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>> demo_Polynomial_Dictionary_Learning
Starting to train the dictionary
solving the quadratic problem with YALMIP...
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```
num. of constraints = 45
dim. of socp var = 46, num. of socp blk = 1
dim. of linear var = 800
*****
SDPT3: Infeasible path-following algorithms
*****
version predcorr gam expon scale_data
HKM      1      0.000 1      0
it pstep dstep pinfeas dinfeas gap      prim-obj      dual-obj      cputime
-----
0|0.000|0.000|1.3e+00|1.4e+01|1.7e+06| 2.228445e+04  0.000000e+00| 0:0:00| chol 1✓
1
1|1.000|0.911|2.1e-05|1.4e+00|1.8e+05| 2.162456e+04 -7.378223e+01| 0:0:00| chol 1✓
1
2|0.804|0.949|7.9e-06|1.0e-01|4.4e+04| 2.818503e+04 -1.924820e+02| 0:0:00| chol 1✓
1
3|1.000|1.000|1.2e-06|1.0e-02|1.8e+04| 1.726440e+04 -2.015616e+02| 0:0:00| chol 1✓
1
4|0.972|1.000|2.4e-06|3.0e-03|5.1e+02| 3.183454e+02 -1.859961e+02| 0:0:00| chol 1✓
1
5|0.697|0.133|6.7e-06|2.6e-03|6.1e+02| 4.506856e+02 -1.520448e+02| 0:0:00| chol 1✓
1
6|0.095|0.126|5.5e-06|2.3e-03|6.1e+02| 3.227561e+02 -2.829177e+02| 0:0:00| chol 1✓
1
7|1.000|0.639|1.4e-07|8.3e-04|5.8e+02| 4.941705e+02 -8.733638e+01| 0:0:00| chol 1✓
1
8|0.926|1.000|1.2e-08|3.3e-07|9.4e+01| 1.735373e+01 -7.649071e+01| 0:0:00| chol 1✓
1
9|0.834|1.000|2.1e-09|3.2e-08|3.5e+01|-2.733217e+01 -6.244602e+01| 0:0:00| chol 1✓
1
10|1.000|1.000|7.9e-14|3.4e-09|1.3e+01|-4.063029e+01 -5.385716e+01| 0:0:00| chol 1✓
1
11|1.000|1.000|9.0e-14|3.0e-10|4.8e+00|-4.817830e+01 -5.295457e+01| 0:0:01| chol 1✓
1
12|1.000|1.000|2.9e-14|3.1e-11|2.0e+00|-4.995476e+01 -5.198492e+01| 0:0:01| chol 1✓
1
13|1.000|1.000|2.9e-14|4.0e-12|6.5e-01|-5.108660e+01 -5.173332e+01| 0:0:01| chol 1✓
1
14|1.000|1.000|9.8e-15|1.3e-12|2.6e-01|-5.135266e+01 -5.161754e+01| 0:0:01| chol 1✓
1
15|1.000|1.000|1.4e-14|1.0e-12|7.9e-02|-5.150212e+01 -5.158158e+01| 0:0:01| chol 1✓
1
16|1.000|1.000|6.8e-14|1.0e-12|3.3e-02|-5.153490e+01 -5.156758e+01| 0:0:01| chol 1✓
1
17|1.000|1.000|6.3e-14|1.0e-12|8.4e-03|-5.155437e+01 -5.156275e+01| 0:0:01| chol 1✓
1
18|1.000|1.000|2.2e-12|1.0e-12|3.4e-03|-5.155803e+01 -5.156146e+01| 0:0:01| chol 1✓
1
19|0.974|0.871|1.5e-12|1.1e-12|6.7e-04|-5.156032e+01 -5.156099e+01| 0:0:01| chol 2✓
1
```

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20|0.656|1.000|1.8e-11|1.0e-12|3.9e-04|-5.156052e+01 -5.156092e+01| 0:0:01| chol 1✓
1
21|1.000|0.936|1.4e-12|1.6e-12|1.1e-04|-5.156078e+01 -5.156089e+01| 0:0:01| chol 2✓
1
22|0.669|0.943|1.5e-11|1.1e-12|5.0e-05|-5.156083e+01 -5.156088e+01| 0:0:01| chol 1✓
1
23|0.815|0.947|2.2e-11|1.6e-12|1.8e-05|-5.156086e+01 -5.156088e+01| 0:0:01| chol 1✓
1
24|0.926|0.979|1.3e-12|2.3e-12|4.4e-06|-5.156087e+01 -5.156088e+01| 0:0:01|
stop: max(relative gap, infeasibilities) < 1.00e-07

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-----
number of iterations    = 24
primal objective value = -5.15608739e+01
dual  objective value = -5.15608783e+01
gap := trace(XZ)        = 4.41e-06
relative gap           = 4.23e-08
actual relative gap    = 4.23e-08
rel. primal infeas     = 1.34e-12
rel. dual  infeas     = 2.28e-12
norm(X), norm(y), norm(Z) = 9.1e-01, 5.2e+01, 2.0e+01
norm(A), norm(b), norm(C) = 3.0e+02, 5.6e+00, 7.7e+01
Total CPU time (secs)   = 0.60
CPU time per iteration = 0.02
termination code        = 0
DIMACS errors: 2.5e-12  0.0e+00  3.3e-12  0.0e+00  4.2e-08  4.2e-08
-----

```

ans =

51.5609

```

num. of constraints = 45
dim. of socp var   = 46,   num. of socp blk = 1
dim. of linear var = 800
*****
SDPT3: Infeasible path-following algorithms
*****
version predcorr gam expon scale_data
HKM      1      0.000  1      0
it pstep dstep pinfeas dinfeas gap      prim-obj      dual-obj      cputime
-----
0|0.000|0.000|1.0e+00|9.4e+04|6.4e+10| 8.222168e+08  0.000000e+00| 0:0:00| chol 2✓
2
1|1.000|0.982|6.0e-07|1.7e+03|2.6e+09| 7.769330e+08 -3.046054e+06| 0:0:00| chol 3✓
4
2|0.612|0.530|2.3e-07|7.8e+02|1.5e+09| 6.215876e+08 -4.443286e+06| 0:0:00| chol 3✓
4
3|0.336|0.410|1.5e-07|4.6e+02|1.2e+09| 5.993335e+08 -7.156278e+06| 0:0:00| chol 4✓
4
4|0.268|0.485|1.1e-07|2.4e+02|9.2e+08| 5.807209e+08 -9.386592e+06| 0:0:00| chol 5✓
4
5|0.330|0.386|1.3e-07|1.5e+02|7.6e+08| 5.377706e+08 -1.074369e+07| 0:0:00| chol 7✓
6

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6|0.255|0.595|9.9e-08|5.9e+01|6.0e+08| 4.958113e+08 -9.418299e+06| 0:0:00| chol 5✓  
5  
7|0.304|0.165|9.6e-08|4.9e+01|5.2e+08| 4.337786e+08 -1.001848e+07| 0:0:00| chol 13✓  
8  
8|0.171|0.646|2.2e-06|1.7e+01|4.4e+08| 4.032935e+08 -6.001105e+06| 0:0:00| chol 5✓  
5  
9|0.166|0.083|1.8e-06|1.6e+01|4.1e+08| 3.693695e+08 -6.423943e+06| 0:0:00| chol  
linsysolve: Schur complement matrix not positive definite  
switch to LU factor. lu 13 5  
10|0.077|0.605|6.6e-06|6.3e+00|3.8e+08| 3.632251e+08 -1.954992e+06| 0:0:00| lu 6✓  
2  
11|0.063|0.130|4.9e-06|5.5e+00|3.7e+08| 3.547226e+08 -3.198855e+06| 0:0:00| lu 7✓  
3  
12|0.049|0.059|4.8e-06|5.2e+00|3.6e+08| 3.470962e+08 -3.833179e+06| 0:0:00| lu 26✓  
8  
13|0.041|0.019|4.1e-06|5.1e+00|3.6e+08| 3.427622e+08 -4.011625e+06| 0:0:00| lu 27✓  
7  
14|0.015|0.097|6.8e-06|4.6e+00|3.6e+08| 3.415267e+08 -4.138756e+06| 0:0:00| lu *14✓  
3  
15|0.030|0.115|6.1e-06|4.0e+00|3.6e+08| 3.394231e+08 -4.077880e+06| 0:0:00| lu 30✓  
13  
16|0.048|0.027|1.5e-04|3.9e+00|3.5e+08| 3.366823e+08 -4.305621e+06| 0:0:00| lu *13✓  
6  
17|0.011|0.088|1.5e-04|3.6e+00|3.5e+08| 3.358987e+08 -4.787937e+06| 0:0:00| lu 15✓  
4  
18|0.054|0.104|1.4e-04|3.2e+00|3.5e+08| 3.298412e+08 -5.142473e+06| 0:0:00| lu *14✓  
6  
19|0.037|0.093|1.4e-04|2.9e+00|3.4e+08| 3.264725e+08 -5.339837e+06| 0:0:00| lu 30✓  
9  
20|0.031|0.037|1.3e-04|2.8e+00|3.4e+08| 3.235205e+08 -5.613957e+06| 0:0:00| lu 18✓  
8  
21|0.025|0.025|1.3e-04|2.7e+00|3.4e+08| 3.214449e+08 -5.833898e+06| 0:0:00| lu 14✓  
30  
22|0.020|0.022|2.1e-04|2.7e+00|3.4e+08| 3.199454e+08 -6.018505e+06| 0:0:00| lu 30✓  
12  
23|0.018|0.026|2.5e-04|2.6e+00|3.4e+08| 3.186973e+08 -6.218914e+06| 0:0:00| lu 14✓  
30  
24|0.012|0.063|2.3e-04|2.4e+00|3.4e+08| 3.179350e+08 -6.168320e+06| 0:0:00| lu 26✓  
30  
25|0.007|0.029|2.1e-04|2.4e+00|3.3e+08| 3.175631e+08 -5.938005e+06| 0:0:00| lu 30✓  
^14  
26|0.001|0.004|1.8e-04|2.4e+00|3.3e+08| 3.175310e+08 -6.062762e+06| 0:0:01| lu 17✓  
^12  
27|0.052|0.031|1.7e-04|2.3e+00|3.3e+08| 3.143500e+08 -6.498525e+06| 0:0:01| lu *27✓  
11  
28|0.032|0.033|1.7e-04|2.2e+00|3.3e+08| 3.114536e+08 -6.771779e+06| 0:0:01| lu 12✓  
11  
29|0.023|0.028|1.7e-04|2.1e+00|3.3e+08| 3.097070e+08 -6.993129e+06| 0:0:01| lu 30✓  
20  
30|0.016|0.065|1.6e-04|2.0e+00|3.3e+08| 3.087489e+08 -7.121400e+06| 0:0:01| lu 19✓  
19  
31|0.020|0.162|2.2e-04|1.7e+00|3.2e+08| 3.074985e+08 -6.313735e+06| 0:0:01| lu 26✓  
7  
32|0.046|0.083|1.9e-04|1.5e+00|3.2e+08| 3.046530e+08 -6.397620e+06| 0:0:01| lu *15✓
```

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8
33|0.053|0.064|1.4e-04|1.4e+00|3.2e+08| 3.008944e+08 -6.815496e+06| 0:0:01| 1u 30✓
5
34|0.020|0.073|1.1e-04|1.3e+00|3.2e+08| 2.997253e+08 -7.308511e+06| 0:0:01| 1u 28✓
8
35|0.052|0.057|1.1e-04|1.3e+00|3.1e+08| 2.946576e+08 -7.465402e+06| 0:0:01| 1u 30✓
4
36|0.028|0.057|1.1e-04|1.2e+00|3.1e+08| 2.931112e+08 -7.701042e+06| 0:0:01| 1u 18✓
^18
37|0.000|0.000|8.0e-04|1.2e+00|3.1e+08| 2.930447e+08 -7.454557e+06| 0:0:01| 1u *19✓
4
38|0.021|0.118|7.9e-04|1.1e+00|3.1e+08| 2.919879e+08 -7.464830e+06| 0:0:01| 1u 14✓
30
39|0.035|0.187|7.1e-04|8.6e-01|3.1e+08| 2.900562e+08 -6.989039e+06| 0:0:01| 1u 30✓
17
40|0.069|0.145|9.1e-04|7.3e-01|3.0e+08| 2.856622e+08 -6.894300e+06| 0:0:01| 1u 28✓
5
41|0.066|0.074|8.5e-04|6.8e-01|2.9e+08| 2.772911e+08 -7.197336e+06| 0:0:01| 1u 14✓
9
42|0.043|0.036|8.0e-04|6.5e-01|2.9e+08| 2.742097e+08 -7.457792e+06| 0:0:01| 1u 24✓
8
43|0.037|0.033|8.0e-04|6.3e-01|2.9e+08| 2.721113e+08 -7.702988e+06| 0:0:01| 1u 30✓
22
44|0.032|0.031|8.1e-04|6.1e-01|2.9e+08| 2.702489e+08 -7.950648e+06| 0:0:01| 1u 14✓
22
45|0.018|0.070|7.5e-04|5.7e-01|2.9e+08| 2.695228e+08 -7.999079e+06| 0:0:01| 1u 14✓
30
46|0.016|0.144|6.2e-04|4.9e-01|2.8e+08| 2.687631e+08 -7.075012e+06| 0:0:01| 1u *27 ^✓
7
47|0.068|0.105|6.5e-04|4.4e-01|2.8e+08| 2.655272e+08 -7.072706e+06| 0:0:01| 1u *16✓
6
48|0.037|0.191|6.4e-04|3.5e-01|2.8e+08| 2.623317e+08 -7.239593e+06| 0:0:01| 1u 16✓
30
49|0.000|0.000|1.6e-04|3.5e-01|2.8e+08| 2.623341e+08 -7.292255e+06| 0:0:01| 1u 30✓
^12
50|0.001|0.002|3.7e-04|3.5e-01|2.8e+08| 2.623423e+08 -7.097637e+06| 0:0:01|
  sqlp stop: maximum number of iterations reached
-----
number of iterations      = 50
primal objective value = 2.91987860e+08
dual   objective value = -7.46483037e+06
gap := trace(XZ)         = 3.09e+08
relative gap              = 1.03e+00
actual relative gap       = 1.00e+00
rel. primal infeas        = 7.90e-04
rel. dual   infeas        = 1.05e+00
norm(X), norm(y), norm(Z) = 1.2e+08, 7.5e+06, 1.1e+07
norm(A), norm(b), norm(C) = 1.4e+07, 1.2e+06, 7.7e+01
Total CPU time (secs)    = 1.10
CPU time per iteration   = 0.02
termination code          = -6
DIMACS errors: 8.4e-04  0.0e+00  1.5e+00  0.0e+00  1.0e+00  1.0e+00
-----

```

0	0.000 0.000 1.0e+00 4.1e+02 1.1e+09	1.409233e+07	0.000000e+00	0:0:00	chol	1
1	1 0.992 0.963 7.8e-03 1.5e+01 6.4e+07	1.335507e+07	-8.175002e+03	0:0:00	chol	2
1	2 0.657 0.629 2.7e-03 5.7e+00 3.8e+07	1.372330e+07	-3.551558e+04	0:0:00	chol	2
2	3 0.427 0.457 1.5e-03 3.1e+00 2.9e+07	1.379162e+07	-6.589812e+04	0:0:00	chol	2
2	4 0.249 0.459 1.1e-03 1.7e+00 2.2e+07	1.363046e+07	-1.081918e+05	0:0:00	chol	1
2	5 0.267 0.416 8.4e-04 9.7e-01 1.9e+07	1.310862e+07	-1.533775e+05	0:0:00	chol	2
2	6 0.218 0.526 6.6e-04 4.6e-01 1.5e+07	1.244646e+07	-2.014797e+05	0:0:00	chol	2
2	7 0.368 0.352 4.1e-04 3.0e-01 1.3e+07	1.104751e+07	-2.343111e+05	0:0:00	chol	2
2	8 0.210 0.722 3.3e-04 8.3e-02 1.1e+07	1.025605e+07	-2.021704e+05	0:0:00	chol	2
2	9 0.322 0.181 2.2e-04 6.8e-02 9.6e+06	8.927012e+06	-2.210041e+05	0:0:00	chol	3
2	10 0.181 0.262 1.8e-04 5.0e-02 9.0e+06	8.337610e+06	-2.129952e+05	0:0:00	chol	3
3	11 0.052 0.655 1.7e-04 1.7e-02 8.6e+06	8.281415e+06	-1.320959e+05	0:0:00	chol	2
3	12 0.091 0.413 1.6e-04 1.0e-02 8.3e+06	8.064423e+06	-1.642172e+05	0:0:00	chol	3
2	13 0.152 0.447 1.3e-04 5.6e-03 8.1e+06	7.798339e+06	-2.011565e+05	0:0:00	chol	3
3	14 0.302 0.870 9.3e-05 7.4e-04 7.6e+06	7.279154e+06	-2.662802e+05	0:0:00	chol	3
3	15 0.253 0.293 6.9e-05 5.3e-04 7.3e+06	7.070285e+06	-2.261415e+05	0:0:00	chol	2
2	16 0.325 1.000 4.7e-05 1.9e-05 6.8e+06	6.502872e+06	-3.350488e+05	0:0:00	chol	2
2	17 1.000 1.000 9.3e-09 1.2e-05 4.5e+06	4.255944e+06	-2.794913e+05	0:0:00	chol	2
2	18 1.000 1.000 7.8e-09 1.4e-06 1.8e+06	1.650896e+06	-1.265054e+05	0:0:00	chol	2

```

19|1.000|1.000|8.0e-09|7.1e-07|6.1e+05| 5.550121e+05 -5.641558e+04| 0:0:00| chol 2✓
2
20|1.000|1.000|2.8e-10|7.2e-08|2.4e+05| 2.128908e+05 -2.619845e+04| 0:0:00| chol 2✓
2
21|1.000|1.000|1.8e-09|7.1e-09|1.1e+05| 9.387430e+04 -1.229641e+04| 0:0:00| chol 2✓
2
22|1.000|1.000|2.5e-10|7.9e-10|4.3e+04| 3.720240e+04 -6.024193e+03| 0:0:00| chol 2✓
2
23|1.000|1.000|3.6e-11|1.2e-10|1.8e+04| 1.535999e+04 -2.534825e+03| 0:0:00| chol 2✓
2
24|1.000|1.000|7.0e-11|1.4e-11|6.8e+03| 5.608559e+03 -1.154949e+03| 0:0:00| chol 2✓
2
25|1.000|1.000|1.3e-11|1.1e-11|2.6e+03| 2.128054e+03 -4.448572e+02| 0:0:00| chol 2✓
2
26|1.000|1.000|5.5e-12|2.7e-12|8.8e+02| 6.870059e+02 -1.938168e+02| 0:0:00| chol 2✓
2
27|1.000|1.000|3.7e-12|1.1e-12|3.6e+02| 2.712915e+02 -8.388003e+01| 0:0:00| chol 2✓
2
28|1.000|1.000|4.0e-12|1.0e-12|1.2e+02| 7.221932e+01 -4.603099e+01| 0:0:00| chol 2✓
2
29|1.000|1.000|1.3e-12|1.0e-12|4.7e+01| 1.641212e+01 -3.039248e+01| 0:0:00| chol 2✓
2
30|1.000|1.000|1.5e-12|1.0e-12|1.2e+01|-1.242250e+01 -2.445270e+01| 0:0:00| chol 2✓
2
31|1.000|1.000|3.5e-12|1.0e-12|5.1e+00|-1.779540e+01 -2.286639e+01| 0:0:00| chol 2✓
2
32|0.986|1.000|2.8e-12|1.0e-12|1.2e+00|-2.100181e+01 -2.216278e+01| 0:0:00| chol 2✓
2
33|1.000|1.000|1.1e-11|1.0e-12|4.8e-01|-2.154317e+01 -2.202567e+01| 0:0:00| chol 2✓
2
34|0.973|0.899|7.1e-12|1.6e-12|7.8e-02|-2.188161e+01 -2.195961e+01| 0:0:00| chol 2✓
3
35|0.772|0.997|1.5e-11|1.4e-12|3.6e-02|-2.191223e+01 -2.194781e+01| 0:0:00| chol 3✓
4
36|0.951|0.907|1.0e-10|2.3e-12|5.1e-03|-2.193933e+01 -2.194443e+01| 0:0:00| chol 5✓
8
37|1.000|0.913|1.5e-10|3.4e-12|8.0e-04|-2.194299e+01 -2.194379e+01| 0:0:00| chol
linsysolve: Schur complement matrix not positive definite
switch to LU factor. lu 11 ^10
38|0.916|0.591|3.8e-10|6.1e-12|1.5e-04|-2.194355e+01 -2.194370e+01| 0:0:00| lu 23✓
30
39|0.694|0.782|2.7e-09|8.5e-12|8.1e-05|-2.194358e+01 -2.194365e+01| 0:0:00| lu 17✓
30
40|0.845|0.530|3.5e-08|1.5e-11|5.8e-05|-2.194358e+01 -2.194364e+01| 0:0:00| lu 30✓
^17
41|0.364|0.258|7.1e-08|2.7e-11|4.9e-05|-2.194356e+01 -2.194364e+01| 0:0:00| lu 21✓
30
42|0.594|0.544|7.1e-08|3.6e-11|3.4e-05|-2.194354e+01 -2.194364e+01| 0:0:00| lu 30 ^✓
7
43|0.058|0.127|4.2e-08|6.8e-11|3.4e-05|-2.194359e+01 -2.194364e+01| 0:0:00| lu 30✓
30
44|0.444|0.558|9.1e-08|8.4e-11|2.9e-05|-2.194363e+01 -2.194364e+01| 0:0:01|
stop: progress is too slow
stop: progress is bad*

```

```

-----
number of iterations      = 44
primal objective value   = -2.19435415e+01
dual   objective value   = -2.19436382e+01
gap := trace(XZ)         = 3.38e-05
relative gap             = 7.54e-07
actual relative gap      = 2.16e-06
rel. primal infeas       = 7.08e-08
rel. dual   infeas       = 3.65e-11
norm(X), norm(y), norm(Z) = 6.9e+01, 8.1e+01, 4.8e+01
norm(A), norm(b), norm(C) = 6.4e+04, 9.3e+04, 7.7e+01
Total CPU time (secs)    = 0.51
CPU time per iteration   = 0.01
termination code         = -5
DIMACS errors: 1.4e-07   0.0e+00   5.2e-11   0.0e+00   2.2e-06   7.5e-07
-----

```

ans =

21.9436

Iteration 3 Total error is: 0.029291

```

num. of constraints = 45
dim. of socp var   = 46,   num. of socp blk = 1
dim. of linear var = 800
*****
SDPT3: Infeasible path-following algorithms
*****
version predcorr gam expon scale_data
HKM      1      0.000 1      0
it pstep dstep pinfeas dinfeas gap      prim-obj      dual-obj      cputime
-----
0|0.000|0.000|1.0e+00|1.1e+05|2.3e+11| 3.018463e+09  0.000000e+00| 0:0:00| chol 3✓
3
1|0.995|0.967|5.1e-03|3.7e+03|1.3e+10| 2.858932e+09 -1.711193e+06| 0:0:00| chol 4✓
3
2|0.572|0.588|2.2e-03|1.5e+03|7.9e+09| 2.871200e+09 -8.170967e+06| 0:0:00| chol 4✓
4
3|0.382|0.436|1.3e-03|8.5e+02|6.1e+09| 2.899347e+09 -1.560156e+07| 0:0:00| chol 4✓
4
4|0.234|0.458|1.0e-03|4.6e+02|4.8e+09| 2.875626e+09 -2.569095e+07| 0:0:00| chol 4✓
4
5|0.269|0.404|7.5e-04|2.7e+02|4.0e+09| 2.768125e+09 -3.610273e+07| 0:0:00| chol 5✓
5
6|0.204|0.529|6.0e-04|1.3e+02|3.3e+09| 2.637402e+09 -4.678200e+07| 0:0:00| chol 5✓
5
7|0.352|0.307|3.9e-04|9.0e+01|2.9e+09| 2.362003e+09 -5.515569e+07| 0:0:00| chol 6✓
7
8|0.143|0.634|3.3e-04|3.3e+01|2.5e+09| 2.252621e+09 -5.135593e+07| 0:0:00| chol 5✓
5
9|0.242|0.184|2.5e-04|2.7e+01|2.3e+09| 2.091495e+09 -5.964175e+07| 0:0:00| chol 6✓
9
10|0.073|0.602|2.3e-04|1.1e+01|2.1e+09| 2.021606e+09 -4.033344e+07| 0:0:00| chol 5✓

```

```

6
11|0.094|0.301|2.1e-04|7.5e+00|2.1e+09| 1.957882e+09 -6.084349e+07| 0:0:00| chol 6✓
6
12|0.196|0.193|1.7e-04|6.0e+00|2.0e+09| 1.817817e+09 -7.473556e+07| 0:0:00| chol *
warning: symqmr failed: 2.0
switch to LU factor. lu 9 2
13|0.128|0.445|1.5e-04|3.4e+00|1.9e+09| 1.754395e+09 -7.011297e+07| 0:0:00| lu 7✓
2
14|0.081|0.371|1.4e-04|2.1e+00|1.9e+09| 1.692818e+09 -8.170337e+07| 0:0:00| lu 6✓
2
15|0.173|0.225|1.1e-04|1.6e+00|1.8e+09| 1.587071e+09 -9.583708e+07| 0:0:00| lu 24✓
4
16|0.171|0.309|9.3e-05|1.1e+00|1.7e+09| 1.513738e+09 -9.143150e+07| 0:0:00| lu *11✓
2
17|0.103|0.228|8.3e-05|8.7e-01|1.7e+09| 1.451252e+09 -1.049586e+08| 0:0:00| lu *13✓
3
18|0.182|0.270|6.7e-05|6.4e-01|1.6e+09| 1.369541e+09 -1.121536e+08| 0:0:00| lu 30✓
4
19|0.154|0.143|4.6e-05|5.5e-01|1.5e+09| 1.290179e+09 -1.234224e+08| 0:0:00| lu 30✓
13
20|0.103|0.124|4.6e-05|4.8e-01|1.5e+09| 1.252746e+09 -1.290171e+08| 0:0:00| lu 30✓
9
21|0.079|0.122|3.8e-05|4.2e-01|1.5e+09| 1.224293e+09 -1.330197e+08| 0:0:00| lu 13✓
^11
22|0.064|0.239|2.4e-05|3.2e-01|1.4e+09| 1.203562e+09 -1.266387e+08| 0:0:00| lu 30✓
5
23|0.090|0.112|1.6e-05|2.8e-01|1.4e+09| 1.168450e+09 -1.278585e+08| 0:0:00| lu 23✓
^20
24|0.042|0.122|8.2e-05|2.5e-01|1.4e+09| 1.157243e+09 -1.189446e+08| 0:0:00| lu 30✓
10
25|0.026|0.153|6.8e-05|2.1e-01|1.4e+09| 1.146366e+09 -1.186921e+08| 0:0:00| lu 30✓
6
26|0.099|0.144|7.0e-05|1.8e-01|1.3e+09| 1.112638e+09 -1.213511e+08| 0:0:00| lu 18✓
^12
27|0.077|0.258|1.4e-04|1.3e-01|1.3e+09| 1.099598e+09 -1.401027e+08| 0:0:00| lu *10✓
3
28|0.154|0.301|1.1e-04|9.4e-02|1.3e+09| 1.035697e+09 -1.305788e+08| 0:0:00| lu *17✓
5
29|0.029|0.118|1.6e-04|8.3e-02|1.2e+09| 1.020807e+09 -1.082208e+08| 0:0:00| lu 25✓
4
30|0.160|0.393|1.4e-04|5.0e-02|1.1e+09| 9.594550e+08 -1.047538e+08| 0:0:00| lu 30✓
9
31|0.212|0.144|2.3e-04|4.3e-02|1.1e+09| 8.883596e+08 -1.131868e+08| 0:0:00| lu 17✓
^19
32|0.199|0.168|3.1e-04|3.6e-02|1.0e+09| 8.442821e+08 -1.195903e+08| 0:0:01| lu 30✓
16
33|0.089|0.201|2.3e-04|2.9e-02|1.0e+09| 8.184994e+08 -1.281701e+08| 0:0:01| lu 30✓
5
34|0.175|0.256|2.0e-03|2.1e-02|9.6e+08| 8.027322e+08 -8.942159e+07| 0:0:01| lu *14✓
3
35|0.143|0.338|1.6e-03|1.4e-02|8.8e+08| 7.040515e+08 -1.295412e+08| 0:0:01| lu * 9✓
3
36|1.000|1.000|2.2e-03|1.0e-04|5.6e+08| 4.930053e+08 -6.162996e+07| 0:0:01| lu 5✓
2

```



```

37|0.956|1.000|3.2e-04|1.5e-04|3.5e+08| 2.527412e+08 -9.125708e+07| 0:0:01| 1u 5✓
2
38|1.000|1.000|1.2e-04|6.4e-05|1.5e+08| 1.123343e+08 -3.079601e+07| 0:0:01| 1u 4✓
2
39|1.000|1.000|1.5e-05|2.4e-05|3.4e+07| 2.537218e+07 -8.480881e+06| 0:0:01| 1u 5✓
2
40|1.000|1.000|3.0e-06|2.9e-06|1.8e+07| 1.375618e+07 -3.932877e+06| 0:0:01| 1u 4✓
2
41|1.000|1.000|3.6e-08|6.0e-07|5.2e+06| 3.837537e+06 -1.358341e+06| 0:0:01| 1u 4✓
2
42|1.000|1.000|1.7e-07|7.1e-09|2.2e+06| 1.724455e+06 -5.087461e+05| 0:0:01| 1u 4✓
2
43|1.000|1.000|2.2e-08|1.1e-08|6.8e+05| 4.926686e+05 -1.824838e+05| 0:0:01| 1u 3✓
2
44|1.000|1.000|2.0e-08|4.3e-09|2.8e+05| 2.183590e+05 -6.433110e+04| 0:0:01| 1u 4✓
1
45|1.000|1.000|3.4e-09|4.1e-09|8.6e+04| 6.231882e+04 -2.349548e+04| 0:0:01| 1u 4✓
1
46|1.000|1.000|2.2e-09|6.8e-10|3.6e+04| 2.785323e+04 -8.072382e+03| 0:0:01| 1u 3✓
1
47|1.000|1.000|1.2e-09|4.5e-10|1.1e+04| 7.891271e+03 -2.966035e+03| 0:0:01| 1u 3✓
1
48|1.000|1.000|1.0e-09|2.4e-10|4.6e+03| 3.556331e+03 -1.010499e+03| 0:0:01| 1u 3✓
1
49|1.000|1.000|8.9e-10|2.0e-10|1.4e+03| 9.802193e+02 -3.748578e+02| 0:0:01| 1u 4✓
1
50|1.000|1.000|3.2e-10|1.8e-10|5.7e+02| 4.354298e+02 -1.379641e+02| 0:0:01|
sqlp stop: maximum number of iterations reached

```

```

-----
number of iterations      = 50
primal objective value = 1.51373768e+09
dual   objective value = -9.14315020e+07
gap := trace(XZ)         = 1.71e+09
relative gap              = 1.07e+00
actual relative gap       = 1.00e+00
rel. primal infeas        = 9.33e-05
rel. dual   infeas        = 1.13e+00
norm(X), norm(y), norm(Z) = 4.3e+08, 9.2e+07, 1.3e+08
norm(A), norm(b), norm(C) = 1.7e+07, 2.1e+07, 7.7e+01
Total CPU time (secs)    = 0.76
CPU time per iteration   = 0.02
termination code         = -6
DIMACS errors: 1.9e-04  0.0e+00  1.6e+00  0.0e+00  1.0e+00  1.1e+00
-----

```

ans =

4.0269e+09

Iteration 4 Total error is: 6.4226

```

num. of constraints = 45
dim. of socp var   = 46,   num. of socp blk = 1
dim. of linear var = 800

```

SDPT3: Infeasible path-following algorithms

version	predcorr	gam	expon	scale_data							
HKM	1	0.000	1	0							
it	pstep	dstep	pinfeas	dinfeas	gap	prim-obj	dual-obj	cputime			
0	0.000	0.000	1.0e+00	1.2e+02	4.7e+08	6.092409e+06	0.000000e+00	0:0:00	chol	1	✓
1	1	0.963	0.927	3.7e-02	8.8e+00	4.3e+07	5.782131e+06	-4.128673e+03	0:0:00	chol	2
1	2	0.813	0.678	7.0e-03	2.8e+00	2.4e+07	7.096816e+06	-1.708488e+04	0:0:00	chol	1
1	3	0.535	0.525	3.3e-03	1.4e+00	1.7e+07	7.442103e+06	-3.296128e+04	0:0:00	chol	1
1	4	0.311	0.434	2.2e-03	7.7e-01	1.3e+07	7.456360e+06	-5.382952e+04	0:0:00	chol	2
2	5	0.222	0.412	1.7e-03	4.5e-01	1.1e+07	7.312382e+06	-8.178903e+04	0:0:00	chol	2
2	6	0.204	0.408	1.4e-03	2.7e-01	9.4e+06	7.041524e+06	-1.175253e+05	0:0:00	chol	2
2	7	0.200	0.429	1.1e-03	1.5e-01	8.2e+06	6.672079e+06	-1.613573e+05	0:0:00	chol	2
2	8	0.231	0.435	8.6e-04	8.7e-02	7.2e+06	6.177699e+06	-2.067871e+05	0:0:00	chol	2
2	9	0.244	0.492	6.5e-04	4.4e-02	6.3e+06	5.628853e+06	-2.463665e+05	0:0:00	chol	2
2	10	0.340	0.456	4.3e-04	2.4e-02	5.4e+06	4.845805e+06	-2.662427e+05	0:0:00	chol	2
2	11	0.342	0.618	2.8e-04	9.3e-03	4.5e+06	4.153756e+06	-2.578209e+05	0:0:00	chol	2
2	12	0.536	0.717	1.3e-04	2.7e-03	3.7e+06	3.409697e+06	-2.584705e+05	0:0:00	chol	2
2	13	0.508	1.000	6.4e-05	7.1e-05	3.4e+06	3.128854e+06	-2.250703e+05	0:0:00	chol	2
2	14	1.000	1.000	1.6e-08	3.5e-05	2.5e+06	2.267905e+06	-2.716861e+05	0:0:00	chol	1
2	15	1.000	1.000	8.0e-09	1.1e-05	9.2e+05	7.976380e+05	-1.191536e+05	0:0:00	chol	2
2	16	1.000	1.000	7.5e-09	5.6e-06	4.3e+05	3.575405e+05	-7.128537e+04	0:0:00	chol	1
2	17	1.000	1.000	1.4e-09	2.8e-06	1.7e+05	1.401295e+05	-2.876922e+04	0:0:00	chol	2
2	18	1.000	1.000	3.1e-10	1.4e-06	6.6e+04	5.224401e+04	-1.418360e+04	0:0:00	chol	1
1	19	1.000	1.000	1.3e-09	7.0e-07	2.7e+04	2.139928e+04	-5.380710e+03	0:0:00	chol	2
2	20	1.000	1.000	1.4e-11	7.1e-08	9.9e+03	7.433535e+03	-2.461257e+03	0:0:00	chol	1
2	21	1.000	1.000	5.5e-12	7.0e-09	3.9e+03	2.970844e+03	-8.899742e+02	0:0:00	chol	2
1	22	1.000	1.000	3.1e-10	7.1e-10	1.3e+03	9.143297e+02	-3.818698e+02	0:0:00	chol	2
2	23	1.000	1.000	1.2e-12	7.2e-11	5.1e+02	3.530953e+02	-1.575826e+02	0:0:00	chol	2

```

2
24|1.000|1.000|6.4e-13|8.0e-12|1.5e+02| 7.232851e+01 -8.198857e+01| 0:0:00| chol 1✓
2
25|1.000|1.000|4.8e-13|1.7e-12|6.1e+01| 6.768438e+00 -5.437818e+01| 0:0:00| chol 2✓
1
26|1.000|1.000|7.8e-12|1.1e-12|1.6e+01|-2.871936e+01 -4.431478e+01| 0:0:00| chol 2✓
2
27|1.000|1.000|4.6e-13|1.5e-12|6.3e+00|-3.540742e+01 -4.169640e+01| 0:0:00| chol 2✓
2
28|0.982|1.000|6.1e-13|1.0e-12|1.4e+00|-3.920195e+01 -4.063036e+01| 0:0:00| chol 2✓
2
29|1.000|1.000|1.3e-12|1.0e-12|6.2e-01|-3.982857e+01 -4.045118e+01| 0:0:00| chol 2✓
2
30|0.962|0.879|1.4e-12|1.1e-12|1.4e-01|-4.022490e+01 -4.036121e+01| 0:0:00| chol 2✓
2
31|0.822|1.000|1.5e-12|1.0e-12|6.8e-02|-4.027102e+01 -4.033892e+01| 0:0:00| chol 2✓
2
32|0.994|0.959|4.1e-12|1.0e-12|1.1e-02|-4.031990e+01 -4.033057e+01| 0:0:00| chol 3✓
3
33|0.791|1.000|1.7e-11|1.0e-12|4.4e-03|-4.032480e+01 -4.032916e+01| 0:0:00| chol 3✓
3
34|1.000|0.966|2.1e-11|1.5e-12|8.1e-04|-4.032801e+01 -4.032881e+01| 0:0:00| chol 6✓
7
35|0.933|0.920|2.3e-10|2.4e-12|1.9e-04|-4.032853e+01 -4.032872e+01| 0:0:00| chol
linsysolve: Schur complement matrix not positive definite
switch to LU factor. lu 30 30
36|0.985|0.793|2.1e-09|3.9e-12|3.5e-05|-4.032864e+01 -4.032869e+01| 0:0:00| lu 23✓
^16
37|1.000|1.000|1.7e-08|5.1e-12|1.5e-05|-4.032866e+01 -4.032869e+01| 0:0:00| lu 11✓
^19
38|0.002|0.002|4.9e-08|1.3e-11|1.5e-05|-4.032862e+01 -4.032869e+01| 0:0:00| lu 30 ^✓
7
39|0.342|1.000|5.9e-08|1.1e-11|1.4e-05|-4.032859e+01 -4.032869e+01| 0:0:00|
stop: progress is too slow
stop: progress is bad
stop: progress is bad*
-----
number of iterations = 39
primal objective value = -4.03286576e+01
dual objective value = -4.03286893e+01
gap := trace(XZ) = 1.53e-05
relative gap = 1.87e-07
actual relative gap = 3.88e-07
rel. primal infeas = 1.74e-08
rel. dual infeas = 5.06e-12
norm(X), norm(y), norm(Z) = 8.6e+02, 6.3e+01, 2.6e+01
norm(A), norm(b), norm(C) = 2.3e+04, 4.0e+04, 7.7e+01
Total CPU time (secs) = 0.37
CPU time per iteration = 0.01
termination code = -5
DIMACS errors: 4.4e-08 0.0e+00 7.2e-12 0.0e+00 3.9e-07 1.9e-07
-----

```

ans =

40.3287

Iteration 5 Total error is: 0.029183

```

num. of constraints = 45
dim. of socp var = 46, num. of socp blk = 1
dim. of linear var = 800

```

SDPT3: Infeasible path-following algorithms

version predcorr gam expon scale_data

HKM 1 0.000 1 0

it pstep dstep pinfeas dinfeas gap prim-obj dual-obj cputime

```

-----
0|0.000|0.000|1.0e+00|7.1e+04|1.5e+11| 1.989601e+09 0.000000e+00| 0:0:00| chol 3✓
2
1|0.996|0.967|4.4e-03|2.3e+03|8.5e+09| 1.883926e+09 -1.581202e+06| 0:0:00| chol 4✓
3
2|0.566|0.586|1.9e-03|9.7e+02|5.2e+09| 1.889642e+09 -5.886946e+06| 0:0:00| chol 3✓
4
3|0.380|0.434|1.2e-03|5.5e+02|4.0e+09| 1.907406e+09 -1.077287e+07| 0:0:00| chol 4✓
5
4|0.234|0.463|9.1e-04|3.0e+02|3.2e+09| 1.891456e+09 -1.737674e+07| 0:0:00| chol 4✓
4
5|0.277|0.406|6.6e-04|1.8e+02|2.6e+09| 1.817301e+09 -2.401850e+07| 0:0:00| chol 5✓
5
6|0.213|0.557|5.2e-04|7.8e+01|2.1e+09| 1.726686e+09 -3.011797e+07| 0:0:00| chol 4✓
5
7|0.382|0.290|3.2e-04|5.5e+01|1.8e+09| 1.525561e+09 -3.456690e+07| 0:0:00| chol 6✓
7
8|0.171|0.743|2.7e-04|1.4e+01|1.5e+09| 1.438608e+09 -2.492726e+07| 0:0:00| chol 5✓
5
9|0.176|0.150|2.2e-04|1.2e+01|1.5e+09| 1.359130e+09 -2.932546e+07| 0:0:00| chol 7✓
6
10|0.169|0.129|1.8e-04|1.1e+01|1.4e+09| 1.277156e+09 -2.950866e+07| 0:0:00| chol *
warning: symqmr failed: 2.0
switch to LU factor. lu *10 4
11|0.004|0.028|1.8e-04|1.0e+01|1.4e+09| 1.281129e+09 -3.069811e+07| 0:0:00| lu 6✓
3
12|0.072|0.605|1.7e-04|4.0e+00|1.3e+09| 1.245815e+09 -2.020142e+07| 0:0:00| lu 6✓
2
13|0.102|0.176|1.5e-04|3.3e+00|1.3e+09| 1.201451e+09 -2.531370e+07| 0:0:00| lu 6✓
4
14|0.041|0.495|1.5e-04|1.7e+00|1.2e+09| 1.182460e+09 -3.026832e+07| 0:0:00| lu 5✓
2
15|0.126|0.247|1.3e-04|1.3e+00|1.2e+09| 1.140365e+09 -3.631012e+07| 0:0:00| lu *10✓
2
16|0.092|0.202|1.1e-04|1.0e+00|1.2e+09| 1.120329e+09 -2.349925e+07| 0:0:00| lu 5✓
2
17|0.089|0.172|1.0e-04|8.3e-01|1.2e+09| 1.069947e+09 -4.382057e+07| 0:0:00| lu 4✓
2
18|0.446|0.711|5.7e-05|2.4e-01|9.9e+08| 8.971391e+08 -5.057633e+07| 0:0:00| lu 5✓
2

```

```
19|0.398|0.463|3.5e-05|1.3e-01|8.0e+08| 6.940068e+08 -5.804578e+07| 0:0:00| 1u 6✓  
3  
20|0.246|0.270|2.8e-05|9.4e-02|7.4e+08| 6.308929e+08 -6.020949e+07| 0:0:00| 1u *11✓  
3  
21|0.245|0.383|1.2e-05|5.8e-02|6.9e+08| 5.927585e+08 -5.532805e+07| 0:0:00| 1u *12✓  
2  
22|0.220|0.350|8.6e-06|3.8e-02|6.1e+08| 5.243447e+08 -5.433782e+07| 0:0:00| 1u *23✓  
4  
23|0.209|0.236|2.7e-05|2.9e-02|5.8e+08| 4.938246e+08 -5.548679e+07| 0:0:00| 1u 14✓  
30  
24|0.184|0.148|3.3e-04|2.5e-02|5.6e+08| 4.729530e+08 -5.730991e+07| 0:0:00| 1u 12✓  
6  
25|0.152|0.188|7.5e-04|2.0e-02|5.4e+08| 4.555759e+08 -6.128398e+07| 0:0:00| 1u *16✓  
4  
26|0.083|0.183|2.5e-04|1.6e-02|5.2e+08| 4.525334e+08 -4.851142e+07| 0:0:00| 1u *11✓  
2  
27|0.201|0.538|2.8e-04|7.6e-03|4.9e+08| 4.187687e+08 -5.774630e+07| 0:0:00| 1u *11✓  
3  
28|0.311|0.748|1.7e-04|1.9e-03|4.3e+08| 3.979075e+08 -2.676489e+07| 0:0:00| 1u 4✓  
2  
29|0.420|0.967|9.8e-05|6.7e-05|4.1e+08| 3.336599e+08 -7.236624e+07| 0:0:00| 1u 4✓  
2  
30|0.537|1.000|1.9e-04|2.0e-05|3.4e+08| 3.040359e+08 -3.263443e+07| 0:0:00| 1u 4✓  
2  
31|1.000|1.000|2.2e-05|2.9e-05|2.0e+08| 1.567030e+08 -3.795654e+07| 0:0:00| 1u 4✓  
2  
32|1.000|1.000|7.2e-06|4.4e-06|6.5e+07| 5.201756e+07 -1.252800e+07| 0:0:00| 1u 3✓  
2  
33|1.000|1.000|1.2e-06|1.4e-06|2.9e+07| 2.297480e+07 -5.878547e+06| 0:0:00| 1u 3✓  
2  
34|1.000|1.000|3.9e-06|2.3e-07|8.9e+06| 6.842402e+06 -2.014268e+06| 0:0:00| 1u 3✓  
2  
35|1.000|1.000|4.6e-07|3.5e-07|4.0e+06| 3.157572e+06 -8.703839e+05| 0:0:00| 1u 3✓  
2  
36|1.000|1.000|4.6e-08|9.3e-08|1.3e+06| 9.432047e+05 -3.147877e+05| 0:0:00| 1u 3✓  
1  
37|1.000|1.000|2.2e-08|9.2e-09|5.3e+05| 4.063973e+05 -1.188791e+05| 0:0:00| 1u 3✓  
2  
38|1.000|1.000|1.2e-08|4.5e-09|1.6e+05| 1.197009e+05 -4.261646e+04| 0:0:00| 1u 3✓  
1  
39|1.000|1.000|2.4e-09|2.5e-09|6.7e+04| 5.181275e+04 -1.521882e+04| 0:0:00| 1u 3✓  
1  
40|1.000|1.000|1.7e-09|4.7e-10|2.0e+04| 1.498747e+04 -5.463691e+03| 0:0:00| 1u 3✓  
1  
41|1.000|1.000|5.6e-10|3.4e-10|8.5e+03| 6.611062e+03 -1.899610e+03| 0:0:00| 1u 3✓  
1  
42|1.000|1.000|4.1e-10|1.1e-10|2.6e+03| 1.866165e+03 -6.897781e+02| 0:0:00| 1u 3✓  
1  
43|1.000|1.000|2.0e-10|8.2e-11|1.1e+03| 8.280152e+02 -2.453318e+02| 0:0:00| 1u 3✓  
1  
44|1.000|1.000|1.9e-10|4.0e-11|3.1e+02| 2.092869e+02 -9.701552e+01| 0:0:00| 1u 4✓  
1  
45|1.000|1.000|1.1e-10|3.7e-11|1.3e+02| 8.323097e+01 -4.636686e+01| 0:0:00| 1u 3✓  
1
```

```

46|0.995|1.000|1.0e-10|2.3e-11|3.2e+01| 3.928914e+00 -2.818999e+01| 0:0:00| lu 4✓
1
47|1.000|1.000|7.3e-11|2.0e-11|1.4e+01|-9.289651e+00 -2.350550e+01| 0:0:00| lu 4✓
1
48|0.980|1.000|9.6e-11|1.5e-11|3.3e+00|-1.813728e+01 -2.145591e+01| 0:0:01| lu 8✓
2
49|1.000|1.000|3.3e-10|1.9e-11|1.5e+00|-1.958436e+01 -2.104209e+01| 0:0:01| lu 10✓
2
50|0.990|1.000|1.2e-10|2.9e-11|3.3e-01|-2.049888e+01 -2.082937e+01| 0:0:01|
  sqlp stop: maximum number of iterations reached

```

```

-----
number of iterations      = 50
primal objective value = -2.04988842e+01
dual   objective value = -2.08293714e+01
gap := trace(XZ)         = 3.30e-01
relative gap              = 7.81e-03
actual relative gap       = 7.81e-03
rel. primal infeas        = 1.17e-10
rel. dual   infeas        = 2.88e-11
norm(X), norm(y), norm(Z) = 2.3e+04, 8.2e+01, 4.9e+01
norm(A), norm(b), norm(C) = 1.1e+07, 1.3e+07, 7.7e+01
Total CPU time (secs)    = 0.53
CPU time per iteration   = 0.01
termination code         = -6
DIMACS errors: 2.3e-10  0.0e+00  4.1e-11  0.0e+00  7.8e-03  7.8e-03
-----

```

ans =

20.8229

Iteration 6 Total error is: 0.029312

```

num. of constraints = 45
dim. of socp var = 46, num. of socp blk = 1
dim. of linear var = 800
number of nearly dependent constraints = 1
To remove these constraints, re-run sqlp.m with OPTIONS.rmdepconstr = 1.
*****
SDPT3: Infeasible path-following algorithms
*****
version predcorr gam expon scale_data
HKM      1      0.000  1      0
it pstep dstep pinfeas dinfeas gap      prim-obj      dual-obj      cputime
-----
0|0.000|0.000|1.0e+00|2.5e+07|1.7e+14| 2.174262e+12  0.000000e+00| 0:0:00| chol 5✓
4
1|0.898|0.861|1.0e-01|3.5e+06|2.6e+13| 2.079618e+12 -1.307309e+09| 0:0:00| chol 5✓
5
2|0.929|0.723|7.2e-03|9.8e+05|1.4e+13| 2.972419e+12 -6.328957e+09| 0:0:00| chol 5✓
4
3|0.709|0.611|2.1e-03|3.8e+05|8.5e+12| 3.324309e+12 -1.411257e+10| 0:0:00| chol *
warning: symqmr failed: 2.0
switch to LU factor. lu 5 2

```

```

4|0.392|0.438|1.3e-03|2.1e+05|6.6e+12| 3.383567e+12 -2.303262e+10| 0:0:00| 1u * 9✓
2
5|0.219|0.405|1.0e-03|1.3e+05|5.4e+12| 3.349923e+12 -3.619410e+10| 0:0:00| 1u * 9✓
3
6|0.199|0.374|8.0e-04|8.0e+04|4.6e+12| 3.252264e+12 -5.327374e+10| 0:0:00| 1u * 9✓
3
7|0.161|0.406|6.7e-04|4.7e+04|4.0e+12| 3.124775e+12 -7.828760e+10| 0:0:00| 1u * 9✓
2
8|0.212|0.369|5.3e-04|3.0e+04|3.6e+12| 2.916917e+12 -1.066929e+11| 0:0:00| 1u *10✓
2
9|0.158|0.481|4.4e-04|1.5e+04|3.2e+12| 2.729372e+12 -1.442104e+11| 0:0:00| 1u *10✓
2
10|0.320|0.315|3.0e-04|1.1e+04|2.9e+12| 2.380583e+12 -1.726063e+11| 0:0:00| 1u 19✓
4
11|0.139|0.710|2.6e-04|3.1e+03|2.5e+12| 2.216952e+12 -1.682124e+11| 0:0:00| 1u * 9✓
2
12|0.250|0.166|2.0e-04|2.6e+03|2.3e+12| 1.999145e+12 -1.907779e+11| 0:0:00| 1u 22✓
5
13|0.233|0.490|1.5e-04|1.3e+03|2.0e+12| 1.721561e+12 -1.472269e+11| 0:0:00| 1u 21✓
5
14|0.117|0.384|1.3e-04|8.0e+02|1.9e+12| 1.623193e+12 -1.269873e+11| 0:0:00| 1u 30✓
5
15|0.100|0.128|1.2e-04|7.0e+02|1.8e+12| 1.541923e+12 -1.421879e+11| 0:0:00| 1u 30✓
15
16|0.059|0.078|1.1e-04|6.5e+02|1.8e+12| 1.504376e+12 -1.490531e+11| 0:0:00| 1u 30✓
30
17|0.026|0.047|1.1e-04|6.2e+02|1.8e+12| 1.489679e+12 -1.504937e+11| 0:0:00| 1u 30✓
^18
18|0.000|0.000|1.1e-04|6.2e+02|1.8e+12| 1.489743e+12 -1.508779e+11| 0:0:00| 1u 30✓
^23
19|0.009|0.032|1.1e-04|6.0e+02|1.8e+12| 1.485539e+12 -1.562091e+11| 0:0:00| 1u 13✓
30
20|0.007|0.031|1.1e-04|5.8e+02|1.8e+12| 1.480335e+12 -1.460225e+11| 0:0:00| 1u 30✓
^18
21|0.046|0.045|1.3e-04|5.5e+02|1.8e+12| 1.462773e+12 -1.600336e+11| 0:0:00| 1u 24 ^✓
4
22|0.007|0.032|1.0e-04|5.4e+02|1.8e+12| 1.455993e+12 -1.500854e+11| 0:0:00| 1u 21✓
30
23|0.053|0.083|9.7e-05|4.9e+02|1.8e+12| 1.426357e+12 -1.591314e+11| 0:0:00| 1u 30 ^✓
5
24|0.046|0.048|1.2e-04|4.7e+02|1.7e+12| 1.401036e+12 -1.657511e+11| 0:0:00| 1u 12✓
^13
25|0.016|0.035|1.3e-04|4.5e+02|1.7e+12| 1.392933e+12 -1.684885e+11| 0:0:01| 1u 30 ^✓
8
26|0.019|0.023|1.1e-04|4.4e+02|1.7e+12| 1.383180e+12 -1.681544e+11| 0:0:01| 1u 12✓
^16
27|0.015|0.045|2.7e-04|4.2e+02|1.7e+12| 1.376715e+12 -1.784740e+11| 0:0:01| 1u 25✓
^11
28|0.032|0.108|3.8e-04|3.7e+02|1.7e+12| 1.359229e+12 -1.589447e+11| 0:0:01| 1u 30✓
^12
29|0.012|0.044|3.7e-04|3.6e+02|1.7e+12| 1.352416e+12 -1.647905e+11| 0:0:01| 1u 30✓
^24
30|0.045|0.035|4.4e-04|3.5e+02|1.7e+12| 1.329625e+12 -1.713566e+11| 0:0:01| 1u 13 ^✓
4

```

```

31|0.029|0.030|5.1e-04|3.4e+02|1.7e+12| 1.315558e+12 -1.754314e+11| 0:0:01| 1u 16✓
30
32|0.023|0.036|4.2e-04|3.2e+02|1.7e+12| 1.305059e+12 -1.791318e+11| 0:0:01| 1u 30✓
30
33|0.019|0.069|3.9e-04|3.0e+02|1.7e+12| 1.295944e+12 -1.794819e+11| 0:0:01| 1u 17✓
30
34|0.001|0.003|4.2e-04|3.0e+02|1.7e+12| 1.295308e+12 -1.791239e+11| 0:0:01| 1u 18✓
^14
35|0.010|0.028|3.7e-04|2.9e+02|1.6e+12| 1.289495e+12 -1.688809e+11| 0:0:01| 1u 18✓
30
36|0.002|0.016|3.2e-04|2.9e+02|1.6e+12| 1.288916e+12 -1.776986e+11| 0:0:01| 1u 18✓
^26
37|0.010|0.063|3.7e-04|2.7e+02|1.6e+12| 1.284263e+12 -1.782121e+11| 0:0:01| 1u 22✓
8
38|0.057|0.214|3.0e-04|2.1e+02|1.6e+12| 1.253495e+12 -1.563027e+11| 0:0:01| 1u 30✓
25
39|0.077|0.070|3.1e-04|2.0e+02|1.6e+12| 1.211041e+12 -1.684996e+11| 0:0:01| 1u 13✓
30
40|0.044|0.041|2.7e-04|1.9e+02|1.5e+12| 1.189723e+12 -1.738128e+11| 0:0:01| 1u 12✓
^10
41|0.027|0.035|2.8e-04|1.8e+02|1.5e+12| 1.177416e+12 -1.766922e+11| 0:0:01| 1u 20✓
^17
42|0.020|0.036|2.2e-04|1.8e+02|1.5e+12| 1.168527e+12 -1.788933e+11| 0:0:01| 1u 13✓
30
43|0.018|0.126|8.7e-05|1.5e+02|1.5e+12| 1.160841e+12 -1.736077e+11| 0:0:01| 1u 30✓
^12
44|0.004|0.015|4.8e-04|1.5e+02|1.5e+12| 1.158694e+12 -1.633433e+11| 0:0:01| 1u 30✓
30
45|0.014|0.022|9.4e-04|1.5e+02|1.5e+12| 1.153494e+12 -1.735783e+11| 0:0:01| 1u 30✓
30
46|0.029|0.123|9.5e-04|1.3e+02|1.5e+12| 1.138357e+12 -1.543116e+11| 0:0:01| 1u 14✓
^11
47|0.126|0.079|1.1e-03|1.2e+02|1.4e+12| 1.085855e+12 -1.746215e+11| 0:0:01| 1u 30✓
12
48|0.067|0.300|1.0e-03|8.4e+01|1.3e+12| 1.050136e+12 -1.451376e+11| 0:0:01| 1u 12✓
^30
49|0.038|0.051|1.2e-03|7.9e+01|1.3e+12| 1.029622e+12 -1.478371e+11| 0:0:01| 1u 30✓
^14
50|0.001|0.002|9.0e-04|7.9e+01|1.3e+12| 1.029316e+12 -1.462600e+11| 0:0:01|
  sqlp stop: maximum number of iterations reached
-----
number of iterations      = 50
primal objective value    = 1.05013581e+12
dual   objective value    = -1.45137621e+11
gap := trace(XZ)          = 1.34e+12
relative gap              = 1.12e+00
actual relative gap       = 1.00e+00
rel. primal infeas        = 1.05e-03
rel. dual   infeas        = 8.37e+01
norm(X), norm(y), norm(Z) = 6.5e+11, 1.5e+11, 2.1e+11
norm(A), norm(b), norm(C) = 7.7e+09, 1.2e+10, 7.7e+01
Total CPU time (secs)     = 1.16
CPU time per iteration    = 0.02
termination code          = -6

```


DIMACS errors: 2.6e-03 0.0e+00 1.2e+02 0.0e+00 1.0e+00 1.1e+00

ans =

4.6503e+14

Iteration 7 Total error is: 529794.6087

num. of constraints = 45

dim. of socp var = 46, num. of socp blk = 1

dim. of linear var = 800

SDPT3: Infeasible path-following algorithms

version predcorr gam expon scale_data

HKM 1 0.000 1 0

it pstep dstep pinfeas dinfeas gap prim-obj dual-obj cputime

it	pstep	dstep	pinfeas	dinfeas	gap	prim-obj	dual-obj	cputime				
0	0.000	0.000	1.0e+00	1.2e+02	1.7e+08	2.166308e+06	0.000000e+00	0:0:00	chol	1✓		
1	1	1	0.975	2.8e-06	3.2e+00	8.0e+06	2.048347e+06	-4.772382e+03	0:0:00	chol	1✓	
2	2	2	0.435	0.516	1.6e-06	1.5e+00	5.3e+06	1.959831e+06	-1.035390e+04	0:0:00	chol	1✓
1	3	3	0.303	0.409	1.1e-06	9.2e-01	4.2e+06	1.962338e+06	-1.753294e+04	0:0:00	chol	2✓
2	4	4	0.232	0.478	8.5e-07	4.8e-01	3.2e+06	1.939715e+06	-2.561165e+04	0:0:00	chol	1✓
2	5	5	0.301	0.403	5.8e-07	2.9e-01	2.7e+06	1.841144e+06	-3.246499e+04	0:0:00	chol	2✓
2	6	6	0.233	0.622	4.3e-07	1.1e-01	2.1e+06	1.729840e+06	-3.467105e+04	0:0:00	chol	2✓
2	7	7	0.389	0.224	2.6e-07	8.6e-02	1.8e+06	1.482641e+06	-3.784957e+04	0:0:00	chol	2✓
2	8	8	0.164	0.670	2.2e-07	2.9e-02	1.5e+06	1.394998e+06	-3.065169e+04	0:0:00	chol	2✓
2	9	9	0.276	0.154	1.6e-07	2.4e-02	1.4e+06	1.270266e+06	-3.333227e+04	0:0:00	chol	2✓
2	10	10	0.073	0.376	1.2e-07	1.5e-02	1.3e+06	1.244898e+06	-3.645650e+04	0:0:00	chol	2✓
2	11	11	0.207	0.898	1.0e-07	1.6e-03	1.2e+06	1.204468e+06	-2.809761e+04	0:0:00	chol	2✓
2	12	12	0.205	0.572	7.4e-08	7.1e-04	1.2e+06	1.157344e+06	-4.468522e+04	0:0:00	chol	2✓
2	13	13	0.333	1.000	5.2e-08	4.5e-05	1.1e+06	1.084574e+06	-3.938886e+04	0:0:00	chol	2✓
2	14	14	1.000	1.000	2.8e-08	2.3e-05	7.8e+05	7.244434e+05	-5.244230e+04	0:0:00	chol	2✓
2	15	15	1.000	1.000	2.6e-08	1.1e-05	3.0e+05	2.798126e+05	-2.347090e+04	0:0:00	chol	2✓
2	16	16	1.000	1.000	8.3e-09	5.6e-06	1.0e+05	9.298071e+04	-1.124535e+04	0:0:00	chol	2✓
2	17	17	1.000	1.000	2.1e-09	2.8e-06	4.3e+04	3.817238e+04	-5.176478e+03	0:0:00	chol	2✓

```

2
18|1.000|1.000|3.9e-10|1.4e-06|2.0e+04| 1.684737e+04 -2.710966e+03| 0:0:00| chol 1✓
2
19|1.000|1.000|9.0e-11|7.0e-07|7.9e+03| 6.580886e+03 -1.269178e+03| 0:0:00| chol 2✓
2
20|1.000|1.000|1.8e-11|7.0e-08|3.2e+03| 2.556323e+03 -6.070804e+02| 0:0:00| chol 2✓
2
21|1.000|1.000|1.7e-11|7.0e-09|1.1e+03| 8.497408e+02 -2.689169e+02| 0:0:00| chol 2✓
2
22|1.000|1.000|8.3e-12|7.1e-10|4.1e+02| 2.775831e+02 -1.370763e+02| 0:0:00| chol 2✓
2
23|1.000|1.000|3.5e-12|7.2e-11|1.3e+02| 5.567598e+01 -7.645280e+01| 0:0:00| chol 2✓
1
24|1.000|1.000|1.9e-10|8.0e-12|4.9e+01|-7.334758e+00 -5.664465e+01| 0:0:00| chol 1✓
2
25|1.000|1.000|1.8e-12|2.2e-12|1.5e+01|-3.317578e+01 -4.785159e+01| 0:0:00| chol 1✓
2
26|1.000|1.000|6.7e-13|1.1e-12|5.0e+00|-4.027078e+01 -4.522949e+01| 0:0:00| chol 2✓
2
27|1.000|1.000|9.6e-13|1.0e-12|1.2e+00|-4.295768e+01 -4.412590e+01| 0:0:00| chol 2✓
2
28|1.000|1.000|2.8e-12|1.0e-12|3.2e-01|-4.355475e+01 -4.387019e+01| 0:0:00| chol 2✓
2
29|1.000|1.000|1.5e-11|1.0e-12|1.1e-01|-4.370689e+01 -4.381378e+01| 0:0:00| chol 2✓
2
30|0.979|0.908|6.6e-11|1.6e-12|1.7e-02|-4.377205e+01 -4.378893e+01| 0:0:00| chol 3✓
3
31|0.851|1.000|6.1e-11|2.3e-12|6.4e-03|-4.377828e+01 -4.378465e+01| 0:0:00| chol 3✓
3
32|0.900|1.000|3.8e-10|3.4e-12|1.3e-03|-4.378219e+01 -4.378347e+01| 0:0:00| chol 6✓
7
33|1.000|1.000|5.7e-10|5.1e-12|5.6e-04|-4.378283e+01 -4.378339e+01| 0:0:00| chol 5✓
7
34|0.979|1.000|7.3e-10|7.6e-12|1.0e-04|-4.378317e+01 -4.378327e+01| 0:0:00| chol
linsysolve: Schur complement matrix not positive definite
switch to LU factor. lu 17 3
35|1.000|1.000|1.3e-09|1.1e-11|1.9e-05|-4.378323e+01 -4.378325e+01| 0:0:00| lu 30✓
30
36|0.815|0.657|2.7e-09|2.1e-11|7.5e-06|-4.378324e+01 -4.378325e+01| 0:0:00|
stop: max(relative gap, infeasibilities) < 1.00e-07
-----
number of iterations = 36
primal objective value = -4.37832392e+01
dual objective value = -4.37832501e+01
gap := trace(XZ) = 7.45e-06
relative gap = 8.42e-08
actual relative gap = 1.23e-07
rel. primal infeas = 2.70e-09
rel. dual infeas = 2.10e-11
norm(X), norm(y), norm(Z) = 6.9e+02, 5.8e+01, 2.2e+01
norm(A), norm(b), norm(C) = 2.0e+04, 1.4e+04, 7.7e+01
Total CPU time (secs) = 0.33
CPU time per iteration = 0.01
termination code = 0

```

```
DIMACS errors: 5.4e-09  0.0e+00  3.0e-11  0.0e+00  1.2e-07  8.4e-08
```

```
-----
```

```
ans =
```

```
43.7833
```

```
Iteration    8    Total error is: 0.029351
```

```
The total representation error of the testing signals is: 0.018092
```

```
>>
```