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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 = 25
dim. of socp var = 26, 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|1.2e+00|1.0e+01|1.3e+06| 2.236957e+04  0.000000e+00| 0:0:00| chol 1✓
1
1|1.000|0.901|2.6e-05|1.1e+00|1.5e+05| 2.133218e+04 -7.077829e+01| 0:0:00| chol 1✓
1
2|0.306|0.944|1.8e-05|9.5e-02|3.6e+04| 2.371153e+04 -1.799580e+02| 0:0:00| chol 1✓
1
3|1.000|1.000|3.4e-06|1.0e-02|1.8e+04| 1.717970e+04 -1.936221e+02| 0:0:00| chol 1✓
1
4|0.965|1.000|1.6e-06|3.0e-03|6.8e+02| 4.801674e+02 -1.838070e+02| 0:0:00| chol 1✓
1
5|1.000|0.224|4.0e-06|2.4e-03|7.1e+02| 5.518657e+02 -1.499593e+02| 0:0:00| chol 1✓
1
6|0.413|1.000|2.4e-06|3.0e-05|6.0e+02| 4.487956e+02 -1.512587e+02| 0:0:00| chol 1✓
1
7|1.000|0.749|1.2e-08|1.0e-05|3.8e+02| 2.812375e+02 -9.772235e+01| 0:0:00| chol 1✓
1
8|0.989|1.000|2.3e-09|3.0e-07|2.1e+02| 1.252508e+02 -8.765498e+01| 0:0:00| chol 1✓
1
9|1.000|0.992|2.7e-10|3.3e-08|1.1e+02| 3.968205e+01 -6.585011e+01| 0:0:00| chol 1✓
1
10|1.000|1.000|4.5e-13|3.0e-09|5.9e+01|-4.920098e+00 -6.375750e+01| 0:0:00| chol 1✓
1
11|1.000|1.000|6.9e-14|3.0e-10|2.3e+01|-3.254610e+01 -5.574683e+01| 0:0:00| chol 1✓
1
12|1.000|1.000|2.8e-14|3.1e-11|9.2e+00|-4.459437e+01 -5.384282e+01| 0:0:00| chol 1✓
1
13|1.000|1.000|7.6e-15|4.0e-12|3.7e+00|-4.864559e+01 -5.232169e+01| 0:0:00| chol 1✓
1
14|1.000|1.000|1.0e-14|1.3e-12|1.3e+00|-5.061887e+01 -5.188896e+01| 0:0:00| chol 1✓
1
15|1.000|1.000|7.6e-15|1.0e-12|5.1e-01|-5.116111e+01 -5.167161e+01| 0:0:00| chol 1✓
1
16|1.000|1.000|8.1e-15|1.0e-12|1.6e-01|-5.144380e+01 -5.160255e+01| 0:0:00| chol 1✓
1
17|1.000|1.000|1.3e-14|1.0e-12|6.6e-02|-5.151066e+01 -5.157620e+01| 0:0:00| chol 1✓
1
18|1.000|1.000|4.2e-15|1.0e-12|1.8e-02|-5.154937e+01 -5.156695e+01| 0:0:01| chol 1✓
1
19|1.000|1.000|6.5e-14|1.0e-12|7.4e-03|-5.155702e+01 -5.156438e+01| 0:0:01| chol 1✓
1
```

```

20|0.976|0.967|1.5e-13|1.0e-12|1.6e-03|-5.156181e+01 -5.156336e+01| 0:0:01| chol 1✓
1
21|1.000|1.000|1.1e-12|1.0e-12|6.8e-04|-5.156252e+01 -5.156320e+01| 0:0:01| chol 1✓
1
22|0.977|1.000|2.2e-12|1.0e-12|2.1e-04|-5.156293e+01 -5.156313e+01| 0:0:01| chol 1✓
1
23|1.000|1.000|5.8e-13|1.0e-12|1.0e-04|-5.156302e+01 -5.156312e+01| 0:0:01| chol 1✓
2
24|0.916|1.000|1.2e-13|1.0e-12|3.8e-05|-5.156308e+01 -5.156312e+01| 0:0:01| chol 2✓
2
25|0.835|1.000|3.3e-13|1.0e-12|1.5e-05|-5.156310e+01 -5.156311e+01| 0:0:01| chol 2✓
2
26|1.000|1.000|3.0e-13|1.0e-12|4.4e-06|-5.156311e+01 -5.156311e+01| 0:0:01|
stop: max(relative gap, infeasibilities) < 1.00e-07

```

```

-----
number of iterations    = 26
primal objective value = -5.15631099e+01
dual   objective value = -5.15631143e+01
gap := trace(XZ)        = 4.42e-06
relative gap           = 4.24e-08
actual relative gap    = 4.24e-08
rel. primal infeas     = 2.97e-13
rel. dual   infeas     = 1.00e-12
norm(X), norm(y), norm(Z) = 9.3e-01, 5.2e+01, 2.0e+01
norm(A), norm(b), norm(C) = 1.5e+02, 4.1e+00, 7.7e+01
Total CPU time (secs)   = 0.55
CPU time per iteration = 0.02
termination code        = 0
DIMACS errors: 6.0e-13  0.0e+00  1.4e-12  0.0e+00  4.2e-08  4.2e-08
-----

```

ans =

51.5631

```

num. of constraints = 25
dim. of socp var   = 26,   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|2.4e+03|1.4e+10| 2.446757e+08  0.000000e+00| 0:0:00| chol 1✓
1
1|0.926|0.858|7.4e-02|3.5e+02|2.3e+09| 2.321316e+08  5.337017e+04| 0:0:00| chol 1✓
1
2|1.000|0.779|2.4e-10|7.7e+01|1.1e+09| 3.267969e+08 -5.600952e+05| 0:0:00| chol 1✓
1
3|0.480|0.591|7.6e-10|3.1e+01|6.7e+08| 3.179440e+08 -1.127606e+06| 0:0:00| chol 1✓
1

```

```
4|0.337|0.445|6.2e-10|1.7e+01|5.3e+08| 3.118945e+08 -1.876995e+06| 0:0:00| chol 1✓  
2  
5|0.227|0.449|6.5e-10|9.6e+00|4.3e+08| 3.036859e+08 -2.869941e+06| 0:0:00| chol 2✓  
2  
6|0.249|0.405|5.9e-10|5.7e+00|3.7e+08| 2.889222e+08 -3.936414e+06| 0:0:00| chol 2✓  
2  
7|0.197|0.479|6.1e-10|3.0e+00|3.2e+08| 2.739742e+08 -5.135023e+06| 0:0:00| chol 2✓  
1  
8|0.298|0.345|2.3e-09|1.9e+00|2.9e+08| 2.492785e+08 -6.166878e+06| 0:0:00| chol 2✓  
2  
9|0.152|0.562|9.7e-10|8.5e-01|2.6e+08| 2.369041e+08 -6.702524e+06| 0:0:00| chol 2✓  
2  
10|0.310|0.204|2.8e-08|6.8e-01|2.4e+08| 2.140454e+08 -7.660915e+06| 0:0:00| chol 2✓  
2  
11|0.064|0.719|2.4e-08|1.9e-01|2.2e+08| 2.083323e+08 -6.636082e+06| 0:0:00| chol 2✓  
2  
12|0.143|0.157|6.4e-08|1.6e-01|2.1e+08| 1.998918e+08 -7.977722e+06| 0:0:00| chol 2✓  
2  
13|0.119|0.254|6.9e-08|1.2e-01|2.1e+08| 1.904884e+08 -8.057021e+06| 0:0:00| chol 2✓  
2  
14|0.015|0.101|1.0e-07|1.1e-01|2.1e+08| 1.881475e+08 -7.608896e+06| 0:0:00| chol 2✓  
2  
15|0.238|0.465|3.8e-07|5.8e-02|2.0e+08| 1.793280e+08 -9.569388e+06| 0:0:00| chol 2✓  
2  
16|0.236|0.516|1.4e-07|2.8e-02|1.7e+08| 1.561858e+08 -1.003188e+07| 0:0:00| chol 2✓  
2  
17|0.256|0.342|3.0e-06|1.8e-02|1.5e+08| 1.372011e+08 -1.093112e+07| 0:0:00| chol 2✓  
2  
18|0.225|0.305|1.6e-06|1.3e-02|1.4e+08| 1.287810e+08 -1.211129e+07| 0:0:00| chol 2✓  
2  
19|0.184|0.700|9.2e-06|3.8e-03|1.4e+08| 1.244631e+08 -1.258509e+07| 0:0:00| chol 2✓  
2  
20|0.212|0.449|1.1e-05|2.1e-03|1.3e+08| 1.212983e+08 -1.076218e+07| 0:0:00| chol 2✓  
2  
21|0.433|1.000|7.0e-05|2.4e-08|1.3e+08| 1.066198e+08 -1.855502e+07| 0:0:00| chol 2✓  
2  
22|0.810|1.000|1.6e-05|2.6e-08|1.0e+08| 8.994512e+07 -1.131219e+07| 0:0:00| chol 1✓  
1  
23|1.000|1.000|6.7e-07|3.8e-08|6.0e+07| 4.839814e+07 -1.198735e+07| 0:0:00| chol 1✓  
2  
24|1.000|0.984|5.9e-06|5.7e-08|1.5e+07| 1.156251e+07 -2.991374e+06| 0:0:00| chol 1✓  
2  
25|1.000|1.000|1.7e-06|8.5e-08|7.7e+06| 5.995163e+06 -1.732876e+06| 0:0:00| chol 1✓  
2  
26|1.000|1.000|4.1e-08|1.3e-07|2.5e+06| 2.001417e+06 -5.380499e+05| 0:0:00| chol 1✓  
2  
27|1.000|1.000|6.7e-08|8.3e-09|1.0e+06| 7.784898e+05 -2.647757e+05| 0:0:00| chol 1✓  
1  
28|1.000|1.000|1.8e-09|1.2e-08|3.7e+05| 2.872179e+05 -8.244395e+04| 0:0:00| chol 1✓  
2  
29|1.000|1.000|2.9e-09|3.7e-10|1.4e+05| 9.921339e+04 -3.583487e+04| 0:0:00| chol 1✓  
1  
30|1.000|1.000|7.0e-10|5.5e-10|5.1e+04| 3.964081e+04 -1.164662e+04| 0:0:00| chol 1✓  
2
```

```

31|1.000|1.000|6.3e-11|1.4e-10|1.7e+04| 1.230404e+04 -4.528966e+03| 0:0:00| chol 1✓
1
32|1.000|1.000|2.2e-10|1.3e-11|6.9e+03| 5.295349e+03 -1.572558e+03| 0:0:00| chol 1✓
1
33|1.000|1.000|2.2e-11|1.9e-11|2.1e+03| 1.519211e+03 -5.890433e+02| 0:0:00| chol 1✓
1
34|1.000|1.000|4.3e-11|4.5e-12|8.9e+02| 6.616626e+02 -2.299717e+02| 0:0:00| chol 1✓
1
35|1.000|1.000|9.4e-12|6.7e-12|2.6e+02| 1.578598e+02 -1.049745e+02| 0:0:00| chol 1✓
1
36|1.000|1.000|8.7e-12|1.9e-12|1.1e+02| 5.052755e+01 -6.271311e+01| 0:0:00| chol 1✓
1
37|1.000|1.000|1.6e-12|1.7e-12|3.1e+01|-1.661583e+01 -4.767206e+01| 0:0:00| chol 1✓
1
38|1.000|1.000|8.6e-13|1.0e-12|1.4e+01|-2.941031e+01 -4.327911e+01| 0:0:00| chol 1✓
1
39|0.999|1.000|6.5e-14|1.0e-12|3.4e+00|-3.825248e+01 -4.162841e+01| 0:0:00| chol 1✓
1
40|1.000|1.000|2.4e-14|1.0e-12|1.6e+00|-3.965262e+01 -4.126020e+01| 0:0:00| chol 1✓
1
41|0.973|1.000|4.2e-13|1.0e-12|3.4e-01|-4.075538e+01 -4.109895e+01| 0:0:00| chol 1✓
1
42|1.000|1.000|5.2e-13|1.0e-12|1.6e-01|-4.091834e+01 -4.107726e+01| 0:0:00| chol 1✓
1
43|0.969|0.940|3.9e-12|1.1e-12|2.8e-02|-4.103874e+01 -4.106676e+01| 0:0:00| chol 1✓
2
44|0.827|1.000|1.2e-12|1.0e-12|1.4e-02|-4.105157e+01 -4.106538e+01| 0:0:00| chol 1✓
1
45|0.956|1.000|3.0e-12|1.0e-12|2.1e-03|-4.106288e+01 -4.106495e+01| 0:0:00| chol 2✓
2
46|1.000|0.894|1.4e-12|1.1e-12|3.5e-04|-4.106456e+01 -4.106491e+01| 0:0:00| chol 2✓
2
47|0.851|0.951|2.2e-11|1.1e-12|8.4e-05|-4.106482e+01 -4.106491e+01| 0:0:00| chol 2✓
2
48|0.973|0.927|3.4e-12|1.6e-12|6.0e-06|-4.106490e+01 -4.106490e+01| 0:0:00|
stop: max(relative gap, infeasibilities) < 1.00e-07

```

```

-----
number of iterations    = 48
primal objective value = -4.10648990e+01
dual  objective value = -4.10649049e+01
gap := trace(XZ)       = 5.97e-06
relative gap           = 7.18e-08
actual relative gap    = 7.17e-08
rel. primal infeas     = 3.39e-12
rel. dual  infeas     = 1.58e-12
norm(X), norm(y), norm(Z) = 3.4e+02, 6.2e+01, 2.6e+01
norm(A), norm(b), norm(C) = 4.0e+05, 4.9e+05, 7.7e+01
Total CPU time (secs)  = 0.37
CPU time per iteration = 0.01
termination code       = 0
DIMACS errors: 5.0e-12  0.0e+00  2.3e-12  0.0e+00  7.2e-08  7.2e-08
-----

```

ans =

41.0649

Iteration 2 Total error is: 0.029084

num. of constraints = 25

dim. of socp var = 26, 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	5.0e+04	2.5e+11	4.402068e+09	0.000000e+00	0:0:00	chol	1✓	
1	1	1									
1	1	0.938	0.860	6.2e-02	7.0e+03	4.0e+10	4.173301e+09	6.929546e+05	0:0:00	chol	1✓
1	1										
2	2	1.000	0.783	1.2e-11	1.5e+03	1.9e+10	5.850195e+09	-1.156797e+07	0:0:00	chol	1✓
2	2										
3	3	0.491	0.569	7.8e-11	6.5e+02	1.2e+10	5.633336e+09	-2.133752e+07	0:0:00	chol	2✓
2	2										
4	4	0.308	0.460	6.2e-11	3.5e+02	9.3e+09	5.543886e+09	-3.615690e+07	0:0:00	chol	2✓
2	2										
5	5	0.248	0.431	5.5e-11	2.0e+02	7.7e+09	5.383224e+09	-5.406016e+07	0:0:00	chol	2✓
2	2										
6	6	0.229	0.454	3.2e-10	1.1e+02	6.5e+09	5.137601e+09	-7.429453e+07	0:0:00	chol	2✓
1	1										
7	7	0.271	0.436	1.4e-09	6.2e+01	5.6e+09	4.761859e+09	-9.189700e+07	0:0:00	chol	2✓
2	2										
8	8	0.261	0.488	1.0e-09	3.2e+01	4.9e+09	4.355286e+09	-1.008009e+08	0:0:00	chol	2✓
2	2										
9	9	0.306	0.325	2.4e-09	2.1e+01	4.3e+09	3.867071e+09	-1.073499e+08	0:0:00	chol	2✓
2	2										
10	10	0.154	0.529	1.2e-08	1.0e+01	4.0e+09	3.684558e+09	-9.661577e+07	0:0:00	chol	2✓
2	2										
11	11	0.241	0.155	5.2e-09	8.5e+00	3.7e+09	3.400412e+09	-1.066165e+08	0:0:00	chol	2✓
2	2										
12	12	0.044	0.422	3.6e-08	4.9e+00	3.6e+09	3.350015e+09	-8.979191e+07	0:0:00	chol	2✓
2	2										
13	13	0.118	0.185	2.7e-08	4.0e+00	3.5e+09	3.256943e+09	-8.905695e+07	0:0:00	chol	2✓
2	2										
14	14	0.363	0.360	1.9e-07	2.6e+00	3.3e+09	3.054804e+09	-1.296993e+08	0:0:00	chol	2✓
2	2										
15	15	0.126	0.718	4.1e-07	7.2e-01	3.0e+09	2.841388e+09	-9.695822e+07	0:0:00	chol	2✓
2	2										
16	16	0.169	0.231	7.8e-07	5.5e-01	2.9e+09	2.644040e+09	-1.247065e+08	0:0:00	chol	2✓
2	2										
17	17	0.074	0.516	8.2e-08	2.7e-01	2.8e+09	2.561584e+09	-1.351962e+08	0:0:00	chol	2✓
2	2										
18	18	0.157	0.163	6.3e-06	2.2e-01	2.7e+09	2.419147e+09	-1.526904e+08	0:0:00	chol	2✓
2	2										
19	19	0.128	0.094	5.1e-05	2.0e-01	2.7e+09	2.410675e+09	-1.313888e+08	0:0:00	chol	2✓

```
2
20|0.035|0.199|5.2e-05|1.6e-01|2.7e+09| 2.303434e+09 -1.437586e+08| 0:0:00| chol 2✓
2
21|0.129|0.629|4.9e-05|6.1e-02|2.4e+09| 2.143302e+09 -1.234382e+08| 0:0:00| chol 2✓
2
22|0.089|0.203|6.1e-05|4.8e-02|2.3e+09| 2.062047e+09 -1.482818e+08| 0:0:00| chol 2✓
2
23|0.083|0.150|1.3e-05|4.1e-02|2.3e+09| 2.016723e+09 -1.550548e+08| 0:0:00| chol 2✓
2
24|0.118|0.242|4.0e-04|3.1e-02|2.2e+09| 1.968364e+09 -1.421137e+08| 0:0:00| chol 2✓
2
25|0.130|0.334|2.5e-04|2.1e-02|2.1e+09| 1.814825e+09 -1.602023e+08| 0:0:00| chol 2✓
2
26|0.234|0.566|2.0e-04|9.0e-03|1.9e+09| 1.679865e+09 -1.581780e+08| 0:0:00| chol 2✓
2
27|1.000|0.378|1.0e-02|5.6e-03|1.3e+09| 1.025838e+09 -2.139527e+08| 0:0:00| chol 2✓
2
28|0.739|1.000|8.6e-04|6.3e-08|9.8e+08| 8.220718e+08 -1.609219e+08| 0:0:00| chol 2✓
2
29|0.719|0.847|1.8e-04|1.0e-07|8.2e+08| 6.496041e+08 -1.697333e+08| 0:0:00| chol 2✓
2
30|0.981|1.000|2.6e-04|1.4e-07|3.4e+08| 2.413215e+08 -1.000042e+08| 0:0:00| chol 2✓
2
31|1.000|1.000|9.0e-05|2.1e-07|1.5e+08| 1.191848e+08 -3.157023e+07| 0:0:00| chol 2✓
2
32|1.000|1.000|1.7e-05|3.2e-07|5.1e+07| 3.782827e+07 -1.337487e+07| 0:0:00| chol 2✓
2
33|1.000|1.000|1.7e-06|4.7e-07|2.1e+07| 1.613554e+07 -4.660463e+06| 0:0:00| chol 2✓
2
34|1.000|1.000|8.3e-07|3.4e-07|6.7e+06| 4.865096e+06 -1.791619e+06| 0:0:00| chol 2✓
2
35|1.000|1.000|1.1e-07|1.7e-07|2.8e+06| 2.129111e+06 -6.322663e+05| 0:0:00| chol 2✓
2
36|1.000|1.000|5.1e-08|2.3e-08|8.5e+05| 6.214506e+05 -2.327556e+05| 0:0:00| chol 1✓
1
37|1.000|1.000|6.8e-09|1.0e-08|3.6e+05| 2.771952e+05 -8.281690e+04| 0:0:00| chol 1✓
2
38|1.000|1.000|2.2e-09|1.4e-09|1.1e+05| 7.962055e+04 -2.999733e+04| 0:0:00| chol 1✓
2
39|1.000|1.000|6.4e-11|4.4e-10|4.7e+04| 3.587298e+04 -1.070435e+04| 0:0:00| chol 1✓
2
40|1.000|1.000|3.5e-11|1.3e-11|1.4e+04| 1.021408e+04 -3.869020e+03| 0:0:00| chol 1✓
2
41|1.000|1.000|1.4e-11|7.0e-12|6.0e+03| 4.612072e+03 -1.398259e+03| 0:0:00| chol 1✓
2
42|1.000|1.000|1.0e-11|2.9e-12|1.8e+03| 1.281270e+03 -5.237900e+02| 0:0:00| chol 1✓
2
43|1.000|1.000|4.4e-13|2.1e-12|7.7e+02| 5.615974e+02 -2.118328e+02| 0:0:00| chol 1✓
1
44|1.000|1.000|4.4e-13|1.0e-12|2.3e+02| 1.265487e+02 -1.015200e+02| 0:0:00| chol 1✓
1
45|1.000|1.000|1.6e-12|1.0e-12|9.8e+01| 3.479733e+01 -6.359436e+01| 0:0:00| chol 1✓
1
46|1.000|1.000|4.0e-13|1.0e-12|2.8e+01|-2.227490e+01 -5.003324e+01| 0:0:00| chol 1✓
```

```

1
47|1.000|1.000|3.5e-13|1.0e-12|1.2e+01|-3.353061e+01 -4.577014e+01| 0:0:00| chol 1✓
1
48|1.000|1.000|9.2e-14|1.0e-12|3.2e+00|-4.096308e+01 -4.418468e+01| 0:0:00| chol 1✓
1
49|1.000|1.000|9.9e-14|1.0e-12|1.5e+00|-4.228341e+01 -4.375305e+01| 0:0:00| chol 1✓
1
50|0.993|1.000|3.4e-13|1.0e-12|3.5e-01|-4.322741e+01 -4.357664e+01| 0:0:00|
    sqlp stop: maximum number of iterations reached

```

```

-----
number of iterations      = 50
primal objective value = -4.32274137e+01
dual   objective value = -4.35766373e+01
gap := trace(XZ)         = 3.49e-01
relative gap              = 3.98e-03
actual relative gap       = 3.98e-03
rel. primal infeas        = 3.38e-13
rel. dual   infeas        = 1.00e-12
norm(X), norm(y), norm(Z) = 1.6e+04, 6.0e+01, 2.4e+01
norm(A), norm(b), norm(C) = 8.1e+06, 7.6e+06, 7.7e+01
Total CPU time (secs)    = 0.34
CPU time per iteration   = 0.01
termination code         = -6
DIMACS errors: 4.4e-13  0.0e+00  1.4e-12  0.0e+00  4.0e-03  4.0e-03
-----

```

ans =

43.5652

Iteration 3 Total error is: 0.029103

```

num. of constraints = 25
dim. of socp var = 26, 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|1.3e+06|5.9e+12| 1.050316e+11  0.000000e+00| 0:0:00| chol 2✓
2
1|0.945|0.857|5.5e-02|1.9e+05|9.8e+11| 9.961331e+10  1.122390e+07| 0:0:00| chol 2✓
2
2|1.000|0.781|6.9e-13|4.1e+04|4.7e+11| 1.402934e+11 -3.097205e+08| 0:0:00| chol 2✓
2
3|0.498|0.567|1.7e-12|1.8e+04|2.9e+11| 1.354265e+11 -5.461567e+08| 0:0:00| chol 2✓
2
4|0.305|0.469|1.3e-11|9.4e+03|2.3e+11| 1.334616e+11 -9.181044e+08| 0:0:00| chol 2✓
2

```

```
5|0.261|0.429|8.9e-11|5.3e+03|1.9e+11| 1.293794e+11 -1.344082e+09| 0:0:00| chol 2✓  
2  
6|0.229|0.476|2.7e-10|2.8e+03|1.6e+11| 1.234076e+11 -1.813120e+09| 0:0:00| chol 2✓  
2  
7|0.303|0.415|1.0e-09|1.6e+03|1.3e+11| 1.131674e+11 -2.181995e+09| 0:0:00| chol 2✓  
* 3  
8|0.250|0.564|6.5e-10|7.1e+02|1.1e+11| 1.037933e+11 -2.208886e+09| 0:0:00| chol 2✓  
2  
9|0.355|0.232|3.3e-09|5.5e+02|1.0e+11| 8.978884e+10 -2.351328e+09| 0:0:00| chol 2✓  
2  
10|0.152|0.632|1.7e-08|2.0e+02|9.0e+10| 8.530221e+10 -1.666264e+09| 0:0:00| chol 2✓  
2  
11|0.162|0.106|2.9e-08|1.8e+02|8.6e+10| 8.051160e+10 -1.814296e+09| 0:0:00| chol 2✓  
2  
12|0.059|0.599|1.9e-07|7.2e+01|8.2e+10| 7.923544e+10 -7.173290e+08| 0:0:00| chol 2✓  
2  
13|0.064|0.129|1.2e-07|6.3e+01|8.1e+10| 7.800031e+10 -1.019653e+09| 0:0:00| chol 2✓  
2  
14|0.063|0.062|3.3e-07|5.9e+01|8.0e+10| 7.668403e+10 -1.170825e+09| 0:0:00| chol 2✓  
* 3  
15|0.046|0.122|4.3e-07|5.2e+01|7.9e+10| 7.605674e+10 -1.189718e+09| 0:0:00| chol 2✓  
* 3  
16|0.070|0.057|1.5e-06|4.9e+01|7.9e+10| 7.514141e+10 -1.332680e+09| 0:0:00| chol 2✓  
3  
17|0.012|0.064|6.8e-07|4.6e+01|7.9e+10| 7.522680e+10 -1.615550e+09| 0:0:00| chol 2✓  
2  
18|0.206|0.357|9.7e-07|3.0e+01|6.7e+10| 6.357943e+10 -1.217856e+09| 0:0:00| chol 2✓  
3  
19|0.017|0.064|1.4e-06|2.8e+01|6.7e+10| 6.321745e+10 -1.475057e+09| 0:0:00| chol 2✓  
2  
20|0.148|0.413|1.2e-06|1.6e+01|6.5e+10| 6.176783e+10 -1.526360e+09| 0:0:00| chol 2✓  
2  
21|0.205|0.306|8.2e-07|1.1e+01|5.6e+10| 5.335650e+10 -1.413794e+09| 0:0:00| chol 2✓  
2  
22|0.023|0.137|1.2e-06|9.7e+00|5.6e+10| 5.276302e+10 -1.846547e+09| 0:0:00| chol 2✓  
2  
23|0.274|0.447|1.9e-06|5.4e+00|5.4e+10| 5.049520e+10 -1.779170e+09| 0:0:00| chol 2✓  
2  
24|0.158|0.539|6.9e-07|2.5e+00|4.9e+10| 4.565384e+10 -1.546579e+09| 0:0:00| chol 2✓  
2  
25|0.108|0.338|2.1e-05|1.6e+00|4.7e+10| 4.347788e+10 -1.979593e+09| 0:0:00| chol 2✓  
2  
26|0.153|0.280|5.6e-05|1.2e+00|4.6e+10| 4.126048e+10 -2.306355e+09| 0:0:00| chol 2✓  
2  
27|0.121|0.519|1.5e-04|5.7e-01|4.3e+10| 3.975149e+10 -1.982547e+09| 0:0:00| chol 2✓  
2  
28|0.101|0.255|1.1e-04|4.2e-01|4.2e+10| 3.818574e+10 -2.443045e+09| 0:0:00| chol 2✓  
2  
29|0.102|0.333|2.2e-04|2.8e-01|4.1e+10| 3.641485e+10 -2.745688e+09| 0:0:00| chol 2✓  
2  
30|0.115|0.433|1.3e-03|1.6e-01|3.9e+10| 3.483268e+10 -1.708991e+09| 0:0:00| chol 2✓  
2  
31|0.360|0.303|1.0e-03|1.1e-01|3.6e+10| 3.040675e+10 -2.667549e+09| 0:0:00| chol 2✓  
2
```



```

32|0.238|0.343|3.8e-03|7.3e-02|3.3e+10| 2.735195e+10 -3.095214e+09| 0:0:00| chol 2✓
2
33|0.166|0.182|7.8e-03|6.0e-02|3.1e+10| 2.580003e+10 -3.297682e+09| 0:0:00| chol 2✓
2
34|0.142|0.208|5.1e-03|4.7e-02|3.0e+10| 2.496244e+10 -3.337288e+09| 0:0:00| chol *
warning: symqmr failed: 2.0
switch to LU factor. lu 3 1
35|0.155|0.140|1.7e-01|4.1e-02|2.9e+10| 2.373707e+10 -3.485332e+09| 0:0:00| lu 3✓
1
36|0.132|0.192|1.6e-01|3.3e-02|2.9e+10| 2.317572e+10 -3.469002e+09| 0:0:00| lu 3✓
1
37|0.170|0.164|2.3e-02|2.8e-02|2.7e+10| 2.179938e+10 -3.563785e+09| 0:0:00| lu 2✓
1
38|0.370|0.289|1.1e-01|2.0e-02|2.5e+10| 1.998063e+10 -3.138264e+09| 0:0:00| lu 2✓
1
39|0.572|0.369|8.1e-01|1.2e-02|1.8e+10| 1.318275e+10 -3.743214e+09| 0:0:00| lu 2✓
1
40|1.000|0.809|1.3e-01|2.4e-03|1.2e+10| 1.033527e+10 -1.539653e+09| 0:0:00| lu 2✓
1
41|0.860|1.000|1.4e-02|1.7e-09|4.9e+09| 3.505237e+09 -1.437547e+09| 0:0:00| lu 2✓
1
42|1.000|1.000|4.8e-03|4.9e-06|2.5e+09| 2.078675e+09 -4.249146e+08| 0:0:00| lu 2✓
1
43|0.891|1.000|3.5e-03|7.4e-06|7.4e+08| 5.166740e+08 -2.170484e+08| 0:0:00| lu 2✓
1
44|1.000|1.000|2.0e-04|1.1e-05|3.4e+08| 2.585455e+08 -6.874148e+07| 0:0:00| lu 2✓
1
45|0.964|1.000|7.7e-06|1.7e-05|1.0e+08| 6.755053e+07 -2.603272e+07| 0:0:00| lu 2✓
1
46|1.000|1.000|1.3e-06|1.5e-06|4.8e+07| 3.688702e+07 -1.094613e+07| 0:0:00| lu 2✓
1
47|1.000|1.000|3.2e-06|2.6e-07|1.6e+07| 1.192486e+07 -4.376628e+06| 0:0:00| lu 2✓
1
48|1.000|1.000|1.2e-06|3.9e-07|6.7e+06| 5.102898e+06 -1.548972e+06| 0:0:00| lu 2✓
1
49|1.000|1.000|4.0e-07|2.3e-07|2.1e+06| 1.494270e+06 -5.556490e+05| 0:0:00| lu 2✓
1
50|1.000|1.000|7.1e-08|7.9e-08|8.9e+05| 6.796946e+05 -2.049211e+05| 0:0:00|
sqlp stop: maximum number of iterations reached
-----
number of iterations = 50
primal objective value = 4.12604806e+10
dual objective value = -2.30635542e+09
gap := trace(XZ) = 4.55e+10
relative gap = 1.04e+00
actual relative gap = 1.00e+00
rel. primal infeas = 5.63e-05
rel. dual infeas = 1.18e+00
norm(X), norm(y), norm(Z) = 4.4e+10, 2.3e+09, 3.3e+09
norm(A), norm(b), norm(C) = 2.1e+08, 1.8e+08, 7.7e+01
Total CPU time (secs) = 0.42
CPU time per iteration = 0.01
termination code = -6
DIMACS errors: 7.2e-05 0.0e+00 1.7e+00 0.0e+00 1.0e+00 1.0e+00

```

-----

ans =

1.0564e+11

Iteration 4 Total error is: 31.8321

num. of constraints = 25  
 dim. of socp var = 26, 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	4.3e+01	6.1e+07	1.077227e+06	0.000000e+00	0:0:00	chol	1✓	
1	0.965	0.879	3.5e-02	5.2e+00	8.7e+06	1.006061e+06	-9.647616e+01	0:0:00	chol	1✓	
1	0.771	0.600	8.0e-03	2.1e+00	5.7e+06	1.310510e+06	-4.370039e+03	0:0:00	chol	1✓	
1	0.450	0.490	4.4e-03	1.1e+00	4.2e+06	1.453673e+06	-9.394541e+03	0:0:00	chol	1✓	
1	0.292	0.454	3.1e-03	5.9e-01	3.2e+06	1.513139e+06	-1.553205e+04	0:0:00	chol	1✓	
1	0.251	0.430	2.3e-03	3.4e-01	2.5e+06	1.511585e+06	-2.273805e+04	0:0:00	chol	1✓	
1	0.225	0.458	1.8e-03	1.9e-01	2.1e+06	1.465185e+06	-3.091618e+04	0:0:00	chol	1✓	
1	0.263	0.412	1.3e-03	1.1e-01	1.8e+06	1.371714e+06	-3.860960e+04	0:0:00	chol	1✓	
1	0.210	0.502	1.0e-03	5.5e-02	1.5e+06	1.284990e+06	-4.544211e+04	0:0:00	chol	1✓	
1	0.319	0.338	7.1e-04	3.6e-02	1.3e+06	1.143051e+06	-5.099388e+04	0:0:00	chol	1✓	
1	0.193	0.728	5.8e-04	1.0e-02	1.2e+06	1.086438e+06	-5.297337e+04	0:0:00	chol	1✓	
1	0.413	0.388	3.4e-04	6.3e-03	1.1e+06	9.636554e+05	-5.820417e+04	0:0:00	chol	2✓	
2	0.303	0.830	2.4e-04	1.1e-03	9.6e+05	8.910483e+05	-6.409219e+04	0:0:00	chol	1✓	
2	0.387	0.222	1.4e-04	9.2e-04	9.3e+05	8.654989e+05	-5.561207e+04	0:0:00	chol	1✓	
2	0.528	1.000	6.8e-05	5.1e-05	8.0e+05	7.341046e+05	-6.896745e+04	0:0:00	chol	1✓	
1	1.000	1.000	7.5e-09	2.5e-05	5.0e+05	4.408287e+05	-5.562280e+04	0:0:00	chol	1✓	
1	1.000	1.000	6.1e-09	5.6e-06	1.9e+05	1.615793e+05	-2.542958e+04	0:0:00	chol	1✓	
1	1.000	1.000	4.0e-09	2.8e-06	8.5e+04	7.048962e+04	-1.418393e+04	0:0:00	chol	1✓	

```

18|1.000|1.000|5.1e-10|1.4e-06|3.8e+04| 3.157646e+04 -6.351851e+03| 0:0:00| chol 1✓
1
19|1.000|1.000|3.6e-10|7.0e-07|1.5e+04| 1.180954e+04 -3.255930e+03| 0:0:00| chol 1✓
1
20|1.000|1.000|1.3e-10|7.1e-08|6.1e+03| 4.893415e+03 -1.248400e+03| 0:0:00| chol 1✓
1
21|1.000|1.000|1.4e-10|7.1e-09|2.2e+03| 1.655599e+03 -5.593761e+02| 0:0:00| chol 1✓
1
22|1.000|1.000|4.7e-12|7.3e-10|8.7e+02| 6.534450e+02 -2.193011e+02| 0:0:00| chol 1✓
1
23|1.000|1.000|8.5e-13|7.1e-11|2.8e+02| 1.765611e+02 -1.063057e+02| 0:0:00| chol 1✓
1
24|1.000|1.000|5.9e-12|8.0e-12|1.2e+02| 5.216759e+01 -6.345961e+01| 0:0:00| chol 1✓
1
25|1.000|1.000|1.2e-11|1.9e-12|3.3e+01|-1.531114e+01 -4.859116e+01| 0:0:00| chol 1✓
1
26|1.000|1.000|1.8e-11|1.8e-12|1.4e+01|-2.990427e+01 -4.419022e+01| 0:0:00| chol 1✓
1
27|1.000|1.000|3.0e-13|2.7e-12|3.4e+00|-3.916372e+01 -4.261007e+01| 0:0:00| chol 1✓
1
28|1.000|1.000|4.4e-12|1.0e-12|1.6e+00|-4.069809e+01 -4.229395e+01| 0:0:00| chol 1✓
1
29|0.963|1.000|4.3e-13|1.0e-12|2.8e-01|-4.188377e+01 -4.216397e+01| 0:0:00| chol 1✓
1
30|1.000|1.000|1.0e-11|1.0e-12|1.0e-01|-4.205128e+01 -4.215505e+01| 0:0:00| chol 1✓
1
31|1.000|0.995|1.1e-11|1.5e-12|1.3e-02|-4.213826e+01 -4.215138e+01| 0:0:00| chol 2✓
2
32|1.000|0.820|1.3e-12|2.5e-12|1.2e-03|-4.215002e+01 -4.215121e+01| 0:0:00| chol 2✓
2
33|0.964|0.968|1.3e-12|1.1e-12|8.4e-05|-4.215109e+01 -4.215118e+01| 0:0:00| chol 2✓
2
34|0.991|0.990|7.7e-13|1.0e-12|2.4e-06|-4.215117e+01 -4.215117e+01| 0:0:00|
stop: max(relative gap, infeasibilities) < 1.00e-07

```

```

-----
number of iterations    = 34
primal objective value = -4.21511721e+01
dual   objective value = -4.21511745e+01
gap := trace(XZ)        = 2.38e-06
relative gap           = 2.79e-08
actual relative gap     = 2.79e-08
rel. primal infeas      = 7.69e-13
rel. dual   infeas      = 1.01e-12
norm(X), norm(y), norm(Z) = 2.7e+01, 6.1e+01, 2.5e+01
norm(A), norm(b), norm(C) = 7.3e+03, 2.5e+03, 7.7e+01
Total CPU time (secs)   = 0.28
CPU time per iteration = 0.01
termination code        = 0
DIMACS errors: 1.3e-12  0.0e+00  1.4e-12  0.0e+00  2.8e-08  2.8e-08
-----

```

ans =

42.1512

Iteration 5 Total error is: 0.029084

num. of constraints = 25  
 dim. of socp var = 26, 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	4.4e+02	1.7e+09	3.073631e+07	0.000000e+00	0:0:00	chol	1	✓
1	1	0.929	0.838	7.1e-02	7.1e+01	3.2e+08	2.958215e+07	-8.578668e+02	0:0:00	chol	1
1	2	1.000	0.764	3.0e-09	1.7e+01	1.6e+08	4.255376e+07	-1.078284e+05	0:0:00	chol	1
1	3	0.465	0.556	3.6e-09	7.5e+00	1.0e+08	4.326719e+07	-2.040400e+05	0:0:00	chol	1
1	4	0.300	0.433	3.7e-09	4.3e+00	8.0e+07	4.346679e+07	-3.383956e+05	0:0:00	chol	1
1	5	0.213	0.425	4.9e-09	2.4e+00	6.5e+07	4.283718e+07	-5.215710e+05	0:0:00	chol	1
1	6	0.220	0.404	4.9e-09	1.5e+00	5.6e+07	4.126092e+07	-7.376830e+05	0:0:00	chol	1
1	7	0.197	0.457	4.7e-09	7.9e-01	4.8e+07	3.920439e+07	-9.928727e+05	0:0:00	chol	1
1	8	0.277	0.385	6.9e-09	4.9e-01	4.2e+07	3.585661e+07	-1.212913e+06	0:0:00	chol	1
2	9	0.200	0.570	8.2e-09	2.1e-01	3.7e+07	3.331340e+07	-1.317511e+06	0:0:00	chol	2
1	10	0.369	0.226	1.1e-08	1.6e-01	3.3e+07	2.871602e+07	-1.429059e+06	0:0:00	chol	1
2	11	0.144	0.729	5.6e-08	4.4e-02	2.9e+07	2.729507e+07	-1.047249e+06	0:0:00	chol	1
1	12	0.171	0.127	5.9e-08	3.8e-02	2.8e+07	2.563039e+07	-1.149227e+06	0:0:00	chol	2
2	13	0.080	0.256	4.1e-08	2.8e-02	2.7e+07	2.518652e+07	-1.140676e+06	0:0:00	chol	2
2	14	0.017	0.215	1.8e-07	2.2e-02	2.7e+07	2.517909e+07	-8.691333e+05	0:0:00	chol	1
2	15	0.166	0.474	1.5e-07	1.2e-02	2.4e+07	2.291910e+07	-9.122776e+05	0:0:00	chol	2
2	16	0.110	0.241	1.3e-06	8.9e-03	2.4e+07	2.216022e+07	-1.097857e+06	0:0:00	chol	1
2	17	0.133	1.000	7.6e-07	2.8e-06	2.3e+07	2.167782e+07	-1.256079e+06	0:0:00	chol	2
2	18	0.768	1.000	3.2e-06	1.4e-06	2.1e+07	1.869323e+07	-1.965753e+06	0:0:00	chol	2
2	19	0.757	1.000	8.8e-07	7.6e-07	1.7e+07	1.533116e+07	-1.846964e+06	0:0:00	chol	2
2	20	1.000	1.000	2.0e-07	1.5e-07	1.2e+07	1.046016e+07	-1.346139e+06	0:0:00	chol	1

```

1
21|0.986|1.000|8.7e-07|4.7e-08|3.2e+06| 2.771710e+06 -4.702301e+05| 0:0:00| chol 1✓
1
22|1.000|1.000|2.7e-07|6.0e-08|1.6e+06| 1.412565e+06 -2.366398e+05| 0:0:00| chol 1✓
1
23|1.000|1.000|2.9e-08|5.3e-08|5.1e+05| 4.150869e+05 -9.822746e+04| 0:0:00| chol 1✓
1
24|1.000|1.000|2.7e-09|5.9e-09|2.5e+05| 2.039881e+05 -4.322204e+04| 0:0:00| chol 1✓
1
25|1.000|1.000|1.7e-09|5.4e-10|9.3e+04| 7.213153e+04 -2.066695e+04| 0:0:00| chol 1✓
1
26|1.000|1.000|1.5e-09|3.5e-10|3.9e+04| 3.069893e+04 -7.887268e+03| 0:0:00| chol 1✓
1
27|1.000|1.000|2.2e-10|3.0e-10|1.4e+04| 1.036521e+04 -3.458642e+03| 0:0:00| chol 1✓
1
28|1.000|1.000|3.5e-11|4.4e-11|5.5e+03| 4.263297e+03 -1.257850e+03| 0:0:00| chol 1✓
1
29|1.000|1.000|1.1e-11|7.1e-12|1.8e+03| 1.294293e+03 -5.053737e+02| 0:0:00| chol 1✓
1
30|1.000|1.000|1.6e-11|2.1e-12|7.4e+02| 5.292806e+02 -2.078392e+02| 0:0:00| chol 1✓
1
31|1.000|1.000|5.4e-12|3.1e-12|2.3e+02| 1.237532e+02 -1.022138e+02| 0:0:00| chol 1✓
1
32|1.000|1.000|7.8e-12|1.1e-12|9.5e+01| 2.991063e+01 -6.504133e+01| 0:0:00| chol 1✓
1
33|1.000|1.000|2.1e-12|1.6e-12|2.8e+01|-2.373751e+01 -5.149781e+01| 0:0:00| chol 1✓
1
34|1.000|1.000|5.9e-13|1.0e-12|1.2e+01|-3.512137e+01 -4.706426e+01| 0:0:00| chol 1✓
1
35|1.000|1.000|5.4e-13|1.0e-12|3.3e+00|-4.206793e+01 -4.540503e+01| 0:0:00| chol 1✓
1
36|1.000|1.000|1.7e-12|1.0e-12|1.5e+00|-4.343703e+01 -4.489681e+01| 0:0:00| chol 1✓
1
37|1.000|1.000|1.1e-12|1.0e-12|3.8e-01|-4.431927e+01 -4.469521e+01| 0:0:00| chol 1✓
1
38|1.000|1.000|5.4e-13|1.0e-12|1.6e-01|-4.447729e+01 -4.464187e+01| 0:0:00| chol 1✓
1
39|0.991|1.000|7.7e-13|1.0e-12|3.7e-02|-4.458113e+01 -4.461813e+01| 0:0:00| chol 1✓
1
40|1.000|1.000|6.6e-12|1.0e-12|1.6e-02|-4.459826e+01 -4.461388e+01| 0:0:00| chol 1✓
1
41|1.000|1.000|4.0e-12|1.3e-12|4.6e-03|-4.460758e+01 -4.461222e+01| 0:0:00| chol 2✓
2
42|0.822|1.000|3.3e-13|1.0e-12|1.9e-03|-4.461003e+01 -4.461191e+01| 0:0:00| chol 2✓
1
43|0.934|0.901|4.5e-11|1.1e-12|4.6e-04|-4.461137e+01 -4.461183e+01| 0:0:00| chol 2✓
2
44|0.690|0.905|1.5e-11|1.6e-12|1.9e-04|-4.461162e+01 -4.461181e+01| 0:0:00| chol 2✓
2
45|0.930|0.941|1.9e-13|2.3e-12|3.1e-05|-4.461178e+01 -4.461181e+01| 0:0:00| chol 2✓
2
46|0.962|0.987|2.1e-11|1.0e-12|2.9e-06|-4.461181e+01 -4.461181e+01| 0:0:00|
stop: max(relative gap, infeasibilities) < 1.00e-07
-----

```

```

number of iterations    = 46
primal objective value = -4.46118057e+01
dual   objective value = -4.46118086e+01
gap := trace(XZ)       = 2.92e-06
relative gap           = 3.23e-08
actual relative gap    = 3.22e-08
rel. primal infeas     = 2.05e-11
rel. dual   infeas     = 1.03e-12
norm(X), norm(y), norm(Z) = 5.6e+02, 5.9e+01, 2.3e+01
norm(A), norm(b), norm(C) = 8.5e+04, 5.2e+04, 7.7e+01
Total CPU time (secs)   = 0.23
CPU time per iteration = 0.01
termination code        = 0
DIMACS errors: 2.6e-11  0.0e+00  1.5e-12  0.0e+00  3.2e-08  3.2e-08
-----

```

ans =

44.6118

Iteration 6 Total error is: 0.029095

```

num. of constraints = 25
dim. of socp var   = 26,   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|2.7e+04|6.4e+09| 1.138240e+08  0.000000e+00| 0:0:00| chol 1✓
1
1|1.000|0.945|3.8e-07|1.5e+03|5.3e+08| 1.052985e+08 -5.132751e+05| 0:0:00| chol 1✓
1
2|0.474|0.697|2.0e-07|4.5e+02|2.8e+08| 1.045739e+08 -9.037848e+05| 0:0:00| chol 1✓
1
3|0.323|0.338|1.4e-07|3.0e+02|2.3e+08| 1.018972e+08 -1.477500e+06| 0:0:00| chol 1✓
1
4|0.198|0.479|1.1e-07|1.6e+02|1.8e+08| 1.004985e+08 -2.147749e+06| 0:0:00| chol 2✓
2
5|0.287|0.293|7.8e-08|1.1e+02|1.5e+08| 9.550328e+07 -2.753784e+06| 0:0:00| chol 2✓
2
6|0.124|0.650|6.8e-08|3.8e+01|1.2e+08| 9.253150e+07 -2.974036e+06| 0:0:00| chol 1✓
1
7|0.231|0.198|5.2e-08|3.1e+01|1.1e+08| 8.651910e+07 -3.560891e+06| 0:0:00| chol 2✓
2
8|0.109|0.650|4.7e-08|1.1e+01|9.2e+07| 8.142826e+07 -1.327553e+06| 0:0:00| chol 2✓
2
9|0.175|0.273|3.9e-08|7.8e+00|8.7e+07| 7.611919e+07 -2.650248e+06| 0:0:00| chol 2✓
2
10|0.153|0.144|3.5e-08|6.7e+00|8.3e+07| 7.149684e+07 -3.398604e+06| 0:0:00| chol 2✓
2

```

```
11|0.101|0.263|3.7e-08|5.0e+00|8.0e+07| 6.917415e+07 -3.611258e+06| 0:0:00| chol 2✓  
2  
12|0.089|0.199|5.9e-08|4.0e+00|7.8e+07| 6.681036e+07 -4.037865e+06| 0:0:00| chol 2✓  
2  
13|0.144|0.187|5.4e-08|3.2e+00|7.6e+07| 6.397083e+07 -4.127778e+06| 0:0:00| chol 2✓  
2  
14|0.150|0.067|1.9e-07|3.0e+00|7.5e+07| 6.050453e+07 -4.949014e+06| 0:0:00| chol 2✓  
2  
15|0.073|0.292|1.6e-07|2.1e+00|7.3e+07| 6.079879e+07 -5.774730e+06| 0:0:00| chol 2✓  
2  
16|0.140|0.595|1.2e-07|8.6e-01|6.2e+07| 5.465757e+07 -3.354683e+06| 0:0:00| chol 2✓  
2  
17|0.307|0.493|6.5e-08|4.4e-01|5.0e+07| 4.201022e+07 -3.714227e+06| 0:0:00| chol 2✓  
2  
18|0.207|0.233|2.4e-07|3.4e-01|4.6e+07| 3.706419e+07 -4.113948e+06| 0:0:00| chol 2✓  
2  
19|0.111|0.155|4.7e-08|2.8e-01|4.4e+07| 3.546541e+07 -4.324174e+06| 0:0:00| chol 2✓  
2  
20|0.081|0.108|2.8e-06|2.5e-01|4.4e+07| 3.448708e+07 -4.524031e+06| 0:0:00| chol 2✓  
2  
21|0.063|0.066|1.8e-05|2.4e-01|4.3e+07| 3.374793e+07 -4.714329e+06| 0:0:00| chol 2✓  
2  
22|0.053|0.066|2.8e-05|2.2e-01|4.3e+07| 3.323506e+07 -4.868836e+06| 0:0:00| chol 2✓  
2  
23|0.043|0.062|3.1e-05|2.1e-01|4.3e+07| 3.278216e+07 -4.988442e+06| 0:0:00| chol *  
warning: symqmr failed: 2.0  
switch to LU factor. lu 2 1  
24|0.048|0.091|3.0e-05|1.9e-01|4.2e+07| 3.240995e+07 -4.985139e+06| 0:0:00| lu 2✓  
1  
25|0.040|0.098|3.9e-05|1.7e-01|4.2e+07| 3.185071e+07 -4.803410e+06| 0:0:00| lu 2✓  
1  
26|0.092|0.142|3.7e-05|1.5e-01|4.1e+07| 3.105743e+07 -4.717070e+06| 0:0:00| lu 2✓  
1  
27|0.077|0.153|3.4e-05|1.2e-01|3.9e+07| 2.994700e+07 -4.727110e+06| 0:0:00| lu 2✓  
1  
28|0.079|0.189|2.6e-05|1.0e-01|3.8e+07| 2.911651e+07 -4.659955e+06| 0:0:00| lu 2✓  
1  
29|0.094|0.063|4.6e-05|9.4e-02|3.7e+07| 2.807464e+07 -4.833270e+06| 0:0:00| lu 2✓  
1  
30|0.063|0.040|1.1e-04|9.0e-02|3.7e+07| 2.756344e+07 -4.941192e+06| 0:0:00| lu * 3✓  
1  
31|0.073|0.035|3.1e-04|8.7e-02|3.6e+07| 2.705584e+07 -5.049637e+06| 0:0:00| lu * 3✓  
1  
32|0.088|0.025|6.4e-04|8.5e-02|3.6e+07| 2.634578e+07 -5.184626e+06| 0:0:00| lu 2✓  
1  
33|0.062|0.047|4.0e-04|8.1e-02|3.6e+07| 2.603669e+07 -5.028128e+06| 0:0:00| lu 2✓  
1  
34|0.209|0.131|3.1e-04|7.0e-02|3.2e+07| 2.254380e+07 -4.996697e+06| 0:0:00| lu 2✓  
1  
35|0.422|0.712|2.9e-04|2.0e-02|2.3e+07| 1.850852e+07 -2.613257e+06| 0:0:00| lu 2✓  
1  
36|1.000|0.351|1.4e-04|1.3e-02|1.5e+07| 1.038060e+07 -3.461182e+06| 0:0:00| lu 2✓  
1  
37|1.000|1.000|3.4e-05|9.3e-06|7.7e+06| 5.934337e+06 -1.717029e+06| 0:0:00| lu 2✓
```

```

1
38|1.000|1.000|9.2e-06|6.8e-06|5.1e+06| 3.903871e+06 -1.132084e+06| 0:0:00| 1u 2✓
1
39|1.000|1.000|2.5e-06|1.8e-06|1.3e+06| 9.407162e+05 -3.572877e+05| 0:0:00| 1u 2✓
1
40|1.000|1.000|6.1e-08|4.9e-07|6.2e+05| 4.767812e+05 -1.416172e+05| 0:0:00| 1u 1✓
1
41|1.000|1.000|3.0e-08|1.2e-08|1.8e+05| 1.321809e+05 -4.960470e+04| 0:0:00| 1u 1✓
1
42|1.000|1.000|1.1e-08|6.0e-09|7.9e+04| 6.083468e+04 -1.820126e+04| 0:0:00| 1u 1✓
1
43|1.000|1.000|1.7e-09|2.1e-09|2.4e+04| 1.718668e+04 -6.512630e+03| 0:0:00| 1u 1✓
1
44|1.000|1.000|2.3e-09|3.4e-10|1.0e+04| 7.796998e+03 -2.363679e+03| 0:0:00| 1u 1✓
1
45|1.000|1.000|1.2e-10|4.5e-10|3.1e+03| 2.183704e+03 -8.723599e+02| 0:0:00| 1u 1✓
1
46|1.000|1.000|5.9e-11|2.3e-11|1.3e+03| 9.692245e+02 -3.389349e+02| 0:0:00| 1u 1✓
1
47|1.000|1.000|1.6e-11|1.2e-11|3.9e+02| 2.411525e+02 -1.493803e+02| 0:0:00| 1u 1✓
1
48|1.000|1.000|4.3e-12|3.2e-12|1.7e+02| 8.501320e+01 -8.256480e+01| 0:0:00| 1u 1✓
1
49|1.000|1.000|2.7e-12|1.0e-12|4.9e+01|-1.018754e+01 -5.871103e+01| 0:0:00| 1u 1✓
1
50|1.000|1.000|1.5e-12|1.0e-12|2.1e+01|-2.972886e+01 -5.073602e+01| 0:0:00|
  sqlp stop: maximum number of iterations reached
-----
number of iterations      = 50
primal objective value = -2.97288557e+01
dual   objective value = -5.07360249e+01
gap := trace(XZ)         = 2.10e+01
relative gap              = 2.58e-01
actual relative gap       = 2.58e-01
rel. primal infeas        = 1.50e-12
rel. dual   infeas        = 1.00e-12
norm(X), norm(y), norm(Z) = 1.9e+05, 6.2e+01, 2.6e+01
norm(A), norm(b), norm(C) = 4.7e+06, 2.2e+05, 7.7e+01
Total CPU time (secs)     = 0.35
CPU time per iteration    = 0.01
termination code          = -6
DIMACS errors: 2.1e-12  0.0e+00  1.4e-12  0.0e+00  2.6e-01  2.6e-01
-----

ans =

    49.7431

Iteration    7    Total error is: 0.029105

num. of constraints = 25
dim. of socp var   = 26,   num. of socp blk   = 1
dim. of linear var = 800
*****

```



\*\*\*\*\*

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	7.7e+04	8.0e+10	1.411337e+09	0.000000e+00	0:0:00	chol	2	✓	
2												
1	0.971	0.832	2.9e-02	1.3e+04	1.5e+10	1.331173e+09	-1.142760e+06	0:0:00	chol	1	✓	
1												
2	1.000	0.638	1.1e-10	4.7e+03	9.8e+09	1.943937e+09	-9.315894e+06	0:0:00	chol	2	✓	
1												
3	0.382	0.527	2.1e-10	2.2e+03	6.6e+09	2.146072e+09	-1.918508e+07	0:0:00	chol	2	✓	
2												
4	0.297	0.395	3.5e-10	1.3e+03	5.3e+09	2.254517e+09	-3.005616e+07	0:0:00	chol	2	✓	
2												
5	0.176	0.455	3.5e-10	7.3e+02	4.0e+09	2.268682e+09	-4.678913e+07	0:0:00	chol	2	✓	
2												
6	0.261	0.343	2.8e-10	4.8e+02	3.5e+09	2.203934e+09	-6.404227e+07	0:0:00	chol	2	✓	
2												
7	0.130	0.556	3.2e-10	2.1e+02	2.8e+09	2.129811e+09	-8.864459e+07	0:0:00	chol	2	✓	
2												
8	0.348	0.241	8.4e-10	1.6e+02	2.5e+09	1.922475e+09	-1.067976e+08	0:0:00	chol	2	✓	
2												
9	0.080	0.792	1.9e-09	3.4e+01	2.0e+09	1.840856e+09	-8.048007e+07	0:0:00	chol	2	✓	
2												
10	0.118	0.232	2.7e-09	2.6e+01	2.0e+09	1.766499e+09	-1.086223e+08	0:0:00	chol	2	✓	
2												
11	0.127	0.083	1.1e-08	2.4e+01	1.9e+09	1.689144e+09	-1.175414e+08	0:0:00	chol	2	✓	
2												
12	0.036	0.165	6.1e-08	2.0e+01	1.8e+09	1.626158e+09	-4.685961e+07	0:0:00	chol	2	✓	
2												
13	0.086	0.362	3.1e-08	1.3e+01	1.8e+09	1.568772e+09	-8.310530e+07	0:0:00	chol	2	✓	
2												
14	0.107	0.144	1.1e-07	1.1e+01	1.7e+09	1.495076e+09	-1.048820e+08	0:0:00	chol	2	✓	
2												
15	0.079	0.094	4.9e-07	9.8e+00	1.7e+09	1.452818e+09	-1.153889e+08	0:0:00	chol	2	✓	
2												
16	0.056	0.157	6.6e-07	8.3e+00	1.7e+09	1.425259e+09	-1.226031e+08	0:0:00	chol	2	✓	
2												
17	0.059	0.147	7.8e-07	7.0e+00	1.7e+09	1.387072e+09	-1.265683e+08	0:0:00	chol	2	✓	
2												
18	0.055	0.110	6.8e-07	6.3e+00	1.6e+09	1.354541e+09	-1.317289e+08	0:0:00	chol	2	✓	
2												
19	0.043	0.173	4.9e-07	5.2e+00	1.6e+09	1.332501e+09	-1.328615e+08	0:0:00	chol	2	✓	
2												
20	0.065	0.068	2.7e-06	4								

```
24|0.042|0.080|7.1e-06|2.8e+00|1.5e+09| 1.214820e+09 -1.325671e+08| 0:0:00| chol 2✓  
* 3  
25|0.028|0.095|6.9e-06|2.5e+00|1.5e+09| 1.199250e+09 -1.326700e+08| 0:0:00| chol 2✓  
* 3  
26|0.045|0.101|3.2e-06|2.2e+00|1.5e+09| 1.179022e+09 -1.371921e+08| 0:0:00| chol 2✓  
2  
27|0.043|0.040|2.7e-05|2.2e+00|1.5e+09| 1.159372e+09 -1.435157e+08| 0:0:00| chol *  
warning: symqmr failed: 2.0  
switch to LU factor. lu * 3 1  
28|0.030|0.028|2.3e-05|2.1e+00|1.5e+09| 1.147219e+09 -1.474628e+08| 0:0:00| lu * 3✓  
1  
29|0.024|0.028|2.1e-06|2.0e+00|1.4e+09| 1.138040e+09 -1.509020e+08| 0:0:00| lu 3✓  
1  
30|0.020|0.033|2.0e-05|2.0e+00|1.4e+09| 1.130310e+09 -1.538250e+08| 0:0:00| lu * 4✓  
1  
31|0.018|0.049|1.2e-06|1.9e+00|1.4e+09| 1.123144e+09 -1.553738e+08| 0:0:00| lu * 3✓  
1  
32|0.021|0.086|1.2e-05|1.7e+00|1.4e+09| 1.114870e+09 -1.533504e+08| 0:0:00| lu 3✓  
1  
33|0.026|0.094|1.8e-05|1.5e+00|1.4e+09| 1.104139e+09 -1.499631e+08| 0:0:00| lu * 3✓  
1  
34|0.026|0.078|5.2e-05|1.4e+00|1.4e+09| 1.093652e+09 -1.480039e+08| 0:0:00| lu * 3✓  
1  
35|0.023|0.042|7.8e-05|1.4e+00|1.4e+09| 1.083920e+09 -1.490702e+08| 0:0:00| lu * 4✓  
1  
36|0.017|0.043|6.9e-05|1.3e+00|1.4e+09| 1.077305e+09 -1.501663e+08| 0:0:00| lu * 4✓  
1  
37|0.018|0.037|1.6e-04|1.3e+00|1.4e+09| 1.069989e+09 -1.511179e+08| 0:0:00| lu * 4✓  
1  
38|0.016|0.050|1.7e-04|1.2e+00|1.4e+09| 1.064181e+09 -1.506488e+08| 0:0:00| lu * 3✓  
1  
39|0.018|0.054|1.9e-04|1.1e+00|1.4e+09| 1.056579e+09 -1.497733e+08| 0:0:00| lu * 4✓  
1  
40|0.021|0.038|1.8e-04|1.1e+00|1.4e+09| 1.049134e+09 -1.503015e+08| 0:0:00| lu * 4✓  
1  
41|0.016|0.027|5.1e-05|1.1e+00|1.4e+09| 1.042572e+09 -1.521420e+08| 0:0:00| lu * 4✓  
1  
42|0.018|0.025|6.2e-05|1.0e+00|1.3e+09| 1.036451e+09 -1.534765e+08| 0:0:00| lu * 4✓  
1  
43|0.013|0.024|1.2e-04|1.0e+00|1.3e+09| 1.031266e+09 -1.543716e+08| 0:0:00| lu * 4✓  
1  
44|0.025|0.027|2.7e-04|9.8e-01|1.3e+09| 1.023396e+09 -1.557744e+08| 0:0:00| lu * 3✓  
1  
45|0.021|0.048|3.2e-04|9.4e-01|1.3e+09| 1.014103e+09 -1.543988e+08| 0:0:00| lu * 3✓  
1  
46|0.038|0.066|3.1e-04|8.7e-01|1.3e+09| 1.000316e+09 -1.566267e+08| 0:0:00| lu * 3✓  
1  
47|0.025|0.059|3.0e-04|8.2e-01|1.3e+09| 9.899953e+08 -1.598010e+08| 0:0:00| lu 3✓  
1  
48|0.025|0.026|8.3e-05|8.0e-01|1.3e+09| 9.809956e+08 -1.625613e+08| 0:0:00| lu * 4✓  
1  
49|0.018|0.018|1.6e-04|7.9e-01|1.3e+09| 9.751185e+08 -1.642388e+08| 0:0:00| lu * 4✓  
1  
50|0.014|0.016|9.4e-04|7.7e-01|1.3e+09| 9.706616e+08 -1.657563e+08| 0:0:00|
```

sqlp stop: maximum number of iterations reached

```
-----  
number of iterations    = 50  
primal objective value =  1.06418123e+09  
dual   objective value = -1.50648802e+08  
gap := trace(XZ)       =  1.37e+09  
relative gap           =  1.13e+00  
actual relative gap    =  1.00e+00  
rel. primal infeas     =  1.71e-04  
rel. dual   infeas     =  1.20e+00  
norm(X), norm(y), norm(Z) = 5.9e+08, 1.5e+08, 2.1e+08  
norm(A), norm(b), norm(C) = 1.5e+07, 2.3e+06, 7.7e+01  
Total CPU time (secs)   = 0.40  
CPU time per iteration = 0.01  
termination code        = -6  
DIMACS errors: 2.1e-04  0.0e+00  1.7e+00  0.0e+00  1.0e+00  1.1e+00  
-----
```

ans =

7.0629e+09

Iteration 8 Total error is: 7.3606

The total representation error of the testing signals is: 0.0077524

>>