

```
>> demo_Polynomial_Dictionary_Learning_Uber
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```
Starting to train the dictionary
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```
solving the quadratic problem with YALMIP...
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```
num. of constraints = 18
dim. of socp var = 19, num. of socp blk = 1
dim. of linear var = 116
8 linear variables from unrestricted variable.
```

```
*** convert ublk to linear blk
number of nearly dependent constraints = 1
To remove these constraints, re-run sqlp.m with OPTIONS.rmdepconstr = 1.
```

```
***** ✓
*****
```

```
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	1.7e+00	3.6e+00	2.5e+04	5.401873e+02	0:0:00	2.5e+04	1.0e+00	1.0e+00	✓	
chol 1	1											
1	0.905	0.905	1.6e-01	3.3e-01	2.8e+03	4.389137e+02	0:0:00	3.6e+02	1.1e+00	1.0e-01	✓	
chol 1	1											
2	0.758	0.758	4.5e-02	9.5e-02	6.5e+02	1.401921e+02	0:0:00	1.3e+01	1.4e+00	3.6e-02	✓	
chol 1	1											
3	1.000	1.000	7.4e-03	1.6e-02	1.4e+02	7.357507e+00	0:0:00	5.1e+00	1.5e+00	6.8e-03	✓	
chol 1	1											
4	0.668	0.668	2.5e-03	5.3e-03	4.4e+01	-2.548066e+01	0:0:00	2.5e+00	1.6e+00	2.4e-03	✓	
chol 1	1											
5	0.955	0.955	1.7e-03	4.0e-03	3.5e+01	-2.908689e+01	0:0:00	7.4e-01	1.5e+00	1.6e-03	✓	
chol 1	1											
6	1.000	1.000	7.6e-04	1.8e-03	1.5e+01	-3.523754e+01	0:0:00	3.9e-01	1.6e+00	7.1e-04	✓	
chol 1	1											
7	1.000	1.000	3.5e-04	8.5e-04	6.8e+00	-3.794572e+01	0:0:00	1.7e-01	1.6e+00	3.3e-04	✓	
chol 1	1											
8	1.000	1.000	1.1e-04	3.3e-04	2.2e+00	-3.918080e+01	0:0:00	7.8e-02	1.6e+00	1.1e-04	✓	
chol 1	1											
9	1.000	1.000	4.7e-05	1.8e-04	8.9e-01	-3.955532e+01	0:0:00	2.5e-02	1.6e+00	4.5e-05	✓	
chol 1	1											
10	1.000	1.000	1.5e-05	1.3e-04	2.8e-01	-3.969771e+01	0:0:00	1.0e-02	1.6e+00	1.5e-05	✓	
chol 1	1											
11	1.000	1.000	5.8e-06	5.1e-05	1.0e-01	-3.974395e+01	0:0:00	3.2e-03	1.7e+00	5.7e-06	✓	
chol 1	1											
12	1.000	1.000	1.8e-06	2.0e-05	3.2e-02	-3.975966e+01	0:0:00	1.2e-03	1.7e+00	1.8e-06	✓	
chol 1	1											
13	1.000	1.000	6.5e-07	8.0e-06	1.1e-02	-3.976517e+01	0:0:00	3.9e-04	1.7e+00	6.8e-07	✓	
chol 1	1											
14	1.000	1.000	2.0e-07	3.1e-06	3.4e-03	-3.976677e+01	0:0:00	1.4e-04	1.8e+00	2.1e-07	✓	
chol 1	1											
15	1.000	1.000	6.5e-08	1.2e-06	1.1e-03	-3.976732e+01	0:0:00	4.3e-05	1.8e+00	6.9e-08	✓	
chol 1	1											
16	1.000	1.000	1.4e-08	4.9e-07	2.3e-04	-3.976747e+01	0:0:00	1.4e-05	1.8e+00	1.5e-08	✓	

```

chol 1 1
17|1.000|1.000|7.3e-09|2.0e-07|1.2e-04|-3.976750e+01| 0:0:00|3.2e-06|1.8e+00|7.6e-09| ✓
chol 1 1
18|0.913|0.913|3.2e-09|8.9e-08|3.9e-05|-3.976751e+01| 0:0:00|1.7e-06|1.8e+00|2.6e-09| ✓
chol 1 1
19|1.000|1.000|1.1e-08|1.6e-08|1.8e-05|-3.976752e+01| 0:0:00|5.5e-07|1.8e+00|1.3e-09| ✓
chol 1 1
20|1.000|1.000|6.5e-09|3.7e-09|7.2e-06|-3.976752e+01| 0:0:00|2.5e-07|1.8e+00|5.1e-10| ✓
chol 1 1
21|1.000|1.000|6.9e-09|9.4e-10|2.0e-06|-3.976752e+01| 0:0:00|9.8e-08|1.8e+00|1.9e-10|
  Stop: max(relative gap,infeasibilities) < 1.00e-07
-----
number of iterations    = 21
primal objective value = -3.97675230e+01
dual   objective value = -3.97675251e+01
gap := trace(XZ)       = 2.01e-06
relative gap           = 4.94e-08
actual relative gap    = 2.56e-08
rel. primal infeas     = 6.93e-09
rel. dual   infeas     = 9.44e-10
norm(X), norm(y), norm(Z) = 4.1e+01, 4.1e+03, 7.7e+00
norm(A), norm(b), norm(C) = 1.6e+02, 1.0e+00, 5.7e+01
Total CPU time (secs)   = 0.17
CPU time per iteration = 0.01
termination code        = 0
DIMACS errors: 6.9e-09  0.0e+00  9.4e-10  0.0e+00  2.6e-08  2.5e-08
-----

ans =

    39.7675

num. of constraints = 18
dim. of socp var   = 19,   num. of socp blk = 1
dim. of linear var = 116
8 linear variables from unrestricted variable.

*** convert ublk to linear blk
number of nearly dependent constraints = 1
To remove these constraints, re-run sqlp.m with OPTIONS.rmdepconstr = 1.
***** ✓
*****
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|1.0e+00|4.1e+04|7.5e+09| 1.856518e+08| 0:0:00|7.5e+10|1.0e+00|1.0e+00| ✓
chol 1 1
1|0.987|0.987|2.0e-02|8.0e+02|4.4e+08| 1.570668e+08| 0:0:00|8.0e+08|1.0e+00|2.0e-02| ✓
chol 1 1

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 2|0.888|0.888|3.6e-03|1.4e+02|1.3e+08| 5.568319e+07| 0:0:00|8.0e+07|1.0e+00|3.7e-03| ✓
chol 1 1
 3|0.279|0.279|3.2e-03|1.3e+02|1.4e+08| 5.729698e+07| 0:0:00|6.1e+07|1.0e+00|3.2e-03| ✓
chol 1 1
 4|1.000|1.000|1.2e-03|4.7e+01|9.5e+07| 3.737216e+07| 0:0:00|4.9e+06|9.4e-01|1.1e-03| ✓
chol 1 1
 5|0.819|0.819|7.7e-04|3.1e+01|7.0e+07| 2.431953e+07| 0:0:00|1.8e+06|8.8e-01|6.7e-04| ✓
chol 1 1
 6|1.000|1.000|3.6e-04|1.4e+01|3.4e+07| 1.033907e+07| 0:0:00|5.4e+05|8.4e-01|3.0e-04| ✓
chol 1 1
 7|1.000|1.000|1.3e-04|5.2e+00|1.3e+07| 3.307356e+06| 0:0:00|2.4e+05|8.0e-01|1.0e-04| ✓
chol 1 1
 8|0.971|0.971|8.3e-06|3.4e-01|7.4e+05| 1.292212e+05| 0:0:00|8.3e+04|8.0e-01|6.7e-06| ✓
chol 1 1
 9|0.839|0.839|1.6e-06|6.5e-02|1.3e+05| 2.693419e+04| 0:0:00|9.1e+03|8.9e-01|1.4e-06| ✓
chol 1 1
10|0.872|0.872|9.0e-07|3.6e-02|7.1e+04| 1.525568e+04| 0:0:00|6.7e+02|1.0e+00|9.1e-07| ✓
chol 1 1
11|0.936|0.936|2.1e-07|8.6e-03|1.6e+04| 4.361295e+03| 0:0:00|5.1e+02|1.1e+00|2.2e-07| ✓
chol 1 1
12|1.000|1.000|1.0e-07|4.2e-03|7.9e+03| 2.053599e+03| 0:0:00|1.2e+02|1.1e+00|1.1e-07| ✓
chol 1 1
13|1.000|1.000|2.6e-08|1.1e-03|1.9e+03| 5.672727e+02| 0:0:00|6.2e+01|1.1e+00|2.9e-08| ✓
chol 1 1
14|1.000|1.000|9.5e-09|3.8e-04|7.0e+02| 2.296321e+02| 0:0:00|1.6e+01|1.1e+00|1.0e-08| ✓
chol 1 1
15|1.000|1.000|2.6e-09|1.1e-04|1.9e+02| 7.617400e+01| 0:0:00|5.8e+00|1.1e+00|2.8e-09| ✓
chol
    SMW too ill-conditioned, switch to LU factor, 1.6e+28.
    switch to LU factor lu 1 1
16|0.996|0.996|7.7e-10|3.1e-05|5.7e+01| 1.883314e+01| 0:0:00|1.6e+00|1.1e+00|8.2e-10| ✓
lu 1 1
17|1.000|1.000|3.0e-10|1.2e-05|2.3e+01| 7.671785e+00| 0:0:00|5.0e-01|1.1e+00|3.1e-10| ✓
lu 1 1
18|0.956|0.956|3.2e-11|1.3e-06|2.3e+00|-9.968302e-01| 0:0:00|2.0e-01|1.1e+00|3.3e-11| ✓
lu 1 1
19|0.967|0.967|2.6e-12|1.0e-07|1.7e-01|-1.918606e+00| 0:0:00|2.2e-02|1.1e+00|2.7e-12| ✓
lu 1 1
20|0.982|0.982|7.1e-13|2.6e-09|3.1e-03|-1.982192e+00| 0:0:00|1.3e-03|1.1e+00|6.9e-14| ✓
lu 1 1
21|0.988|0.988|6.6e-13|5.7e-10|3.6e-05|-1.983155e+00| 0:0:00|4.9e-05|1.1e+00|1.3e-15| ✓
lu 1 1
22|1.000|1.000|1.6e-12|5.7e-10|2.0e-06|-1.983165e+00| 0:0:00|6.5e-07|1.1e+00|3.7e-17| ✓
lu 1 1
23|1.000|1.000|1.1e-11|5.7e-10|9.5e-08|-1.983166e+00| 0:0:00|2.1e-08|1.1e+00|1.4e-18|
    Stop: max(relative gap,infeasibilities) < 1.00e-07
-----
number of iterations    = 23
primal objective value = -1.98316587e+00
dual   objective value = -1.98316593e+00
gap := trace(XZ)       = 9.54e-08
relative gap           = 3.20e-08
actual relative gap    = 1.13e-08
rel. primal infeas     = 1.08e-11
rel. dual   infeas     = 5.66e-10

```

```

norm(X), norm(y), norm(Z) = 3.7e+01, 4.0e+03, 5.5e+01
norm(A), norm(b), norm(C) = 2.4e+06, 6.0e+05, 5.7e+01
Total CPU time (secs) = 0.19
CPU time per iteration = 0.01
termination code = 0
DIMACS errors: 1.1e-11 0.0e+00 5.7e-10 0.0e+00 1.1e-08 1.9e-08
-----

```

```
ans =
```

```
1.9832
```

```
Iteration 2 Total error is: 0.024597
```

```

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dim. of linear var = 116
8 linear variables from unrestricted variable.

```

```

*** convert ublk to linear blk
number of nearly dependent constraints = 1
To remove these constraints, re-run sqlp.m with OPTIONS.rmdepconstr = 1.
*****

```

```
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|1.0e+00|3.8e+04|8.8e+09| 2.188626e+08| 0:0:00|8.8e+10|1.0e+00|1.0e+00| ✓
chol 1 1
1|0.987|0.987|2.0e-02|7.5e+02|5.2e+08| 1.851795e+08| 0:0:00|9.4e+08|1.0e+00|2.0e-02| ✓
chol 1 1
2|0.929|0.929|3.1e-03|1.2e+02|1.6e+08| 6.900472e+07| 0:0:00|6.2e+07|1.0e+00|3.2e-03| ✓
chol 1 1
3|0.371|0.371|2.6e-03|9.9e+01|1.7e+08| 6.760885e+07| 0:0:00|4.2e+07|9.8e-01|2.6e-03| ✓
chol 1 1
4|1.000|1.000|9.5e-04|3.6e+01|9.3e+07| 3.612349e+07| 0:0:00|3.5e+06|9.4e-01|8.9e-04| ✓
chol 1 1
5|0.857|0.857|6.3e-04|2.4e+01|6.8e+07| 2.334855e+07| 0:0:00|1.3e+06|8.7e-01|5.5e-04| ✓
chol 1 1
6|1.000|1.000|2.9e-04|1.1e+01|3.3e+07| 9.756208e+06| 0:0:00|5.0e+05|8.3e-01|2.4e-04| ✓
chol 1 1
7|1.000|1.000|9.0e-05|3.4e+00|1.1e+07| 2.574112e+06| 0:0:00|2.2e+05|8.0e-01|7.2e-05| ✓
chol 1 1
8|0.970|0.970|4.3e-06|1.6e-01|4.3e+05| 7.308206e+04| 0:0:00|6.7e+04|8.1e-01|3.5e-06| ✓
chol 1 1
9|0.844|0.844|1.7e-06|6.2e-02|1.6e+05| 3.639026e+04| 0:0:00|3.1e+03|9.3e-01|1.5e-06| ✓
chol 1 1
10|1.000|1.000|6.3e-07|2.4e-02|5.9e+04| 1.474998e+04| 0:0:00|8.2e+02|1.0e+00|6.4e-07| ✓
chol 1 1
11|1.000|1.000|2.7e-07|1.0e-02|2.5e+04| 6.502813e+03| 0:0:00|4.2e+02|1.1e+00|2.9e-07| ✓

```

```

chol 1 1
12|1.000|1.000|1.1e-07|3.9e-03|9.3e+03| 2.506361e+03| 0:0:00|1.9e+02|1.1e+00|1.1e-07| ✓
chol 1 1
13|1.000|1.000|3.6e-08|1.4e-03|3.2e+03| 8.806085e+02| 0:0:00|7.3e+01|1.1e+00|3.9e-08| ✓
chol 1 1
14|1.000|1.000|8.8e-09|3.3e-04|7.6e+02| 2.570831e+02| 0:0:00|2.6e+01|1.1e+00|9.5e-09| ✓
chol 1 1
15|1.000|1.000|2.7e-09|1.0e-04|2.4e+02| 8.857440e+01| 0:0:00|6.3e+00|1.1e+00|3.0e-09| ✓
chol
    SMW too ill-conditioned, switch to LU factor, 2.8e+28.
    switch to LU factor lu 1 1
16|1.000|1.000|6.3e-10|2.4e-05|5.4e+01| 2.073066e+01| 0:0:00|2.0e+00|1.1e+00|6.7e-10| ✓
lu 1 1
17|1.000|1.000|2.0e-10|7.6e-06|1.8e+01| 6.054616e+00| 0:0:00|4.8e-01|1.1e+00|2.1e-10| ✓
lu 1 1
18|0.968|0.968|2.3e-11|8.5e-07|1.9e+00|-7.462816e-01| 0:0:00|1.6e-01|1.1e+00|2.4e-11| ✓
lu 1 1
19|0.977|0.977|1.4e-12|5.3e-08|1.1e-01|-1.551096e+00| 0:0:00|1.7e-02|1.1e+00|1.5e-12| ✓
lu 1 1
20|0.986|0.986|1.5e-12|1.3e-09|1.6e-03|-1.589730e+00| 0:0:00|9.3e-04|1.1e+00|3.3e-14| ✓
lu 1 1
21|0.986|0.986|5.9e-12|5.7e-10|2.3e-05|-1.590243e+00| 0:0:00|3.2e-05|1.1e+00|7.0e-16| ✓
lu 1 1
22|0.998|0.998|2.9e-11|5.7e-10|2.9e-06|-1.590250e+00| 0:0:00|4.9e-07|1.1e+00|4.2e-17| ✓
lu 1 1
23|1.000|1.000|7.6e-11|5.7e-10|1.3e-07|-1.590251e+00| 0:0:00|2.7e-08|1.1e+00|2.7e-18|
    Stop: max(relative gap,infeasibilities) < 1.00e-07
-----
number of iterations    = 23
primal objective value = -1.59025049e+00
dual   objective value = -1.59025065e+00
gap := trace(XZ)       = 1.33e-07
relative gap           = 5.14e-08
actual relative gap    = 3.93e-08
rel. primal infeas     = 7.59e-11
rel. dual   infeas     = 5.66e-10
norm(X), norm(y), norm(Z) = 4.4e+01, 3.9e+03, 5.6e+01
norm(A), norm(b), norm(C) = 2.2e+06, 7.0e+05, 5.7e+01
Total CPU time (secs)   = 0.19
CPU time per iteration = 0.01
termination code        = 0
DIMACS errors: 7.6e-11  0.0e+00  5.7e-10  0.0e+00  3.9e-08  3.2e-08
-----

ans =

    1.5903

Iteration    3    Total error is: 0.022132

num. of constraints = 18
dim. of socp var   = 19,    num. of socp blk   = 1
dim. of linear var = 116
8 linear variables from unrestricted variable.

```

```

*** convert ublk to linear blk
number of nearly dependent constraints = 1
To remove these constraints, re-run sqlp.m with OPTIONS.rmdepconstr = 1.
***** ✓
*****
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|1.0e+00|3.9e+04|1.3e+10| 3.274697e+08| 0:0:00|1.3e+11|1.0e+00|1.0e+00| ✓
chol 1 1
1|0.987|0.987|2.0e-02|7.8e+02|7.7e+08| 2.770253e+08| 0:0:00|1.4e+09|1.0e+00|2.0e-02| ✓
chol 1 1
2|0.937|0.937|2.7e-03|1.1e+02|2.0e+08| 8.966112e+07| 0:0:00|7.2e+07|1.0e+00|2.8e-03| ✓
chol 1 1
3|0.409|0.409|2.2e-03|8.7e+01|2.1e+08| 8.561185e+07| 0:0:00|4.7e+07|9.9e-01|2.2e-03| ✓
chol 1 1
4|1.000|1.000|7.3e-04|2.9e+01|1.1e+08| 4.196804e+07| 0:0:00|3.8e+06|9.5e-01|6.9e-04| ✓
chol 1 1
5|0.751|0.751|5.5e-04|2.2e+01|8.8e+07| 3.096622e+07| 0:0:00|1.8e+06|8.8e-01|4.8e-04| ✓
chol 1 1
6|1.000|1.000|2.5e-04|9.7e+00|4.2e+07| 1.256363e+07| 0:0:00|6.6e+05|8.4e-01|2.1e-04| ✓
chol 1 1
7|1.000|1.000|9.0e-05|3.5e+00|1.6e+07| 3.968085e+06| 0:0:00|2.9e+05|8.1e-01|7.2e-05| ✓
chol 1 1
8|0.974|0.974|5.3e-06|2.1e-01|8.2e+05| 1.320886e+05| 0:0:00|1.0e+05|8.1e-01|4.3e-06| ✓
chol 1 1
9|0.850|0.850|1.3e-06|5.1e-02|1.9e+05| 4.063934e+04| 0:0:00|6.4e+03|9.2e-01|1.2e-06| ✓
chol 1 1
10|0.892|0.892|7.4e-07|2.9e-02|1.0e+05| 2.053789e+04| 0:0:00|1.1e+03|1.0e+00|7.6e-07| ✓
chol 1 1
11|1.000|1.000|3.0e-07|1.2e-02|4.1e+04| 1.050424e+04| 0:0:00|7.6e+02|1.0e+00|3.2e-07| ✓
chol 1 1
12|0.977|0.977|7.2e-08|2.8e-03|9.4e+03| 2.635846e+03| 0:0:00|3.1e+02|1.1e+00|7.8e-08| ✓
chol 1 1
13|1.000|1.000|3.2e-08|1.2e-03|4.2e+03| 1.317887e+03| 0:0:00|7.7e+01|1.1e+00|3.4e-08| ✓
chol 1 1
14|0.964|0.964|7.4e-09|2.9e-04|9.7e+02| 3.516145e+02| 0:0:00|3.5e+01|1.1e+00|8.0e-09| ✓
chol
SMW too ill-conditioned, switch to LU factor, 3.6e+31.
switch to LU factor lu 1 1
15|1.000|1.000|2.8e-09|1.1e-04|3.8e+02| 1.249622e+02| 0:0:00|8.6e+00|1.1e+00|3.0e-09| ✓
lu 1 1
16|1.000|1.000|9.6e-10|3.8e-05|1.3e+02| 5.082980e+01| 0:0:00|3.3e+00|1.0e+00|9.9e-10| ✓
lu 1 1
17|0.982|0.982|1.9e-10|7.6e-06|2.8e+01| 8.825253e+00| 0:0:00|1.1e+00|1.0e+00|2.0e-10| ✓
lu 1 1
18|1.000|1.000|7.1e-11|2.8e-06|1.0e+01| 2.705744e+00| 0:0:00|2.5e-01|9.8e-01|6.9e-11| ✓
lu 1 1
19|0.969|0.969|4.6e-12|1.8e-07|6.0e-01|-1.225106e+00| 0:0:00|8.0e-02|9.9e-01|4.6e-12| ✓
lu 1 1

```

```

20|0.960|0.960|4.6e-13|8.4e-09|2.4e-02|-1.453401e+00| 0:0:00|4.0e-03|1.0e+00|2.2e-13| ✓
lu 1 1
21|0.979|0.979|2.5e-11|2.4e-10|4.9e-04|-1.458011e+00| 0:0:00|6.5e-05|1.1e+00|6.5e-15| ✓
lu 1 1
22|0.986|0.986|1.5e-11|6.3e-11|6.6e-06|-1.458110e+00| 0:0:00|5.1e-06|1.1e+00|1.2e-16| ✓
lu 1 1
23|1.000|1.000|2.2e-11|6.3e-11|2.9e-07|-1.458111e+00| 0:0:00|9.1e-08|1.1e+00|2.5e-18| ✓
lu 1 1
24|1.000|1.000|1.5e-10|6.3e-11|7.8e-09|-1.458112e+00| 0:0:00|3.0e-09|1.1e+00|0.0e+00|
Stop: max(relative gap,infeasibilities) < 1.00e-07
-----
number of iterations    = 24
primal objective value = -1.45811160e+00
dual   objective value = -1.45811156e+00
gap := trace(XZ)        = 7.83e-09
relative gap           = 3.18e-09
actual relative gap    = -9.00e-09
rel. primal infeas     = 1.45e-10
rel. dual   infeas     = 6.29e-11
norm(X), norm(y), norm(Z) = 3.3e+01, 3.8e+03, 5.6e+01
norm(A), norm(b), norm(C) = 2.3e+06, 1.0e+06, 5.7e+01
Total CPU time (secs)   = 0.17
CPU time per iteration = 0.01
termination code        = 0
DIMACS errors: 1.5e-10  0.0e+00  6.3e-11  0.0e+00  -9.0e-09  2.0e-09
-----

ans =

    1.4581

Iteration    4    Total error is: 0.02126

num. of constraints = 18
dim. of socp var   = 19,    num. of socp blk   = 1
dim. of linear var = 116
8 linear variables from unrestricted variable.

*** convert ublk to linear blk
number of nearly dependent constraints = 1
To remove these constraints, re-run sqlp.m with OPTIONS.rmdepconstr = 1.
***** ✓
*****
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|1.0e+00|3.0e+04|9.2e+09| 2.281529e+08| 0:0:00|9.2e+10|1.0e+00|1.0e+00| ✓
chol 1 1
1|0.987|0.987|2.0e-02|5.9e+02|5.4e+08| 1.930964e+08| 0:0:00|9.8e+08|1.0e+00|2.0e-02| ✓
chol 1 1

```

```

 2|0.992|0.992|3.7e-03|1.1e+02|2.8e+08| 1.175649e+08| 0:0:00|4.1e+07|9.9e-01|3.6e-03| ✓
chol 1 1
 3|0.884|0.884|1.9e-03|5.6e+01|1.8e+08| 7.307099e+07| 0:0:00|9.0e+06|9.3e-01|1.7e-03| ✓
chol 1 1
 4|1.000|1.000|1.0e-03|3.1e+01|1.2e+08| 4.299402e+07| 0:0:00|1.8e+06|8.8e-01|9.2e-04| ✓
chol 1 1
 5|0.666|0.666|8.1e-04|2.4e+01|9.5e+07| 3.265159e+07| 0:0:00|1.2e+06|8.5e-01|6.9e-04| ✓
chol 1 1
 6|1.000|1.000|5.1e-04|1.5e+01|6.2e+07| 1.861227e+07| 0:0:00|6.6e+05|8.1e-01|4.1e-04| ✓
chol 1 1
 7|0.991|0.991|1.0e-04|3.1e+00|1.3e+07| 2.435621e+06| 0:0:00|4.0e+05|7.8e-01|8.1e-05| ✓
chol 1 1
 8|0.944|0.944|1.4e-05|4.2e-01|1.7e+06| 3.779562e+05| 0:0:00|9.2e+04|7.9e-01|1.1e-05| ✓
chol 1 1
 9|0.907|0.907|2.8e-06|8.2e-02|3.1e+05| 6.569166e+04| 0:0:00|9.6e+03|8.6e-01|2.4e-06| ✓
chol 1 1
10|0.726|0.726|1.7e-06|5.0e-02|1.7e+05| 3.494341e+04| 0:0:00|2.7e+03|9.9e-01|1.7e-06| ✓
chol 1 1
11|1.000|1.000|8.4e-07|2.5e-02|8.3e+04| 2.187942e+04| 0:0:00|1.2e+03|1.0e+00|8.4e-07| ✓
chol 1 1
12|0.917|0.917|2.6e-07|7.8e-03|2.4e+04| 6.401920e+03| 0:0:00|6.0e+02|1.1e+00|2.8e-07| ✓
chol 1 1
13|1.000|1.000|1.3e-07|3.8e-03|1.2e+04| 3.129426e+03| 0:0:00|1.9e+02|1.1e+00|1.4e-07| ✓
chol 1 1
14|1.000|1.000|3.2e-08|9.5e-04|2.9e+03| 8.185789e+02| 0:0:00|9.2e+01|1.1e+00|3.5e-08| ✓
chol 1 1
15|1.000|1.000|1.2e-08|3.5e-04|1.1e+03| 3.570153e+02| 0:0:00|2.4e+01|1.1e+00|1.3e-08| ✓
chol 1 1
16|0.978|0.978|2.8e-09|8.2e-05|2.5e+02| 9.558712e+01| 0:0:00|9.1e+00|1.1e+00|3.0e-09| ✓
chol
    SMW too ill-conditioned, switch to LU factor, 2.5e+29.
    switch to LU factor lu 1 1
17|1.000|1.000|9.6e-10|2.8e-05|8.8e+01| 3.099027e+01| 0:0:00|2.1e+00|1.1e+00|1.0e-09| ✓
lu 1 1
18|1.000|1.000|3.3e-10|9.8e-06|3.1e+01| 1.174411e+01| 0:0:00|7.6e-01|1.1e+00|3.4e-10| ✓
lu 1 1
19|0.961|0.961|4.4e-11|1.3e-06|4.0e+00| 2.951979e-01| 0:0:00|2.7e-01|1.0e+00|4.5e-11| ✓
lu 1 1
20|0.981|0.981|5.8e-12|1.7e-07|5.2e-01|-1.165065e+00| 0:0:00|3.5e-02|1.1e+00|6.1e-12| ✓
lu 1 1
21|0.976|0.976|7.8e-13|5.4e-09|1.2e-02|-1.366977e+00| 0:0:00|3.7e-03|1.1e+00|2.0e-13| ✓
lu 1 1
22|0.986|0.986|6.5e-12|5.2e-10|1.7e-04|-1.370354e+00| 0:0:00|1.6e-04|1.1e+00|4.1e-15| ✓
lu 1 1
23|0.955|0.955|1.0e-11|5.1e-10|8.1e-06|-1.370399e+00| 0:0:00|9.7e-06|1.1e+00|2.2e-16| ✓
lu 1 1
24|0.992|0.992|8.1e-11|5.1e-10|2.1e-06|-1.370401e+00| 0:0:00|2.1e-07|1.1e+00|2.6e-17| ✓
lu 1 1
25|1.000|1.000|7.4e-12|5.1e-10|3.6e-08|-1.370401e+00| 0:0:00|1.8e-08|1.1e+00|5.7e-19|
    Stop: max(relative gap,infeasibilities) < 1.00e-07
-----
number of iterations    = 25
primal objective value = -1.37040130e+00
dual   objective value = -1.37040133e+00
gap := trace(XZ)       = 3.62e-08

```



```

relative gap          = 1.53e-08
actual relative gap   = 6.06e-09
rel. primal infeas    = 7.41e-12
rel. dual   infeas    = 5.09e-10
norm(X), norm(y), norm(Z) = 3.0e+01, 3.7e+03, 5.6e+01
norm(A), norm(b), norm(C) = 1.8e+06, 7.3e+05, 5.7e+01
Total CPU time (secs) = 0.19
CPU time per iteration = 0.01
termination code      = 0
DIMACS errors: 7.4e-12 0.0e+00 5.1e-10 0.0e+00 6.1e-09 9.7e-09
-----

```

ans =

1.3704

Iteration 5 Total error is: 0.020645

```

num. of constraints = 18
dim. of socp var = 19, num. of socp blk = 1
dim. of linear var = 116
8 linear variables from unrestricted variable.

```

```

*** convert ublk to linear blk
number of nearly dependent constraints = 1
To remove these constraints, re-run sqlp.m with OPTIONS.rmdepconstr = 1.
*****

```

```

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|1.0e+00|3.8e+04|7.9e+09| 1.955559e+08| 0:0:00|7.9e+10|1.0e+00|1.0e+00| ✓
chol 1 1
1|0.987|0.987|2.0e-02|7.6e+02|4.6e+08| 1.654537e+08| 0:0:00|8.4e+08|1.0e+00|2.0e-02| ✓
chol 1 1
2|0.886|0.886|3.5e-03|1.3e+02|1.3e+08| 5.569341e+07| 0:0:00|8.4e+07|1.0e+00|3.6e-03| ✓
chol 1 1
3|0.278|0.278|3.1e-03|1.2e+02|1.4e+08| 5.749111e+07| 0:0:00|6.4e+07|1.0e+00|3.1e-03| ✓
chol 1 1
4|1.000|1.000|1.1e-03|4.1e+01|9.2e+07| 3.671473e+07| 0:0:00|4.9e+06|9.5e-01|1.0e-03| ✓
chol 1 1
5|0.847|0.847|7.0e-04|2.7e+01|6.6e+07| 2.344029e+07| 0:0:00|1.6e+06|8.8e-01|6.2e-04| ✓
chol 1 1
6|1.000|1.000|3.1e-04|1.2e+01|3.1e+07| 9.688598e+06| 0:0:00|5.1e+05|8.5e-01|2.7e-04| ✓
chol 1 1
7|1.000|1.000|1.3e-04|5.0e+00|1.4e+07| 3.613987e+06| 0:0:00|2.2e+05|8.1e-01|1.1e-04| ✓
chol 1 1
8|0.986|0.986|9.5e-06|3.6e-01|9.2e+05| 1.459364e+05| 0:0:00|8.7e+04|8.0e-01|7.6e-06| ✓
chol 1 1
9|0.839|0.839|1.7e-06|6.6e-02|1.5e+05| 2.888400e+04| 0:0:00|1.1e+04|8.8e-01|1.5e-06| ✓

```

```

chol 1 1
10|0.863|0.863|9.6e-07|3.7e-02|7.9e+04| 1.710800e+04| 0:0:00|8.0e+02|1.0e+00|9.6e-07| ✓
chol 1 1
11|0.940|0.940|2.4e-07|9.3e-03|1.9e+04| 5.326341e+03| 0:0:00|5.7e+02|1.1e+00|2.6e-07| ✓
chol 1 1
12|1.000|1.000|1.2e-07|4.7e-03|9.9e+03| 2.507871e+03| 0:0:00|1.4e+02|1.1e+00|1.3e-07| ✓
chol 1 1
13|1.000|1.000|3.5e-08|1.3e-03|2.7e+03| 7.847200e+02| 0:0:00|7.7e+01|1.1e+00|3.8e-08| ✓
chol 1 1
14|1.000|1.000|1.2e-08|4.4e-04|9.0e+02| 2.913068e+02| 0:0:00|2.2e+01|1.1e+00|1.3e-08| ✓
chol 1 1
15|1.000|1.000|3.2e-09|1.2e-04|2.5e+02| 9.705317e+01| 0:0:00|7.4e+00|1.1e+00|3.4e-09| ✓
chol
    SMW too ill-conditioned, switch to LU factor, 6.3e+28.
    switch to LU factor lu 1 1
16|1.000|1.000|9.6e-10|3.7e-05|7.5e+01| 2.584296e+01| 0:0:00|2.1e+00|1.1e+00|1.0e-09| ✓
lu 1 1
17|1.000|1.000|3.6e-10|1.4e-05|3.0e+01| 1.104862e+01| 0:0:00|6.6e-01|1.0e+00|3.8e-10| ✓
lu 1 1
18|0.958|0.958|4.3e-11|1.6e-06|3.3e+00| 6.598146e-02| 0:0:00|2.5e-01|1.0e+00|4.4e-11| ✓
lu 1 1
19|0.971|0.971|4.1e-12|1.6e-07|3.1e-01|-1.212132e+00| 0:0:00|3.1e-02|1.1e+00|4.3e-12| ✓
lu 1 1
20|0.980|0.980|4.4e-13|4.4e-09|6.3e-03|-1.327401e+00| 0:0:00|2.2e-03|1.1e+00|1.2e-13| ✓
lu 1 1
21|0.987|0.987|2.7e-12|5.7e-10|8.0e-05|-1.329211e+00| 0:0:00|8.9e-05|1.1e+00|2.4e-15| ✓
lu 1 1
22|0.971|0.971|1.4e-11|5.7e-10|2.3e-06|-1.329234e+00| 0:0:00|3.8e-06|1.1e+00|8.5e-17| ✓
lu 1 1
23|0.994|0.994|1.1e-10|5.7e-10|5.2e-07|-1.329234e+00| 0:0:00|7.1e-08|1.1e+00|7.2e-18| ✓
lu 1 1
24|1.000|1.000|4.1e-11|5.7e-10|9.1e-09|-1.329234e+00| 0:0:00|4.7e-09|1.1e+00|0.0e+00|
    Stop: max(relative gap,infeasibilities) < 1.00e-07
-----
number of iterations    = 24
primal objective value = -1.32923439e+00
dual   objective value = -1.32923437e+00
gap := trace(XZ)       = 9.05e-09
relative gap           = 3.89e-09
actual relative gap    = -6.41e-09
rel. primal infeas     = 4.09e-11
rel. dual   infeas     = 5.66e-10
norm(X), norm(y), norm(Z) = 2.8e+01, 3.7e+03, 5.6e+01
norm(A), norm(b), norm(C) = 2.3e+06, 6.3e+05, 5.7e+01
Total CPU time (secs)   = 0.20
CPU time per iteration = 0.01
termination code        = 0
DIMACS errors: 4.1e-11  0.0e+00  5.7e-10  0.0e+00  -6.4e-09  2.5e-09
-----

ans =

    1.3292

Iteration    6    Total error is: 0.020341

```

```

num. of constraints = 18
dim. of socp var = 19, num. of socp blk = 1
dim. of linear var = 116
8 linear variables from unrestricted variable.

*** convert ublk to linear blk
number of nearly dependent constraints = 1
To remove these constraints, re-run sqlp.m with OPTIONS.rmdepconstr = 1.
***** ✓
*****
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|1.0e+00|5.6e+04|1.6e+10| 4.097487e+08| 0:0:00|1.6e+11|1.0e+00|1.0e+00| ✓
chol 1 1
1|0.987|0.987|2.0e-02|1.1e+03|9.7e+08| 3.464665e+08| 0:0:00|1.8e+09|1.0e+00|2.0e-02| ✓
chol 1 1
2|0.851|0.851|3.2e-03|1.8e+02|1.6e+08| 7.293005e+07| 0:0:00|2.0e+08|1.1e+00|3.4e-03| ✓
chol 1 1
3|0.165|0.165|3.0e-03|1.7e+02|1.8e+08| 7.775470e+07| 0:0:00|1.7e+08|1.0e+00|3.1e-03| ✓
chol 1 1
4|1.000|1.000|9.2e-04|5.2e+01|1.5e+08| 6.435106e+07| 0:0:00|1.2e+07|9.8e-01|8.9e-04| ✓
chol 1 1
5|0.780|0.780|6.3e-04|3.5e+01|1.2e+08| 4.470666e+07| 0:0:00|4.4e+06|9.2e-01|5.7e-04| ✓
chol 1 1
6|1.000|1.000|2.5e-04|1.4e+01|4.9e+07| 1.643976e+07| 0:0:00|9.8e+05|8.9e-01|2.2e-04| ✓
chol 1 1
7|1.000|1.000|1.3e-04|7.4e+00|2.8e+07| 8.032170e+06| 0:0:00|3.9e+05|8.3e-01|1.1e-04| ✓
chol 1 1
8|1.000|1.000|2.6e-05|1.4e+00|5.5e+06| 1.150346e+06| 0:0:00|1.9e+05|8.1e-01|2.1e-05| ✓
chol 1 1
9|0.911|0.911|2.6e-06|1.5e-01|5.0e+05| 1.004157e+05| 0:0:00|4.1e+04|8.4e-01|2.2e-06| ✓
chol 1 1
10|0.868|0.868|1.3e-06|7.1e-02|2.3e+05| 5.223204e+04| 0:0:00|2.5e+03|9.6e-01|1.2e-06| ✓
chol 1 1
11|0.969|0.969|3.8e-07|2.1e-02|6.5e+04| 1.661457e+04| 0:0:00|1.5e+03|1.0e+00|3.9e-07| ✓
chol 1 1
12|1.000|1.000|2.1e-07|1.2e-02|3.5e+04| 8.901618e+03| 0:0:00|4.7e+02|1.1e+00|2.2e-07| ✓
chol 1 1
13|1.000|1.000|6.5e-08|3.6e-03|1.1e+04| 2.919847e+03| 0:0:00|2.7e+02|1.1e+00|6.9e-08| ✓
chol 1 1
14|1.000|1.000|2.3e-08|1.3e-03|3.7e+03| 1.200097e+03| 0:0:00|8.5e+01|1.1e+00|2.5e-08| ✓
chol 1 1
15|0.984|0.984|5.2e-09|3.0e-04|8.6e+02| 3.103146e+02| 0:0:00|3.1e+01|1.1e+00|5.7e-09| ✓
chol
SMW too ill-conditioned, switch to LU factor, 8.0e+29.
switch to LU factor lu 1 1
16|1.000|1.000|2.0e-09|1.2e-04|3.4e+02| 1.147641e+02| 0:0:00|7.5e+00|1.1e+00|2.2e-09| ✓
lu 1 1

```

```

17|1.000|1.000|6.5e-10|3.7e-05|1.1e+02| 4.363182e+01| 0:0:00|2.9e+00|1.0e+00|6.8e-10| ✓
lu 1 1
18|0.987|0.987|1.4e-10|7.7e-06|2.4e+01| 7.688053e+00| 0:0:00|9.6e-01|1.0e+00|1.4e-10| ✓
lu 1 1
19|1.000|1.000|4.9e-11|2.8e-06|8.9e+00| 2.330330e+00| 0:0:00|2.2e-01|9.8e-01|4.9e-11| ✓
lu 1 1
20|0.970|0.970|2.9e-12|1.6e-07|4.6e-01|-1.135276e+00| 0:0:00|6.9e-02|9.9e-01|2.9e-12| ✓
lu 1 1
21|0.960|0.960|3.2e-13|7.4e-09|1.8e-02|-1.308687e+00| 0:0:00|2.5e-03|1.0e+00|1.4e-13| ✓
lu 1 1
22|0.983|0.983|2.1e-11|1.8e-10|2.9e-04|-1.311786e+00| 0:0:00|8.9e-05|1.1e+00|3.3e-15| ✓
lu 1 1
23|0.985|0.985|1.6e-11|5.7e-11|4.3e-06|-1.311839e+00| 0:0:00|4.2e-06|1.1e+00|6.6e-17| ✓
lu 1 1
24|1.000|1.000|8.8e-12|5.7e-11|2.7e-07|-1.311840e+00| 0:0:00|6.5e-08|1.1e+00|1.9e-18| ✓
lu 1 1
25|1.000|1.000|3.3e-11|5.7e-11|6.8e-09|-1.311840e+00| 0:0:00|2.6e-09|1.1e+00|9.1e-20|
Stop: max(relative gap,infeasibilities) < 1.00e-07

```

```

-----
number of iterations    = 25
primal objective value = -1.31184001e+00
dual   objective value = -1.31184002e+00
gap := trace(XZ)       = 6.79e-09
relative gap           = 2.94e-09
actual relative gap    = 2.70e-09
rel. primal infeas     = 3.26e-11
rel. dual   infeas     = 5.66e-11
norm(X), norm(y), norm(Z) = 3.3e+01, 3.6e+03, 5.6e+01
norm(A), norm(b), norm(C) = 3.3e+06, 1.3e+06, 5.7e+01
Total CPU time (secs)   = 0.22
CPU time per iteration = 0.01
termination code        = 0
DIMACS errors: 3.3e-11  0.0e+00  5.7e-11  0.0e+00  2.7e-09  1.9e-09
-----

```

ans =

1.3118

Iteration 7 Total error is: 0.020201

```

num. of constraints = 18
dim. of socp var   = 19,   num. of socp blk = 1
dim. of linear var = 116
8 linear variables from unrestricted variable.

```

```

*** convert ublk to linear blk
number of nearly dependent constraints = 1
To remove these constraints, re-run sqlp.m with OPTIONS.rmdepconstr = 1.
***** ✓
*****
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	1.0e+00	1.1e+05	6.1e+10	1.511738e+09	0:0:00	6.1e+11	1.0e+00	1.0e+00	✓	
chol 1 1												
1	0.987	0.987	2.0e-02	2.1e+03	3.6e+09	1.278148e+09	0:0:00	6.5e+09	1.0e+00	2.0e-02	✓	
chol 1 1												
2	0.904	0.904	2.0e-03	2.1e+02	3.6e+08	1.617289e+08	0:0:00	3.3e+08	1.1e+00	2.1e-03	✓	
chol 1 1												
3	0.146	0.146	1.8e-03	1.9e+02	3.8e+08	1.656134e+08	0:0:00	2.9e+08	1.1e+00	1.9e-03	✓	
chol 1 1												
4	1.000	1.000	3.8e-04	4.0e+01	2.3e+08	9.926558e+07	0:0:00	1.6e+07	1.0e+00	3.8e-04	✓	
chol 1 1												
5	0.654	0.654	3.0e-04	3.2e+01	2.0e+08	8.008387e+07	0:0:00	7.7e+06	9.5e-01	2.8e-04	✓	
chol 1 1												
6	1.000	1.000	1.2e-04	1.2e+01	8.2e+07	2.864470e+07	0:0:00	1.8e+06	9.1e-01	1.0e-04	✓	
chol 1 1												
7	1.000	1.000	6.1e-05	6.5e+00	4.7e+07	1.399194e+07	0:0:00	6.7e+05	8.6e-01	5.2e-05	✓	
chol 1 1												
8	1.000	1.000	1.9e-05	2.0e+00	1.5e+07	3.458838e+06	0:0:00	3.2e+05	8.3e-01	1.5e-05	✓	
chol 1 1												
9	0.946	0.946	1.5e-06	1.6e-01	1.1e+06	1.970688e+05	0:0:00	9.4e+04	8.5e-01	1.3e-06	✓	
chol												
SMW too ill-conditioned, switch to LU factor, 3.8e+29.												
switch to LU factor lu 1 1												
10	0.875	0.875	6.9e-07	7.3e-02	4.5e+05	1.049080e+05	0:0:00	5.2e+03	9.7e-01	6.7e-07	✓	
lu 1 1												
11	1.000	1.000	1.9e-07	2.1e-02	1.2e+05	3.096919e+04	0:0:00	2.9e+03	1.0e+00	2.0e-07	✓	
lu 1 1												
12	1.000	1.000	1.0e-07	1.1e-02	6.4e+04	1.588673e+04	0:0:00	8.8e+02	1.1e+00	1.1e-07	✓	
lu 1 1												
13	1.000	1.000	3.4e-08	3.6e-03	2.1e+04	5.571978e+03	0:0:00	4.9e+02	1.1e+00	3.7e-08	✓	
lu 1 1												
14	1.000	1.000	1.2e-08	1.2e-03	7.1e+03	2.207259e+03	0:0:00	1.6e+02	1.1e+00	1.3e-08	✓	
lu 1 1												
15	0.988	0.988	2.8e-09	3.0e-04	1.7e+03	6.057354e+02	0:0:00	5.9e+01	1.1e+00	3.1e-09	✓	
lu 1 1												
16	1.000	1.000	1.0e-09	1.1e-04	6.4e+02	2.008813e+02	0:0:00	1.4e+01	1.1e+00	1.1e-09	✓	
lu 1 1												
17	1.000	1.000	3.8e-10	4.1e-05	2.4e+02	9.185774e+01	0:0:00	5.5e+00	1.0e+00	4.0e-10	✓	
lu 1 1												
18	0.979	0.979	8.4e-11	8.9e-06	5.2e+01	1.825551e+01	0:0:00	2.1e+00	1.0e+00	8.6e-11	✓	
lu 1 1												
19	1.000	1.000	3.5e-11	3.7e-06	2.3e+01	7.125637e+00	0:0:00	4.7e-01	1.0e+00	3.5e-11	✓	
lu 1 1												
20	0.962	0.962	3.8e-12	4.0e-07	2.2e+00	-5.800358e-01	0:0:00	1.6e-01	1.0e+00	3.9e-12	✓	
lu 1 1												
21	0.982	0.982	3.4e-13	1.7e-08	8.2e-02	-1.298261e+00	0:0:00	1.4e-02	1.1e+00	1.8e-13	✓	
lu 1 1												
22	0.988	0.988	4.5e-13	6.5e-10	9.5e-04	-1.323934e+00	0:0:00	8.7e-04	1.1e+00	3.3e-15	✓	
lu 1 1												
23	0.989	0.989	5.1e-13	5.7e-10	1.1e-05	-1.324234e+00	0:0:00	2.4e-05	1.1e+00	6.0e-17	✓	
lu 1 1												
24	1.000	1.000	8.6e-12	5.7e-10	6.7e-07	-1.324237e+00	0:0:00	2.7e-07	1.1e+00	1.6e-18	✓	

```
lu 1 1
25|1.000|1.000|1.6e-11|5.7e-10|2.5e-08|-1.324238e+00| 0:0:00|7.4e-09|1.1e+00|0.0e+00|
Stop: max(relative gap,infeasibilities) < 1.00e-07
```

```
-----
number of iterations    = 25
primal objective value = -1.32423769e+00
dual   objective value = -1.32423767e+00
gap := trace(XZ)       = 2.54e-08
relative gap           = 1.09e-08
actual relative gap    = -4.33e-09
rel. primal infeas     = 1.60e-11
rel. dual   infeas     = 5.66e-10
norm(X), norm(y), norm(Z) = 2.9e+01, 3.5e+03, 5.6e+01
norm(A), norm(b), norm(C) = 6.3e+06, 4.8e+06, 5.7e+01
Total CPU time (secs)   = 0.20
CPU time per iteration = 0.01
termination code        = 0
DIMACS errors: 1.6e-11  0.0e+00  5.7e-10  0.0e+00  -4.3e-09  7.0e-09
-----
```

```
ans =
```

```
1.3242
```

```
Iteration    8    Total error is: 0.02029
The total representation error of the testing signals is: 0.029641
>>
```