11|1.000|1.000|2.1e-04|5.3e-03|2.0e+02| 4.243824e+01| 0:0:00|6.2e-01|1.3e+00|1.3e-04| ✓
chol 1 1
12|1.000|1.000|9.7e-05|2.5e-03|9.2e+01| 1.216779e+01| 0:0:00|3.1e-01|1.3e+00|6.3e-05| ✓
chol 1 1
13|1.000|1.000|4.4e-05|1.2e-03|4.1e+01|-2.712718e+00| 0:0:00|1.4e-01|1.4e+00|2.9e-05| ✓
chol 1 1
14|1.000|1.000|1.8e-05|5.3e-04|1.7e+01|-9.044658e+00| 0:0:00|6.3e-02|1.4e+00|1.3e-05| ✓
chol 1 1
15|1.000|1.000|7.5e-06|2.8e-04|6.4e+00|-1.187062e+01| 0:0:00|2.5e-02|1.5e+00|5.3e-06| ✓
chol 1 1
16|1.000|1.000|3.0e-06|2.0e-04|2.4e+00|-1.287760e+01| 0:0:00|9.7e-03|1.5e+00|2.2e-06| ✓
chol 1 1
17|1.000|1.000|1.1e-06|1.6e-04|8.5e-01|-1.330052e+01| 0:0:00|3.7e-03|1.7e+00|9.3e-07| ✓
```

```

chol 1 1
18|1.000|1.000|4.2e-07|1.4e-04|2.9e-01|-1.344561e+01| 0:0:00|1.4e-03|1.8e+00|3.7e-07| ✓
chol 1 1
19|1.000|1.000|1.2e-07|1.2e-04|8.1e-02|-1.350631e+01| 0:0:00|5.6e-04|1.9e+00|1.1e-07| ✓
chol 1 1
20|1.000|1.000|3.4e-08|5.0e-05|2.2e-02|-1.352316e+01| 0:0:00|1.8e-04|1.9e+00|3.2e-08| ✓
chol 1 1
21|1.000|1.000|1.3e-08|2.0e-05|8.2e-03|-1.352732e+01| 0:0:00|5.0e-05|1.9e+00|1.2e-08| ✓
chol 1 1
22|1.000|1.000|3.4e-09|8.1e-06|2.1e-03|-1.352917e+01| 0:0:00|1.9e-05|1.9e+00|3.2e-09| ✓
chol 1 1
23|1.000|1.000|9.9e-10|3.2e-06|6.2e-04|-1.352967e+01| 0:0:00|5.0e-06|2.0e+00|9.2e-10| ✓
chol 1 1
24|1.000|1.000|2.7e-10|1.3e-06|1.6e-04|-1.352982e+01| 0:0:00|1.4e-06|2.0e+00|2.4e-10| ✓
chol 1 1
25|1.000|1.000|1.4e-10|5.2e-07|4.3e-05|-1.352986e+01| 0:0:00|3.8e-07|2.0e+00|6.4e-11| ✓
chol 1 1
26|1.000|1.000|4.4e-10|5.2e-07|1.5e-05|-1.352987e+01| 0:0:00|1.0e-07|2.0e+00|2.3e-11| ✓
chol 1 1
27|1.000|1.000|7.4e-10|5.2e-07|4.7e-06|-1.352988e+01| 0:0:00|3.6e-08|2.0e+00|7.0e-12| ✓
chol 1 1
28|1.000|1.000|1.5e-09|5.2e-07|1.8e-06|-1.352988e+01| 0:0:00|1.1e-08|2.0e+00|2.6e-12| ✓
chol 1 1
29|1.000|1.000|3.2e-09|5.2e-07|6.0e-07|-1.352988e+01| 0:0:00|4.3e-09|2.0e+00|6.6e-13|
Stop: relative gap < infeasibility
-----
number of iterations    = 29
primal objective value = -1.35298766e+01
dual   objective value = -1.35298793e+01
gap := trace(XZ)       = 4.67e-06
relative gap           = 3.21e-07
actual relative gap    = 9.69e-08
rel. primal infeas     = 7.39e-10
rel. dual   infeas     = 5.16e-07
norm(X), norm(y), norm(Z) = 6.2e+00, 1.4e+01, 2.0e+01
norm(A), norm(b), norm(C) = 7.9e+02, 1.0e+00, 2.8e+01
Total CPU time (secs)   = 0.25
CPU time per iteration = 0.01
termination code        = -1
DIMACS errors: 7.4e-10  0.0e+00  5.2e-07  0.0e+00  9.7e-08  1.7e-07
-----

ans =

    13.5299

num. of constraints = 25
dim. of socp var   = 26,   num. of socp blk = 1
dim. of linear var = 800
2 linear variables from unrestricted variable.

*** convert ublk to linear blk
*****
*****

```

SDPT3: homogeneous self-dual path-following algorithms

***** ✓

version predcorr gam expon

HKM 1 0.000 1

it pstep dstep pinfeas dinfeas gap mean(obj) cputime kap tau theta

----- ✓

0|0.000|0.000|1.1e+00|5.1e+01|9.6e+07| 8.488989e+05| 0:0:00|9.6e+07|1.0e+00|1.0e+00| ✓

chol 1 1

1|1.000|1.000|2.9e-01|1.3e+01|3.7e+07| 1.186338e+06| 0:0:00|1.7e+07|8.2e-01|2.1e-01| ✓

chol 1 1

2|0.842|0.842|8.9e-02|4.1e+00|1.3e+07| 1.082470e+06| 0:0:00|2.8e+06|8.2e-01|6.6e-02| ✓

chol 1 1

3|0.591|0.591|8.3e-02|3.8e+00|1.7e+07| 1.352787e+06| 0:0:00|1.7e+06|6.7e-01|5.0e-02| ✓

chol 1 1

4|1.000|1.000|5.4e-02|2.5e+00|1.3e+07| 1.331402e+06| 0:0:00|1.5e+05|6.2e-01|3.0e-02| ✓

chol 1 1

5|0.753|0.753|2.4e-02|1.1e+00|4.9e+06| 7.587819e+05| 0:0:00|8.6e+03|7.6e-01|1.7e-02| ✓

chol 1 1

6|1.000|1.000|2.4e-03|1.1e-01|3.7e+05| 8.879552e+04| 0:0:00|7.0e+02|1.1e+00|2.4e-03| ✓

chol 1 1

7|0.822|0.822|1.1e-03|5.2e-02|1.6e+05| 4.356719e+04| 0:0:00|4.9e+02|1.2e+00|1.2e-03| ✓

chol 1 1

8|1.000|1.000|7.3e-04|3.4e-02|1.1e+05| 2.735304e+04| 0:0:00|2.2e+02|1.2e+00|7.8e-04| ✓

chol 1 1

9|1.000|1.000|3.5e-04|1.6e-02|5.0e+04| 1.351140e+04| 0:0:00|1.5e+02|1.2e+00|3.8e-04| ✓

chol 1 1

10|1.000|1.000|1.3e-04|6.0e-03|1.8e+04| 4.640523e+03| 0:0:00|6.9e+01|1.2e+00|1.4e-04| ✓

chol 1 1

11|1.000|1.000|6.0e-05|2.9e-03|8.1e+03| 2.181355e+03| 0:0:00|2.5e+01|1.3e+00|6.9e-05| ✓

chol 1 1

12|1.000|1.000|2.1e-05|1.0e-03|2.7e+03| 7.157024e+02| 0:0:00|1.2e+01|1.3e+00|2.5e-05| ✓

chol 1 1

13|1.000|1.000|9.0e-06|5.1e-04|1.1e+03| 3.100818e+02| 0:0:00|3.9e+00|1.4e+00|1.1e-05| ✓

chol 1 1

14|1.000|1.000|3.1e-06|2.7e-04|3.7e+02| 1.004587e+02| 0:0:00|1.7e+00|1.5e+00|4.1e-06| ✓

chol 1 1

15|1.000|1.000|1.3e-06|2.1e-04|1.4e+02| 3.972786e+01| 0:0:00|5.2e-01|1.6e+00|1.8e-06| ✓

chol 1 1

16|1.000|1.000|4.1e-07|1.7e-04|4.1e+01| 1.062810e+01| 0:0:00|2.2e-01|1.7e+00|6.4e-07| ✓

chol 1 1

17|1.000|1.000|1.4e-07|1.5e-04|1.3e+01| 2.656383e+00| 0:0:00|7.0e-02|1.9e+00|2.4e-07| ✓

chol 1 1

18|1.000|1.000|2.8e-08|1.4e-04|2.4e+00|-8.606419e-01| 0:0:00|2.7e-02|1.9e+00|4.8e-08| ✓

chol 1 1

19|1.000|1.000|1.1e-08|1.2e-04|1.0e+00|-1.328537e+00| 0:0:00|5.5e-03|1.9e+00|2.0e-08| ✓

chol 1 1

20|0.912|0.912|1.8e-09|2.1e-05|1.5e-01|-1.610435e+00| 0:0:00|2.6e-03|2.0e+00|3.1e-09| ✓

chol 1 1

21|0.996|0.996|6.4e-10|1.1e-06|5.6e-02|-1.637249e+00| 0:0:00|3.7e-04|1.9e+00|1.1e-09| ✓

chol 1 1

22|1.000|1.000|2.4e-10|9.1e-07|2.1e-02|-1.654170e+00| 0:0:00|1.3e-04|1.9e+00|4.1e-10| ✓

chol 1 1

23|0.955|0.955|4.9e-11|3.9e-07|4.1e-03|-1.660852e+00| 0:0:00|5.2e-05|2.0e+00|8.4e-11| ✓

```

chol 1 1
24|1.000|1.000|3.1e-11|3.7e-07|2.0e-03|-1.661682e+00| 0:0:00|9.7e-06|2.0e+00|4.1e-11| ✓
chol 1 1
25|1.000|1.000|9.0e-12|3.7e-07|3.2e-04|-1.662370e+00| 0:0:00|4.8e-06|2.0e+00|6.5e-12| ✓
chol 1 1
26|1.000|1.000|2.6e-11|3.7e-07|4.7e-05|-1.662482e+00| 0:0:00|7.6e-07|2.0e+00|9.6e-13| ✓
chol 1 1
27|1.000|1.000|2.5e-11|3.7e-07|6.8e-06|-1.662499e+00| 0:0:00|1.1e-07|2.0e+00|1.4e-13| ✓
chol 1 1
28|1.000|1.000|8.8e-11|3.7e-07|3.0e-07|-1.662501e+00| 0:0:00|1.6e-08|2.0e+00|6.1e-15| ✓
chol 1 1
29|1.000|1.000|1.3e-10|3.7e-07|4.3e-09|-1.662501e+00| 0:0:00|7.4e-10|2.0e+00|0.0e+00|
  Stop: relative gap < infeasibility
-----
number of iterations      = 29
primal objective value    = -1.66250117e+00
dual   objective value    = -1.66250142e+00
gap := trace(XZ)          = 3.03e-07
relative gap              = 1.14e-07
actual relative gap       = 5.63e-08
rel. primal infeas        = 8.76e-11
rel. dual   infeas        = 3.66e-07
norm(X), norm(y), norm(Z) = 9.1e+00, 2.6e+01, 2.7e+01
norm(A), norm(b), norm(C) = 8.2e+02, 2.3e+02, 2.8e+01
Total CPU time (secs)     = 0.30
CPU time per iteration    = 0.01
termination code          = -1
DIMACS errors: 8.8e-11  0.0e+00  3.7e-07  0.0e+00  5.6e-08  7.0e-08
-----

ans =

    1.6625

Iteration    2    Total error is: 0.005224

num. of constraints = 25
dim. of socp var   = 26,   num. of socp blk   = 1
dim. of linear var = 800
2 linear variables from unrestricted variable.

*** convert ublk to linear blk
*****
SDPT3: homogeneous self-dual path-following algorithms
*****
version predcorr gam expon
  HKM      1      0.000  1
it pstep dstep pinfeas dinfeas gap      mean(obj)      cputime      kap      tau      theta
-----
0|0.000|0.000|1.1e+00|5.1e+01|1.1e+08| 9.510539e+05| 0:0:00|1.1e+08|1.0e+00|1.0e+00| ✓
chol 1 1
1|1.000|1.000|3.9e-01|1.8e+01|6.1e+07| 1.488819e+06| 0:0:00|2.5e+07|7.7e-01|2.7e-01| ✓

```

```
chol 1 1
2|0.770|0.770|9.6e-02|4.4e+00|1.5e+07| 1.193082e+06| 0:0:00|3.6e+06|8.4e-01|7.1e-02| ✓
chol 1 1
3|0.434|0.434|9.4e-02|4.2e+00|1.9e+07| 1.445492e+06| 0:0:00|2.6e+06|7.1e-01|5.9e-02| ✓
chol 1 1
4|1.000|1.000|7.0e-02|3.2e+00|2.0e+07| 1.748333e+06| 0:0:00|5.1e+05|5.8e-01|3.6e-02| ✓
chol 1 1
5|0.728|0.728|3.5e-02|1.6e+00|8.2e+06| 1.054458e+06| 0:0:00|3.2e+04|7.1e-01|2.2e-02| ✓
chol 1 1
6|0.743|0.743|9.9e-03|4.5e-01|1.7e+06| 3.344834e+05| 0:0:00|1.2e+03|9.8e-01|8.6e-03| ✓
chol 1 1
7|0.869|0.869|1.2e-03|5.4e-02|1.6e+05| 3.610624e+04| 0:0:00|1.6e+03|1.2e+00|1.3e-03| ✓
chol 1 1
8|0.974|0.974|8.6e-04|3.9e-02|1.3e+05| 3.315383e+04| 0:0:00|2.7e+02|1.2e+00|9.0e-04| ✓
chol 1 1
9|1.000|1.000|4.2e-04|1.9e-02|6.5e+04| 1.736832e+04| 0:0:00|1.9e+02|1.2e+00|4.4e-04| ✓
chol 1 1
10|1.000|1.000|1.4e-04|6.5e-03|2.1e+04| 5.643893e+03| 0:0:00|8.9e+01|1.3e+00|1.6e-04| ✓
chol 1 1
11|1.000|1.000|6.8e-05|3.2e-03|1.0e+04| 2.685482e+03| 0:0:00|3.0e+01|1.3e+00|7.7e-05| ✓
chol 1 1
12|1.000|1.000|2.3e-05|1.1e-03|3.3e+03| 8.653109e+02| 0:0:00|1.5e+01|1.3e+00|2.7e-05| ✓
chol 1 1
13|1.000|1.000|1.0e-05|5.4e-04|1.4e+03| 3.729255e+02| 0:0:00|4.7e+00|1.4e+00|1.2e-05| ✓
chol 1 1
14|1.000|1.000|3.5e-06|2.8e-04|4.5e+02| 1.213417e+02| 0:0:00|2.0e+00|1.5e+00|4.4e-06| ✓
chol 1 1
15|1.000|1.000|1.4e-06|2.1e-04|1.7e+02| 4.806872e+01| 0:0:00|6.3e-01|1.6e+00|1.9e-06| ✓
chol 1 1
16|1.000|1.000|4.6e-07|1.7e-04|5.0e+01| 1.391195e+01| 0:0:00|2.6e-01|1.7e+00|6.9e-07| ✓
chol 1 1
17|1.000|1.000|1.6e-07|1.5e-04|1.6e+01| 4.143836e+00| 0:0:00|8.6e-02|1.8e+00|2.6e-07| ✓
chol 1 1
18|1.000|1.000|3.3e-08|1.4e-04|3.2e+00|-5.561715e-02| 0:0:00|3.3e-02|1.9e+00|5.6e-08| ✓
chol 1 1
19|1.000|1.000|1.2e-08|1.2e-04|1.2e+00|-7.076727e-01| 0:0:00|7.2e-03|1.9e+00|2.1e-08| ✓
chol 1 1
20|0.913|0.913|2.0e-09|2.1e-05|1.9e-01|-1.036409e+00| 0:0:00|3.2e-03|2.0e+00|3.4e-09| ✓
chol 1 1
21|0.995|0.995|7.5e-10|1.1e-06|7.3e-02|-1.070540e+00| 0:0:00|4.6e-04|1.9e+00|1.3e-09| ✓
chol 1 1
22|1.000|1.000|2.6e-10|9.1e-07|2.5e-02|-1.093101e+00| 0:0:00|1.7e-04|1.9e+00|4.5e-10| ✓
chol 1 1
23|1.000|1.000|5.4e-11|8.2e-07|5.0e-03|-1.101254e+00| 0:0:00|5.8e-05|2.0e+00|9.0e-11| ✓
chol 1 1
24|1.000|1.000|2.1e-11|8.2e-07|1.6e-03|-1.102641e+00| 0:0:00|1.2e-05|2.0e+00|2.9e-11| ✓
chol 1 1
25|0.993|0.993|5.3e-12|8.2e-07|2.0e-04|-1.103199e+00| 0:0:00|3.8e-06|2.0e+00|3.7e-12| ✓
chol 1 1
26|1.000|1.000|1.4e-11|8.2e-07|2.2e-05|-1.103274e+00| 0:0:00|4.9e-07|2.0e+00|4.0e-13| ✓
chol 1 1
27|1.000|1.000|2.1e-11|8.2e-07|1.6e-06|-1.103283e+00| 0:0:00|5.3e-08|2.0e+00|2.9e-14| ✓
chol 1 1
28|1.000|1.000|3.8e-11|8.2e-07|2.9e-08|-1.103283e+00| 0:0:00|3.8e-09|2.0e+00|4.5e-16| ✓
chol 1 1
```

```
29|1.000|1.000|5.4e-11|8.2e-07|3.5e-10|-1.103283e+00| 0:0:00|7.4e-11|2.0e+00|0.0e+00|
Stop: relative gap < infeasibility
```

```
-----
number of iterations    = 29
primal objective value = -1.10328187e+00
dual   objective value = -1.10328316e+00
gap := trace(XZ)       = 1.58e-06
relative gap           = 7.52e-07
actual relative gap    = 4.04e-07
rel. primal infeas     = 2.12e-11
rel. dual   infeas     = 8.19e-07
norm(X), norm(y), norm(Z) = 9.5e+00, 2.6e+01, 2.8e+01
norm(A), norm(b), norm(C) = 8.2e+02, 2.6e+02, 2.8e+01
Total CPU time (secs)   = 0.28
CPU time per iteration = 0.01
termination code        = -1
DIMACS errors: 2.1e-11  0.0e+00  8.2e-07  0.0e+00  4.0e-07  4.9e-07
-----
```

```
ans =
```

```
1.1033
```

```
Iteration    3    Total error is: 0.0042087
```

```
num. of constraints = 25
dim. of socp var   = 26,   num. of socp blk = 1
dim. of linear var = 800
2 linear variables from unrestricted variable.
```

```
*** convert ublk to linear blk
***** ✓
SDPT3: homogeneous self-dual path-following algorithms
***** ✓
version predcorr gam expon
HKM      1      0.000  1
it pstep dstep pinfeas dinfeas gap      mean(obj)      cputime      kap      tau      theta
----- ✓
0|0.000|0.000|1.1e+00|5.1e+01|1.2e+08| 1.052370e+06| 0:0:00|1.2e+08|1.0e+00|1.0e+00| ✓
chol 1 1
1|1.000|1.000|4.7e-01|2.2e+01|9.0e+07| 1.805081e+06| 0:0:00|3.2e+07|7.3e-01|3.1e-01| ✓
chol 1 1
2|0.787|0.787|9.6e-02|4.5e+00|1.8e+07| 1.431944e+06| 0:0:00|3.6e+06|8.1e-01|7.0e-02| ✓
chol 1 1
3|0.422|0.422|9.3e-02|4.3e+00|2.2e+07| 1.688460e+06| 0:0:00|2.6e+06|6.9e-01|5.8e-02| ✓
chol 1 1
4|1.000|1.000|7.0e-02|3.2e+00|2.3e+07| 1.999942e+06| 0:0:00|5.0e+05|5.7e-01|3.6e-02| ✓
chol 1 1
5|0.759|0.759|3.7e-02|1.7e+00|1.0e+07| 1.281751e+06| 0:0:00|3.4e+04|6.8e-01|2.2e-02| ✓
chol 1 1
6|0.739|0.739|1.0e-02|4.9e-01|2.1e+06| 4.132505e+05| 0:0:00|1.3e+03|9.5e-01|9.0e-03| ✓
chol 1 1
```

```

 7|0.888|0.888|1.1e-03|5.0e-02|1.7e+05| 3.760264e+04| 0:0:00|2.0e+03|1.2e+00|1.2e-03| ✓
chol 1 1
 8|1.000|1.000|7.3e-04|3.4e-02|1.3e+05| 3.368372e+04| 0:0:00|2.3e+02|1.2e+00|7.9e-04| ✓
chol 1 1
 9|1.000|1.000|2.8e-04|1.3e-02|4.9e+04| 1.325129e+04| 0:0:00|1.8e+02|1.2e+00|3.1e-04| ✓
chol 1 1
10|1.000|1.000|1.3e-04|6.2e-03|2.2e+04| 5.854792e+03| 0:0:00|6.8e+01|1.3e+00|1.5e-04| ✓
chol 1 1
11|1.000|1.000|5.6e-05|2.7e-03|9.3e+03| 2.511421e+03| 0:0:00|3.3e+01|1.3e+00|6.5e-05| ✓
chol 1 1
12|1.000|1.000|2.1e-05|1.1e-03|3.4e+03| 8.856890e+02| 0:0:00|1.3e+01|1.3e+00|2.5e-05| ✓
chol 1 1
13|1.000|1.000|8.7e-06|5.0e-04|1.3e+03| 3.715933e+02| 0:0:00|4.9e+00|1.4e+00|1.1e-05| ✓
chol 1 1
14|1.000|1.000|3.1e-06|2.7e-04|4.6e+02| 1.246134e+02| 0:0:00|2.0e+00|1.5e+00|4.2e-06| ✓
chol 1 1
15|1.000|1.000|1.3e-06|2.1e-04|1.7e+02| 4.957700e+01| 0:0:00|6.6e-01|1.6e+00|1.8e-06| ✓
chol 1 1
16|1.000|1.000|4.1e-07|1.7e-04|5.0e+01| 1.437553e+01| 0:0:00|2.7e-01|1.7e+00|6.4e-07| ✓
chol 1 1
17|1.000|1.000|1.4e-07|1.5e-04|1.6e+01| 4.499519e+00| 0:0:00|8.7e-02|1.9e+00|2.3e-07| ✓
chol 1 1
18|1.000|1.000|2.7e-08|1.4e-04|3.0e+00| 2.152498e-01| 0:0:00|3.3e-02|1.9e+00|4.8e-08| ✓
chol 1 1
19|1.000|1.000|1.1e-08|1.2e-04|1.2e+00|-3.861033e-01| 0:0:00|6.8e-03|2.0e+00|1.9e-08| ✓
chol 1 1
20|0.912|0.912|1.7e-09|2.1e-05|1.8e-01|-7.187654e-01| 0:0:00|3.1e-03|2.0e+00|3.0e-09| ✓
chol 1 1
21|0.996|0.996|6.3e-10|1.1e-06|6.9e-02|-7.512424e-01| 0:0:00|4.5e-04|2.0e+00|1.1e-09| ✓
chol 1 1
22|1.000|1.000|2.4e-10|9.1e-07|2.6e-02|-7.721156e-01| 0:0:00|1.7e-04|1.9e+00|4.1e-10| ✓
chol 1 1
23|1.000|1.000|5.4e-11|8.2e-07|5.7e-03|-7.801709e-01| 0:0:00|6.0e-05|2.0e+00|9.3e-11| ✓
chol 1 1
24|1.000|1.000|2.7e-11|8.2e-07|2.4e-03|-7.815150e-01| 0:0:00|1.3e-05|2.0e+00|3.9e-11| ✓
chol 1 1
25|1.000|1.000|9.6e-12|8.2e-07|4.8e-04|-7.822652e-01| 0:0:00|5.6e-06|2.0e+00|7.8e-12| ✓
chol 1 1
26|1.000|1.000|5.6e-12|8.2e-07|7.4e-05|-7.824286e-01| 0:0:00|1.1e-06|2.0e+00|1.2e-12| ✓
chol 1 1
27|1.000|1.000|8.7e-12|8.2e-07|1.7e-05|-7.824516e-01| 0:0:00|1.8e-07|2.0e+00|2.8e-13| ✓
chol 1 1
28|1.000|1.000|1.9e-11|8.2e-07|1.1e-06|-7.824580e-01| 0:0:00|4.0e-08|2.0e+00|1.9e-14| ✓
chol 1 1
29|1.000|1.000|2.7e-11|8.2e-07|2.4e-08|-7.824585e-01| 0:0:00|2.7e-09|2.0e+00|3.3e-16| ✓
chol 1 1
30|0.999|0.999|4.2e-11|8.2e-07|3.2e-10|-7.824585e-01| 0:0:00|6.2e-11|2.0e+00|0.0e+00| ✓
chol 1 1
31|1.000|0.791|3.3e-11|8.2e-07|3.9e-12|-7.824585e-01| 0:0:00|8.3e-13|2.0e+00|0.0e+00|
lack of progress in infeas

```

```

-----
number of iterations    = 31
primal objective value = -7.82457583e-01
dual   objective value = -7.82458501e-01
gap := trace(XZ)       = 1.13e-06

```

```

relative gap          = 6.34e-07
actual relative gap   = 3.58e-07
rel. primal infeas    = 1.94e-11
rel. dual   infeas    = 8.19e-07
norm(X), norm(y), norm(Z) = 9.7e+00, 2.7e+01, 2.8e+01
norm(A), norm(b), norm(C) = 8.2e+02, 2.8e+02, 2.8e+01
Total CPU time (secs) = 0.30
CPU time per iteration = 0.01
termination code      = -9
DIMACS errors: 1.9e-11 0.0e+00 8.2e-07 0.0e+00 3.6e-07 4.4e-07
-----

```

```
ans =
```

```
0.7825
```

```
Iteration 4 Total error is: 0.0034961
```

```

num. of constraints = 25
dim. of socp var = 26, num. of socp blk = 1
dim. of linear var = 800
2 linear variables from unrestricted variable.

```

```
*** convert ublk to linear blk
```

```
***** ✓
```

```
SDPT3: homogeneous self-dual path-following algorithms
```

```
***** ✓
```

```
version predcorr gam expon
```

```
HKM 1 0.000 1
```

```
it pstep dstep pinfeas dinfeas gap mean(obj) cputime kap tau theta
```

```
----- ✓
```

```
0|0.000|0.000|1.1e+00|5.1e+01|1.2e+08| 1.065552e+06| 0:0:00|1.2e+08|1.0e+00|1.0e+00| ✓
```

```
chol 1 1
```

```
1|1.000|1.000|5.7e-01|2.7e+01|1.2e+08| 2.026760e+06| 0:0:00|3.8e+07|6.8e-01|3.5e-01| ✓
```

```
chol 1 1
```

```
2|0.836|0.836|8.7e-02|4.0e+00|1.8e+07| 1.614230e+06| 0:0:00|2.1e+06|7.6e-01|6.0e-02| ✓
```

```
chol 1 1
```

```
3|0.382|0.382|8.1e-02|3.8e+00|2.0e+07| 1.764007e+06| 0:0:00|1.5e+06|6.8e-01|5.0e-02| ✓
```

```
chol 1 1
```

```
4|0.980|0.980|5.4e-02|2.5e+00|1.7e+07| 1.781125e+06| 0:0:00|2.2e+05|6.0e-01|3.0e-02| ✓
```

```
chol 1 1
```

```
5|0.713|0.713|3.4e-02|1.6e+00|1.0e+07| 1.355619e+06| 0:0:00|5.1e+04|6.6e-01|2.0e-02| ✓
```

```
chol 1 1
```

```
6|0.796|0.796|1.4e-02|6.6e-01|3.4e+06| 6.584240e+05| 0:0:00|2.7e+03|8.5e-01|1.1e-02| ✓
```

```
chol 1 1
```

```
7|0.935|0.935|1.2e-03|5.6e-02|2.2e+05| 4.954720e+04| 0:0:00|2.5e+03|1.1e+00|1.2e-03| ✓
```

```
chol 1 1
```

```
8|0.926|0.926|6.6e-04|3.1e-02|1.2e+05| 3.158755e+04| 0:0:00|3.6e+02|1.2e+00|7.1e-04| ✓
```

```
chol 1 1
```

```
9|1.000|1.000|3.9e-04|1.8e-02|6.9e+04| 1.777669e+04| 0:0:00|1.6e+02|1.2e+00|4.2e-04| ✓
```

```
chol 1 1
```

```
10|1.000|1.000|1.8e-04|8.3e-03|3.1e+04| 8.307717e+03| 0:0:00|9.8e+01|1.2e+00|2.0e-04| ✓
```



```

chol 1 1
11|1.000|1.000|6.7e-05|3.2e-03|1.1e+04| 2.980395e+03| 0:0:00|4.3e+01|1.3e+00|7.8e-05| ✓
chol 1 1
12|1.000|1.000|2.9e-05|1.4e-03|4.8e+03| 1.305316e+03| 0:0:00|1.6e+01|1.3e+00|3.5e-05| ✓
chol 1 1
13|1.000|1.000|1.1e-05|5.7e-04|1.7e+03| 4.421565e+02| 0:0:00|7.0e+00|1.4e+00|1.3e-05| ✓
chol 1 1
14|1.000|1.000|4.4e-06|3.1e-04|6.6e+02| 1.848306e+02| 0:0:00|2.4e+00|1.4e+00|5.7e-06| ✓
chol 1 1
15|1.000|1.000|1.5e-06|2.1e-04|2.1e+02| 6.024424e+01| 0:0:00|9.7e-01|1.6e+00|2.2e-06| ✓
chol 1 1
16|1.000|1.000|6.0e-07|1.8e-04|7.7e+01| 2.331271e+01| 0:0:00|3.2e-01|1.7e+00|9.2e-07| ✓
chol 1 1
17|1.000|1.000|1.7e-07|1.5e-04|2.0e+01| 5.598088e+00| 0:0:00|1.3e-01|1.8e+00|2.8e-07| ✓
chol 1 1
18|1.000|1.000|5.2e-08|1.4e-04|5.8e+00| 1.359127e+00| 0:0:00|3.8e-02|1.9e+00|8.9e-08| ✓
chol 1 1
19|0.985|0.985|9.6e-09|1.2e-04|1.1e+00|-2.478965e-01| 0:0:00|1.3e-02|2.0e+00|1.7e-08| ✓
chol 1 1
20|1.000|1.000|2.2e-09|1.1e-05|2.4e-01|-4.997274e-01| 0:0:00|2.5e-03|2.0e+00|3.8e-09| ✓
chol 1 1
21|1.000|1.000|1.0e-09|1.0e-05|1.1e-01|-5.597035e-01| 0:0:00|5.7e-04|2.0e+00|1.8e-09| ✓
chol 1 1
22|1.000|1.000|2.6e-10|9.1e-07|2.9e-02|-5.876907e-01| 0:0:00|2.6e-04|2.0e+00|4.6e-10| ✓
chol 1 1
23|1.000|1.000|1.1e-10|8.2e-07|1.2e-02|-5.956844e-01| 0:0:00|6.8e-05|2.0e+00|1.9e-10| ✓
chol 1 1
24|1.000|1.000|3.1e-11|3.3e-07|3.3e-03|-5.989821e-01| 0:0:00|2.8e-05|2.0e+00|5.3e-11| ✓
chol 1 1
25|1.000|1.000|1.9e-11|3.3e-07|1.1e-03|-5.998779e-01| 0:0:00|7.8e-06|2.0e+00|1.8e-11| ✓
chol 1 1
26|1.000|1.000|8.0e-12|3.3e-07|3.1e-04|-6.002168e-01| 0:0:00|2.7e-06|2.0e+00|5.0e-12| ✓
chol 1 1
27|0.965|0.965|9.8e-12|3.3e-07|2.2e-05|-6.003364e-01| 0:0:00|8.1e-07|2.0e+00|3.6e-13| ✓
chol 1 1
28|1.000|1.000|1.1e-11|3.3e-07|2.1e-06|-6.003447e-01| 0:0:00|5.4e-08|2.0e+00|3.5e-14| ✓
chol 1 1
29|1.000|1.000|8.0e-11|3.3e-07|1.1e-07|-6.003456e-01| 0:0:00|5.1e-09|2.0e+00|1.6e-15| ✓
chol 1 1
30|1.000|1.000|7.2e-11|3.3e-07|1.3e-09|-6.003456e-01| 0:0:00|2.6e-10|2.0e+00|0.0e+00| ✓
chol 1 1
31|1.000|1.000|8.4e-11|3.3e-07|4.8e-11|-6.003456e-01| 0:0:00|3.4e-12|2.0e+00|0.0e+00|
Stop: relative gap < infeasibility
-----
number of iterations    = 31
primal objective value = -6.00345551e-01
dual   objective value = -6.00345632e-01
gap := trace(XZ)       = 1.06e-07
relative gap           = 6.62e-08
actual relative gap    = 3.68e-08
rel. primal infeas     = 7.98e-11
rel. dual   infeas     = 3.29e-07
norm(X), norm(y), norm(Z) = 9.9e+00, 2.7e+01, 2.8e+01
norm(A), norm(b), norm(C) = 8.2e+02, 2.8e+02, 2.8e+01
Total CPU time (secs)  = 0.23

```

```

CPU time per iteration = 0.01
termination code       = -1
DIMACS errors: 8.0e-11  0.0e+00  3.3e-07  0.0e+00  3.7e-08  4.8e-08
-----

```

```
ans =
```

```
0.6003
```

```
Iteration    5    Total error is: 0.0030012
```

```

num. of constraints = 25
dim. of socp var   = 26,    num. of socp blk = 1
dim. of linear var = 800
2 linear variables from unrestricted variable.

```

```
*** convert ublk to linear blk
```

```
***** ✓
*****
```

```
SDPT3: homogeneous self-dual path-following algorithms
```

```
***** ✓
*****
```

```
version predcorr gam expon
```

```
HKM      1      0.000  1
```

```
it pstep dstep pinfeas dinfeas gap      mean(obj)      cputime      kap      tau      theta
```

```
----- ✓
```

```
0|0.000|0.000|1.1e+00|5.1e+01|1.2e+08| 1.025253e+06| 0:0:00|1.2e+08|1.0e+00|1.0e+00| ✓
chol 1 1
```

```
1|1.000|1.000|5.9e-01|2.6e+01|1.2e+08| 1.943751e+06| 0:0:00|3.7e+07|6.9e-01|3.5e-01| ✓
chol 1 1
```

```
2|0.839|0.839|8.7e-02|3.9e+00|1.7e+07| 1.544299e+06| 0:0:00|1.9e+06|7.6e-01|5.8e-02| ✓
chol 1 1
```

```
3|0.390|0.390|8.1e-02|3.6e+00|1.9e+07| 1.678963e+06| 0:0:00|1.4e+06|6.8e-01|4.8e-02| ✓
chol 1 1
```

```
4|0.943|0.943|5.5e-02|2.5e+00|1.6e+07| 1.682966e+06| 0:0:00|2.4e+05|6.1e-01|2.9e-02| ✓
chol 1 1
```

```
5|0.705|0.705|3.4e-02|1.5e+00|9.4e+06| 1.278358e+06| 0:0:00|5.6e+04|6.7e-01|2.0e-02| ✓
chol 1 1
```

```
6|0.784|0.784|1.4e-02|6.5e-01|3.2e+06| 6.169504e+05| 0:0:00|2.9e+03|8.5e-01|1.1e-02| ✓
chol 1 1
```

```
7|0.935|0.935|1.2e-03|5.5e-02|2.1e+05| 4.660586e+04| 0:0:00|2.3e+03|1.1e+00|1.2e-03| ✓
chol 1 1
```

```
8|0.945|0.945|6.7e-04|3.0e-02|1.1e+05| 3.012081e+04| 0:0:00|3.0e+02|1.2e+00|7.0e-04| ✓
chol 1 1
```

```
9|1.000|1.000|3.9e-04|1.8e-02|6.6e+04| 1.715407e+04| 0:0:00|1.6e+02|1.2e+00|4.2e-04| ✓
chol 1 1
```

```
10|1.000|1.000|1.7e-04|7.7e-03|2.8e+04| 7.475789e+03| 0:0:00|9.3e+01|1.2e+00|1.9e-04| ✓
chol 1 1
```

```
11|1.000|1.000|6.9e-05|3.2e-03|1.1e+04| 2.859023e+03| 0:0:00|3.9e+01|1.3e+00|7.7e-05| ✓
chol 1 1
```

```
12|1.000|1.000|2.9e-05|1.4e-03|4.5e+03| 1.207904e+03| 0:0:00|1.6e+01|1.3e+00|3.4e-05| ✓
chol 1 1
```

```
13|1.000|1.000|1.1e-05|5.7e-04|1.6e+03| 4.198952e+02| 0:0:00|6.5e+00|1.4e+00|1.3e-05| ✓
chol 1 1
```

```

14|1.000|1.000|4.4e-06|3.1e-04|6.1e+02| 1.726717e+02| 0:0:00|2.3e+00|1.4e+00|5.5e-06| ✓
chol 1 1
15|1.000|1.000|1.5e-06|2.1e-04|2.0e+02| 5.672673e+01| 0:0:00|9.0e-01|1.6e+00|2.1e-06| ✓
chol 1 1
16|1.000|1.000|6.0e-07|1.8e-04|7.2e+01| 2.174263e+01| 0:0:00|3.0e-01|1.7e+00|8.9e-07| ✓
chol 1 1
17|1.000|1.000|1.6e-07|1.5e-04|1.8e+01| 5.178883e+00| 0:0:00|1.2e-01|1.8e+00|2.6e-07| ✓
chol 1 1
18|1.000|1.000|5.0e-08|1.4e-04|5.3e+00| 1.263891e+00| 0:0:00|3.5e-02|1.9e+00|8.4e-08| ✓
chol 1 1
19|0.984|0.984|9.3e-09|1.2e-04|9.5e-01|-1.910128e-01| 0:0:00|1.2e-02|2.0e+00|1.6e-08| ✓
chol 1 1
20|1.000|1.000|2.1e-09|1.1e-05|2.2e-01|-4.177121e-01| 0:0:00|2.3e-03|2.0e+00|3.7e-09| ✓
chol 1 1
21|1.000|1.000|9.9e-10|1.0e-05|1.0e-01|-4.735915e-01| 0:0:00|5.3e-04|2.0e+00|1.7e-09| ✓
chol 1 1
22|1.000|1.000|2.5e-10|9.1e-07|2.6e-02|-4.996658e-01| 0:0:00|2.4e-04|2.0e+00|4.3e-10| ✓
chol 1 1
23|1.000|1.000|1.0e-10|8.2e-07|1.1e-02|-5.069149e-01| 0:0:00|6.2e-05|2.0e+00|1.8e-10| ✓
chol 1 1
24|1.000|1.000|3.0e-11|3.3e-07|2.9e-03|-5.099704e-01| 0:0:00|2.5e-05|2.0e+00|4.9e-11| ✓
chol 1 1
25|1.000|1.000|1.8e-11|3.3e-07|7.2e-04|-5.109001e-01| 0:0:00|6.9e-06|2.0e+00|1.2e-11| ✓
chol 1 1
26|1.000|1.000|7.9e-12|3.3e-07|1.5e-04|-5.111342e-01| 0:0:00|1.7e-06|2.0e+00|2.6e-12| ✓
chol 1 1
27|1.000|1.000|2.4e-11|3.3e-07|1.5e-05|-5.111926e-01| 0:0:00|3.7e-07|2.0e+00|2.5e-13| ✓
chol 1 1
28|1.000|1.000|4.8e-11|3.3e-07|7.0e-07|-5.111984e-01| 0:0:00|3.5e-08|2.0e+00|1.2e-14| ✓
chol 1 1
29|1.000|1.000|5.8e-11|3.3e-07|1.0e-08|-5.111987e-01| 0:0:00|1.7e-09|2.0e+00|0.0e+00| ✓
chol 1 1
30|1.000|1.000|9.0e-11|3.3e-07|1.2e-10|-5.111987e-01| 0:0:00|2.6e-11|2.0e+00|0.0e+00|

```

Stop: relative gap < infeasibility

```

-----
number of iterations    = 30
primal objective value = -5.11198740e-01
dual   objective value = -5.11198737e-01
gap := trace(XZ)       = 1.02e-08
relative gap           = 6.76e-09
actual relative gap    = -1.34e-09
rel. primal infeas     = 5.77e-11
rel. dual   infeas     = 3.29e-07
norm(X), norm(y), norm(Z) = 9.9e+00, 2.7e+01, 2.8e+01
norm(A), norm(b), norm(C) = 8.3e+02, 2.8e+02, 2.8e+01
Total CPU time (secs)   = 0.27
CPU time per iteration = 0.01
termination code        = -1
DIMACS errors: 5.8e-11  0.0e+00  3.3e-07  0.0e+00  -1.3e-09  5.1e-09
-----

```

ans =

0.5112

Iteration 6 Total error is: 0.0027039

num. of constraints = 25
 dim. of socp var = 26, num. of socp blk = 1
 dim. of linear var = 800
 2 linear variables from unrestricted variable.

*** convert ublk to linear blk

***** ✓

SDPT3: homogeneous self-dual path-following algorithms

***** ✓

version predcorr gam expon
 HKM 1 0.000 1

it	pstep	dstep	pinfeas	dinfeas	gap	mean(obj)	cputime	kap	tau	theta

0	0.000	0.000	1.2e+00	5.1e+01	1.1e+08	1.001345e+06	0:0:00	1.1e+08	1.0e+00	1.0e+00
---	-------	-------	---------	---------	---------	--------------	--------	---------	---------	---------

chol 1 1

1	1.000	1.000	5.7e-01	2.5e+01	1.1e+08	1.843163e+06	0:0:00	3.4e+07	7.0e-01	3.4e-01
---	-------	-------	---------	---------	---------	--------------	--------	---------	---------	---------

chol 1 1

2	0.823	0.823	9.3e-02	4.1e+00	1.7e+07	1.460045e+06	0:0:00	2.4e+06	7.8e-01	6.2e-02
---	-------	-------	---------	---------	---------	--------------	--------	---------	---------	---------

chol 1 1

3	0.422	0.422	8.7e-02	3.8e+00	1.9e+07	1.630832e+06	0:0:00	1.7e+06	6.8e-01	5.1e-02
---	-------	-------	---------	---------	---------	--------------	--------	---------	---------	---------

chol 1 1

4	0.921	0.921	6.3e-02	2.8e+00	1.8e+07	1.722172e+06	0:0:00	3.5e+05	6.0e-01	3.2e-02
---	-------	-------	---------	---------	---------	--------------	--------	---------	---------	---------

chol 1 1

5	0.768	0.768	3.6e-02	1.6e+00	9.4e+06	1.233845e+06	0:0:00	4.8e+04	6.7e-01	2.1e-02
---	-------	-------	---------	---------	---------	--------------	--------	---------	---------	---------

chol 1 1

6	0.801	0.801	1.5e-02	6.4e-01	3.1e+06	5.897221e+05	0:0:00	2.5e+03	8.6e-01	1.1e-02
---	-------	-------	---------	---------	---------	--------------	--------	---------	---------	---------

chol 1 1

7	0.928	0.928	1.3e-03	5.5e-02	2.0e+05	4.541267e+04	0:0:00	2.3e+03	1.1e+00	1.2e-03
---	-------	-------	---------	---------	---------	--------------	--------	---------	---------	---------

chol 1 1

8	0.973	0.973	6.8e-04	3.0e-02	1.1e+05	2.926309e+04	0:0:00	2.4e+02	1.2e+00	6.9e-04
---	-------	-------	---------	---------	---------	--------------	--------	---------	---------	---------

chol 1 1

9	1.000	1.000	3.9e-04	1.7e-02	6.3e+04	1.643789e+04	0:0:00	1.5e+02	1.2e+00	4.1e-04
---	-------	-------	---------	---------	---------	--------------	--------	---------	---------	---------

chol 1 1

10	1.000	1.000	1.6e-04	7.0e-03	2.5e+04	6.590525e+03	0:0:00	8.8e+01	1.2e+00	1.7e-04
----	-------	-------	---------	---------	---------	--------------	--------	---------	---------	---------

chol 1 1

11	1.000	1.000	6.6e-05	3.0e-03	1.0e+04	2.620693e+03	0:0:00	3.4e+01	1.3e+00	7.3e-05
----	-------	-------	---------	---------	---------	--------------	--------	---------	---------	---------

chol 1 1

12	1.000	1.000	2.7e-05	1.3e-03	3.9e+03	1.065875e+03	0:0:00	1.4e+01	1.3e+00	3.1e-05
----	-------	-------	---------	---------	---------	--------------	--------	---------	---------	---------

chol 1 1

13	1.000	1.000	1.0e-05	5.3e-04	1.4e+03	3.789774e+02	0:0:00	5.7e+00	1.4e+00	1.2e-05
----	-------	-------	---------	---------	---------	--------------	--------	---------	---------	---------

chol 1 1

14	1.000	1.000	4.1e-06	3.0e-04	5.4e+02	1.521862e+02	0:0:00	2.0e+00	1.5e+00	5.0e-06
----	-------	-------	---------	---------	---------	--------------	--------	---------	---------	---------

chol 1 1

15	1.000	1.000	1.4e-06	2.1e-04	1.8e+02	5.039756e+01	0:0:00	7.9e-01	1.6e+00	1.9e-06
----	-------	-------	---------	---------	---------	--------------	--------	---------	---------	---------

chol 1 1

16	1.000	1.000	5.5e-07	1.8e-04	6.2e+01	1.895247e+01	0:0:00	2.6e-01	1.7e+00	8.1e-07
----	-------	-------	---------	---------	---------	--------------	--------	---------	---------	---------

chol 1 1

17	1.000	1.000	1.5e-07	1.5e-04	1.5e+01	4.392427e+00	0:0:00	1.1e-01	1.9e+00	2.3e-07
----	-------	-------	---------	---------	---------	--------------	--------	---------	---------	---------

chol 1 1

18	1.000	1.000	4.3e-08	1.4e-04	4.3e+00	1.012557e+00	0:0:00	3.0e-02	1.9e+00	7.1e-08
----	-------	-------	---------	---------	---------	--------------	--------	---------	---------	---------

```

chol 1 1
19|0.983|0.983|8.0e-09|1.2e-04|7.9e-01|-1.879116e-01| 0:0:00|9.9e-03|2.0e+00|1.3e-08| ✓
chol 1 1
20|1.000|1.000|1.8e-09|1.1e-05|1.8e-01|-3.772698e-01| 0:0:00|1.9e-03|2.0e+00|3.1e-09| ✓
chol 1 1
21|1.000|1.000|8.6e-10|1.0e-05|8.5e-02|-4.219537e-01| 0:0:00|4.3e-04|2.0e+00|1.4e-09| ✓
chol 1 1
22|1.000|1.000|2.3e-10|9.1e-07|2.3e-02|-4.429865e-01| 0:0:00|2.0e-04|2.0e+00|3.9e-10| ✓
chol 1 1
23|1.000|1.000|8.9e-11|8.2e-07|8.8e-03|-4.497071e-01| 0:0:00|5.4e-05|2.0e+00|1.5e-10| ✓
chol 1 1
24|1.000|1.000|2.4e-11|3.3e-07|2.2e-03|-4.522767e-01| 0:0:00|2.1e-05|2.0e+00|3.8e-11| ✓
chol 1 1
25|1.000|1.000|1.8e-11|3.3e-07|5.6e-04|-4.529840e-01| 0:0:00|5.3e-06|2.0e+00|9.6e-12| ✓
chol 1 1
26|1.000|1.000|8.3e-12|3.3e-07|1.2e-04|-4.531637e-01| 0:0:00|1.3e-06|2.0e+00|2.1e-12| ✓
chol 1 1
27|1.000|1.000|1.5e-11|3.3e-07|1.1e-05|-4.532111e-01| 0:0:00|3.0e-07|2.0e+00|1.9e-13| ✓
chol 1 1
28|1.000|1.000|7.3e-11|3.3e-07|4.7e-07|-4.532156e-01| 0:0:00|2.7e-08|2.0e+00|8.2e-15| ✓
chol 1 1
29|1.000|1.000|8.6e-11|3.3e-07|6.4e-09|-4.532158e-01| 0:0:00|1.2e-09|2.0e+00|0.0e+00|
Stop: relative gap < infeasibility

```

```

-----
number of iterations    = 29
primal objective value = -4.53215387e-01
dual   objective value = -4.53215778e-01
gap := trace(XZ)       = 4.73e-07
relative gap           = 3.25e-07
actual relative gap    = 2.05e-07
rel. primal infeas     = 7.25e-11
rel. dual   infeas     = 3.29e-07
norm(X), norm(y), norm(Z) = 1.0e+01, 2.7e+01, 2.8e+01
norm(A), norm(b), norm(C) = 8.3e+02, 2.8e+02, 2.8e+01
Total CPU time (secs)   = 0.28
CPU time per iteration = 0.01
termination code        = -1
DIMACS errors: 7.3e-11  0.0e+00  3.3e-07  0.0e+00  2.1e-07  2.5e-07
-----

```

ans =

0.4532

Iteration 7 Total error is: 0.002494

```

num. of constraints = 25
dim. of socp var   = 26,   num. of socp blk = 1
dim. of linear var = 800
2 linear variables from unrestricted variable.

```

```

*** convert ublk to linear blk
*****
SDPT3: homogeneous self-dual path-following algorithms

```

```

*****
version  predcorr  gam  expon
      HKM      1      0.000  1
it  pstep  dstep  pinfeas  dinfeas  gap      mean(obj)      cputime      kap      tau      theta
-----
-----
0|0.000|0.000|1.2e+00|5.1e+01|1.1e+08| 1.007216e+06| 0:0:00|1.1e+08|1.0e+00|1.0e+00| ✓
chol 1 1
1|1.000|1.000|5.6e-01|2.5e+01|1.0e+08| 1.840625e+06| 0:0:00|3.4e+07|7.0e-01|3.4e-01| ✓
chol 1 1
2|0.821|0.821|9.4e-02|4.1e+00|1.7e+07| 1.456022e+06| 0:0:00|2.4e+06|7.8e-01|6.2e-02| ✓
chol 1 1
3|0.422|0.422|8.7e-02|3.8e+00|1.9e+07| 1.630267e+06| 0:0:00|1.7e+06|6.9e-01|5.1e-02| ✓
chol 1 1
4|0.921|0.921|6.3e-02|2.8e+00|1.8e+07| 1.733982e+06| 0:0:00|3.7e+05|6.0e-01|3.2e-02| ✓
chol 1 1
5|0.761|0.761|3.7e-02|1.6e+00|9.6e+06| 1.249190e+06| 0:0:00|5.3e+04|6.7e-01|2.1e-02| ✓
chol 1 1
6|0.791|0.791|1.5e-02|6.6e-01|3.2e+06| 6.027206e+05| 0:0:00|2.7e+03|8.5e-01|1.1e-02| ✓
chol 1 1
7|0.932|0.932|1.3e-03|5.6e-02|2.0e+05| 4.553444e+04| 0:0:00|2.3e+03|1.1e+00|1.2e-03| ✓
chol 1 1
8|0.967|0.967|6.8e-04|3.0e-02|1.1e+05| 2.946741e+04| 0:0:00|2.5e+02|1.2e+00|6.9e-04| ✓
chol 1 1
9|1.000|1.000|4.0e-04|1.8e-02|6.4e+04| 1.687090e+04| 0:0:00|1.5e+02|1.2e+00|4.2e-04| ✓
chol 1 1
10|1.000|1.000|1.7e-04|7.4e-03|2.6e+04| 6.984866e+03| 0:0:00|9.1e+01|1.2e+00|1.8e-04| ✓
chol 1 1
11|1.000|1.000|6.9e-05|3.1e-03|1.0e+04| 2.732567e+03| 0:0:00|3.6e+01|1.3e+00|7.5e-05| ✓
chol 1 1
12|1.000|1.000|2.9e-05|1.3e-03|4.2e+03| 1.133390e+03| 0:0:00|1.5e+01|1.3e+00|3.2e-05| ✓
chol 1 1
13|1.000|1.000|1.1e-05|5.5e-04|1.5e+03| 3.981311e+02| 0:0:00|6.1e+00|1.4e+00|1.2e-05| ✓
chol 1 1
14|1.000|1.000|4.3e-06|3.0e-04|5.7e+02| 1.620800e+02| 0:0:00|2.1e+00|1.4e+00|5.3e-06| ✓
chol 1 1
15|1.000|1.000|1.5e-06|2.1e-04|1.9e+02| 5.341013e+01| 0:0:00|8.4e-01|1.6e+00|2.0e-06| ✓
chol 1 1
16|1.000|1.000|5.9e-07|1.8e-04|6.7e+01| 2.032903e+01| 0:0:00|2.8e-01|1.7e+00|8.5e-07| ✓
chol 1 1
17|1.000|1.000|1.6e-07|1.5e-04|1.6e+01| 4.806004e+00| 0:0:00|1.1e-01|1.8e+00|2.5e-07| ✓
chol 1 1
18|1.000|1.000|4.7e-08|1.4e-04|4.8e+00| 1.177776e+00| 0:0:00|3.2e-02|1.9e+00|7.8e-08| ✓
chol 1 1
19|0.982|0.982|8.8e-09|1.2e-04|8.6e-01|-1.473603e-01| 0:0:00|1.1e-02|2.0e+00|1.5e-08| ✓
chol 1 1
20|1.000|1.000|2.0e-09|1.1e-05|1.9e-01|-3.552507e-01| 0:0:00|2.1e-03|2.0e+00|3.3e-09| ✓
chol 1 1
21|1.000|1.000|9.3e-10|1.0e-05|9.2e-02|-4.032631e-01| 0:0:00|4.6e-04|2.0e+00|1.6e-09| ✓
chol 1 1
22|1.000|1.000|2.6e-10|9.1e-07|2.6e-02|-4.256642e-01| 0:0:00|2.2e-04|2.0e+00|4.4e-10| ✓
chol 1 1
23|1.000|1.000|9.9e-11|8.2e-07|9.7e-03|-4.332887e-01| 0:0:00|6.1e-05|2.0e+00|1.6e-10| ✓
chol 1 1

```

```

24|1.000|1.000|2.8e-11|3.3e-07|2.6e-03|-4.360624e-01| 0:0:00|2.3e-05|2.0e+00|4.5e-11| ✓
chol 1 1
25|1.000|1.000|1.8e-11|3.3e-07|9.1e-04|-4.367792e-01| 0:0:00|6.2e-06|2.0e+00|1.6e-11| ✓
chol 1 1
26|1.000|1.000|1.2e-11|3.3e-07|2.3e-04|-4.370561e-01| 0:0:00|2.2e-06|2.0e+00|4.0e-12| ✓
chol 1 1
27|0.968|0.968|2.1e-11|3.3e-07|1.3e-05|-4.371481e-01| 0:0:00|6.1e-07|2.0e+00|2.3e-13| ✓
chol 1 1
28|0.991|0.991|1.7e-11|3.3e-07|1.0e-06|-4.371531e-01| 0:0:00|3.8e-08|2.0e+00|1.8e-14| ✓
chol 1 1
29|1.000|1.000|8.2e-11|3.3e-07|4.7e-08|-4.371536e-01| 0:0:00|2.5e-09|2.0e+00|7.1e-16| ✓
chol 1 1
30|1.000|1.000|8.7e-11|3.3e-07|6.0e-10|-4.371536e-01| 0:0:00|1.1e-10|2.0e+00|0.0e+00| ✓
chol 1 1
31|0.791|1.000|8.2e-11|3.3e-07|1.3e-10|-4.371536e-01| 0:0:00|2.5e-11|2.0e+00|0.0e+00| ✓
chol 1 1
32|0.782|0.996|3.8e-10|3.3e-07|3.9e-11|-4.371536e-01| 0:0:00|5.8e-12|2.0e+00|0.0e+00|
Stop: relative gap < infeasibility
lack of progress in infeas

```

```

-----
number of iterations    = 32
primal objective value = -4.37153536e-01
dual   objective value = -4.37153569e-01
gap := trace(XZ)       = 4.71e-08
relative gap           = 3.28e-08
actual relative gap    = 1.76e-08
rel. primal infeas     = 8.16e-11
rel. dual   infeas     = 3.29e-07
norm(X), norm(y), norm(Z) = 1.0e+01, 2.7e+01, 2.8e+01
norm(A), norm(b), norm(C) = 8.3e+02, 2.8e+02, 2.8e+01
Total CPU time (secs)   = 0.28
CPU time per iteration = 0.01
termination code        = -9
DIMACS errors: 8.2e-11  0.0e+00  3.3e-07  0.0e+00  1.8e-08  2.5e-08
-----

```

ans =

0.4372

Iteration 8 Total error is: 0.0024236

The total representation error of the testing signals is: 0.14503

>>