

```
>> demo_Polynomial_Dictionary_Learning_Uber
Starting to train the dictionary
solving the quadratic problem with YALMIP...
```

```
num. of constraints = 33
dim. of socp var = 34, num. of socp blk = 1
dim. of linear var = 174
*****
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|3.4e+00|5.0e+05| 1.265258e+04  0.000000e+00| 0:0:00| chol 1✓
1
1|0.904|0.907|9.7e-02|3.7e-01|6.3e+04| 1.206824e+04  3.870777e+01| 0:0:00| chol 1✓
1
2|0.799|0.803|1.9e-02|8.9e-02|2.6e+04| 1.234122e+04 -1.065056e+01| 0:0:00| chol 1✓
1
3|1.000|1.000|1.1e-07|1.0e-02|8.7e+03| 7.199338e+03 -6.981110e+01| 0:0:00| chol 1✓
1
4|0.972|0.985|6.5e-08|2.0e-03|4.1e+02| 3.245437e+02 -4.936922e+01| 0:0:00| chol 1✓
1
5|0.381|1.000|1.6e-07|1.8e-04|3.2e+02| 2.971640e+02 -2.480150e+01| 0:0:00| chol 1✓
1
6|1.000|0.857|6.7e-09|4.2e-05|1.8e+02| 1.708533e+02 -1.199098e+01| 0:0:00| chol 1✓
1
7|1.000|1.000|1.4e-09|1.8e-06|7.9e+01| 6.875945e+01 -1.022471e+01| 0:0:00| chol 1✓
1
8|1.000|1.000|2.5e-10|1.8e-07|2.8e+01| 2.087143e+01 -7.167087e+00| 0:0:00| chol 1✓
1
9|1.000|1.000|8.2e-11|1.8e-08|7.1e+00| 3.236173e-01 -6.727003e+00| 0:0:00| chol 1✓
1
10|1.000|1.000|1.1e-14|1.9e-09|2.3e+00|-4.164620e+00 -6.446209e+00| 0:0:00| chol 1✓
1
11|0.892|0.805|1.1e-13|5.1e-10|3.5e-01|-6.005723e+00 -6.359232e+00| 0:0:00| chol 1✓
1
12|0.790|0.717|1.9e-14|1.6e-10|1.9e-01|-6.171725e+00 -6.357447e+00| 0:0:00| chol 1✓
1
13|1.000|0.985|1.4e-12|5.2e-12|3.2e-02|-6.314743e+00 -6.346328e+00| 0:0:00| chol 1✓
1
14|0.982|0.981|1.2e-12|1.3e-12|5.9e-04|-6.345212e+00 -6.345797e+00| 0:0:00| chol 1✓
1
15|0.988|0.989|1.2e-12|1.0e-12|6.8e-06|-6.345779e+00 -6.345786e+00| 0:0:00| chol 1✓
1
16|0.995|0.995|3.2e-11|1.0e-12|1.4e-07|-6.345786e+00 -6.345786e+00| 0:0:00|
stop: max(relative gap, infeasibilities) < 1.00e-07
-----
number of iterations = 16
primal objective value = -6.34578592e+00
dual objective value = -6.34578606e+00
gap := trace(XZ) = 1.39e-07
relative gap = 1.02e-08
```

ans =

6.3458

```
num. of constraints = 33
dim. of socp var = 34,    num. of socp blk = 1
dim. of linear var = 174
```

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 3.7e+00 1.3e+06	3.556583e+04	0.000000e+00	0:0:00	chol	1	✓
1							
1	0.882 0.882 1.2e-01 5.2e-01 2.1e+05	3.187080e+04	1.098317e+02	0:0:00	chol	1	✓
1							
1	0.746 0.743 3.0e-02 1.7e-01 1.0e+05	3.320383e+04	2.094448e+01	0:0:00	chol	1	✓
1							
1	0.945 0.940 1.6e-03 3.6e-02 3.9e+04	2.483453e+04	-1.782171e+02	0:0:00	chol	1	✓
1							
1	0.972 1.000 4.5e-05 1.5e-02 2.8e+03	1.728035e+03	-1.743932e+02	0:0:00	chol	1	✓
1							
1	0.680 0.598 1.4e-05 8.4e-03 2.0e+03	1.493427e+03	-8.330534e+01	0:0:00	chol	1	✓
1							
1	1.000 1.000 2.6e-08 1.3e-03 1.1e+03	9.784402e+02	-3.612164e+01	0:0:00	chol	1	✓
1							
1	0.862 1.000 4.0e-09 3.8e-04 5.0e+02	4.579458e+02	-3.613793e+01	0:0:00	chol	1	✓
1							
1	1.000 0.972 3.9e-10 4.8e-05 2.4e+02	2.312621e+02	-8.945532e+00	0:0:00	chol	1	✓
1							
1	1.000 1.000 6.6e-11 3.8e-06 6.9e+01	6.177057e+01	-7.160004e+00	0:0:00	chol	1	✓
1							
1	1.000 1.000 9.4e-14 3.8e-07 3.1e+01	2.749827e+01	-3.871738e+00	0:0:00	chol	1	✓
1							
1	0.936 0.974 3.3e-14 4.7e-08 2.9e+00	-4.309489e-01	-3.289434e+00	0:0:00	chol	1	✓
1							
1	0.865 1.000 1.1e-13 3.8e-09 6.9e-01	-2.552950e+00	-3.245571e+00	0:0:00	chol	1	✓
1							
1	1.000 0.921 5.4e-13 6.6e-10 2.0e-01	-3.018876e+00	-3.221846e+00	0:0:00	chol	1	✓
1							

```

14|0.687|0.762|5.0e-11|1.9e-10|8.8e-02|-3.136520e+00 -3.224293e+00| 0:0:00| chol 1✓
1
15|0.984|0.942|4.8e-12|1.6e-11|2.6e-03|-3.217145e+00 -3.219737e+00| 0:0:00| chol 1✓
1
16|0.975|0.983|2.6e-12|1.6e-12|6.8e-05|-3.219553e+00 -3.219621e+00| 0:0:00| chol 1✓
1
17|1.000|1.000|1.3e-11|1.0e-12|7.7e-06|-3.219611e+00 -3.219619e+00| 0:0:00| chol 1✓
1
18|1.000|1.000|4.4e-11|1.5e-12|2.4e-07|-3.219619e+00 -3.219619e+00| 0:0:00|
stop: max(relative gap, infeasibilities) < 1.00e-07

```

```

-----
number of iterations    = 18
primal objective value = -3.21961879e+00
dual  objective value = -3.21961903e+00
gap := trace(XZ)        = 2.37e-07
relative gap           = 3.18e-08
actual relative gap    = 3.18e-08
rel. primal infeas     = 4.42e-11
rel. dual  infeas     = 1.50e-12
norm(X), norm(y), norm(Z) = 2.8e+01, 7.8e+01, 5.6e+01
norm(A), norm(b), norm(C) = 8.9e+01, 5.2e+02, 5.8e+01
Total CPU time (secs)   = 0.15
CPU time per iteration = 0.01
termination code        = 0
DIMACS errors: 4.4e-11  0.0e+00  2.1e-12  0.0e+00  3.2e-08  3.2e-08
-----

```

ans =

3.2196

Iteration 2 Total error is: 0.024601

```

num. of constraints = 33
dim. of socp var   = 34,   num. of socp blk = 1
dim. of linear var = 174

```

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|3.7e+00|1.4e+06| 3.619762e+04  0.000000e+00| 0:0:00| chol 1✓
1
1|0.882|0.881|1.2e-01|5.3e-01|2.1e+05| 3.242170e+04  1.129567e+02| 0:0:00| chol 1✓
1
2|0.745|0.740|3.0e-02|1.7e-01|1.1e+05| 3.383463e+04  2.202498e+01| 0:0:00| chol 1✓
1
3|0.933|0.927|2.0e-03|3.8e-02|4.1e+04| 2.561187e+04 -1.814858e+02| 0:0:00| chol 1✓
1
4|0.985|1.000|3.0e-05|1.5e-02|3.1e+03| 1.892392e+03 -1.868200e+02| 0:0:00| chol 1✓
1
5|0.657|0.605|1.0e-05|8.3e-03|2.1e+03| 1.581828e+03 -8.824324e+01| 0:0:00| chol 1✓

```

```

1
6|1.000|1.000|2.5e-08|1.3e-03|1.1e+03| 1.038829e+03 -4.132350e+01| 0:0:00| chol 1✓
1
7|1.000|1.000|1.5e-09|3.8e-04|4.2e+02| 3.911693e+02 -2.670130e+01| 0:0:00| chol 1✓
1
8|1.000|1.000|3.2e-10|3.8e-05|2.0e+02| 1.922927e+02 -8.247836e+00| 0:0:00| chol 1✓
1
9|1.000|1.000|5.9e-11|3.8e-06|5.1e+01| 4.533737e+01 -5.536782e+00| 0:0:00| chol 1✓
1
10|1.000|1.000|2.5e-14|3.8e-07|1.9e+01| 1.532019e+01 -3.530603e+00| 0:0:00| chol 1✓
1
11|0.937|0.966|1.6e-14|5.0e-08|1.6e+00|-1.583165e+00 -3.211667e+00| 0:0:00| chol 1✓
1
12|0.872|0.997|1.1e-13|4.0e-09|4.1e-01|-2.770795e+00 -3.179288e+00| 0:0:00| chol 1✓
1
13|1.000|0.621|1.0e-12|1.7e-09|1.3e-01|-3.035024e+00 -3.164268e+00| 0:0:00| chol 1✓
1
14|0.930|0.976|6.5e-11|8.1e-11|3.7e-02|-3.127138e+00 -3.164384e+00| 0:0:00| chol 1✓
1
15|0.984|0.979|1.2e-12|7.0e-12|6.2e-04|-3.162289e+00 -3.162913e+00| 0:0:00| chol 1✓
1
16|0.965|0.984|1.7e-11|1.1e-12|2.2e-05|-3.162867e+00 -3.162889e+00| 0:0:00| chol 2✓
2
17|1.000|1.000|4.9e-12|1.5e-12|2.5e-06|-3.162886e+00 -3.162889e+00| 0:0:00| chol 1✓
1
18|1.000|1.000|3.3e-11|1.0e-12|3.2e-08|-3.162889e+00 -3.162889e+00| 0:0:00|
stop: max(relative gap, infeasibilities) < 1.00e-07

```

```

-----
number of iterations    = 18
primal objective value = -3.16288860e+00
dual   objective value = -3.16288863e+00
gap := trace(XZ)       = 3.17e-08
relative gap           = 4.32e-09
actual relative gap    = 4.29e-09
rel. primal infeas     = 3.27e-11
rel. dual   infeas     = 1.00e-12
norm(X), norm(y), norm(Z) = 2.8e+01, 7.8e+01, 5.6e+01
norm(A), norm(b), norm(C) = 9.1e+01, 5.3e+02, 5.8e+01
Total CPU time (secs)   = 0.14
CPU time per iteration = 0.01
termination code        = 0
DIMACS errors: 3.3e-11  0.0e+00  1.4e-12  0.0e+00  4.3e-09  4.3e-09
-----

```

ans =

3.1629

Iteration 3 Total error is: 0.023809

```

num. of constraints = 33
dim. of socp var   = 34,   num. of socp blk = 1
dim. of linear var = 174

```

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	3.7e+00	1.4e+06	3.678192e+04	0.000000e+00	0:0:00	chol	1	✓
1	1	0.882	0.881	1.2e-01	5.3e-01	2.2e+05	3.293061e+04	1.152464e+02	0:0:00	chol	1
1	2	0.743	0.738	3.0e-02	1.8e-01	1.1e+05	3.438750e+04	2.276900e+01	0:0:00	chol	1
1	3	0.925	0.918	2.3e-03	4.0e-02	4.3e+04	2.623280e+04	-1.843396e+02	0:0:00	chol	1
1	4	0.998	1.000	4.1e-06	1.5e-02	3.4e+03	2.060642e+03	-1.970400e+02	0:0:00	chol	1
1	5	0.650	0.614	1.4e-06	8.3e-03	2.2e+03	1.666831e+03	-9.232845e+01	0:0:00	chol	1
1	6	1.000	1.000	2.4e-08	1.3e-03	1.2e+03	1.093649e+03	-4.564885e+01	0:0:00	chol	1
1	7	1.000	1.000	1.7e-09	3.8e-04	4.5e+02	4.184455e+02	-2.359707e+01	0:0:00	chol	1
1	8	1.000	1.000	3.6e-10	3.8e-05	1.9e+02	1.856739e+02	-8.682331e+00	0:0:00	chol	1
1	9	1.000	1.000	5.8e-11	3.8e-06	4.8e+01	4.311177e+01	-5.294559e+00	0:0:00	chol	1
1	10	1.000	1.000	2.8e-14	3.8e-07	1.7e+01	1.364082e+01	-3.488384e+00	0:0:00	chol	1
1	11	0.938	0.962	2.1e-14	5.2e-08	1.5e+00	-1.724899e+00	-3.190960e+00	0:0:00	chol	1
1	12	0.856	0.986	7.4e-14	4.5e-09	3.8e-01	-2.781069e+00	-3.159922e+00	0:0:00	chol	1
1	13	1.000	0.605	4.1e-13	2.0e-09	1.3e-01	-3.021327e+00	-3.146336e+00	0:0:00	chol	1
1	14	1.000	1.000	5.8e-11	3.9e-11	3.8e-02	-3.108458e+00	-3.146248e+00	0:0:00	chol	1
1	15	0.984	0.981	1.5e-12	6.0e-12	6.0e-04	-3.144428e+00	-3.145025e+00	0:0:00	chol	1
2	16	0.960	0.985	5.8e-12	1.1e-12	2.3e-05	-3.144982e+00	-3.145006e+00	0:0:00	chol	2
2	17	1.000	1.000	6.9e-12	1.2e-12	3.1e-06	-3.145002e+00	-3.145005e+00	0:0:00	chol	2
2	18	0.997	0.999	8.1e-12	1.4e-12	4.1e-08	-3.145005e+00	-3.145005e+00	0:0:00		

stop: max(relative gap, infeasibilities) < 1.00e-07

number of iterations = 18
 primal objective value = -3.14500529e+00
 dual objective value = -3.14500533e+00
 gap := trace(XZ) = 4.07e-08
 relative gap = 5.59e-09
 actual relative gap = 5.64e-09
 rel. primal infeas = 8.10e-12
 rel. dual infeas = 1.38e-12
 norm(X), norm(y), norm(Z) = 2.8e+01, 7.8e+01, 5.6e+01

```

norm(A), norm(b), norm(C) = 9.2e+01, 5.3e+02, 5.8e+01
Total CPU time (secs) = 0.14
CPU time per iteration = 0.01
termination code      = 0
DIMACS errors: 8.1e-12  0.0e+00  1.9e-12  0.0e+00  5.6e-09  5.6e-09
-----

```

```
ans =
```

```
3.1450
```

```
Iteration    4    Total error is: 0.023635
```

```

num. of constraints = 33
dim. of socp var   = 34,    num. of socp blk = 1
dim. of linear var = 174
*****

```

```
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	3.7e+00	1.4e+06	3.736937e+04	0.000000e+00	0:0:00	chol	1	✓
1											
1	0.882	0.881	1.2e-01	5.3e-01	2.2e+05	3.344227e+04	1.174728e+02	0:0:00	chol	1	✓
1											
2	0.742	0.736	3.0e-02	1.8e-01	1.1e+05	3.493942e+04	2.349639e+01	0:0:00	chol	1	✓
1											
3	0.917	0.910	2.5e-03	4.1e-02	4.4e+04	2.684082e+04	-1.871608e+02	0:0:00	chol	1	✓
1											
4	1.000	1.000	3.7e-08	1.5e-02	4.1e+03	2.600860e+03	-2.076878e+02	0:0:00	chol	1	✓
1											
5	0.665	0.641	5.6e-08	8.0e-03	2.5e+03	1.903496e+03	-1.015008e+02	0:0:00	chol	1	✓
1											
6	1.000	1.000	2.8e-08	1.3e-03	1.4e+03	1.247649e+03	-5.352311e+01	0:0:00	chol	1	✓
1											
7	1.000	1.000	1.9e-09	3.8e-04	5.2e+02	4.888852e+02	-2.404594e+01	0:0:00	chol	1	✓
1											
8	1.000	1.000	4.2e-10	3.8e-05	2.2e+02	2.108968e+02	-1.147427e+01	0:0:00	chol	1	✓
1											
9	1.000	1.000	6.4e-11	3.8e-06	5.8e+01	5.299850e+01	-5.006640e+00	0:0:00	chol	1	✓
1											
10	1.000	1.000	5.5e-14	3.8e-07	1.5e+01	1.131579e+01	-3.448625e+00	0:0:00	chol	1	✓
1											
11	0.936	0.958	4.4e-14	5.3e-08	1.7e+00	-1.508867e+00	-3.173336e+00	0:0:00	chol	1	✓
1											
12	0.892	0.987	1.4e-14	4.5e-09	4.5e-01	-2.692131e+00	-3.144010e+00	0:0:00	chol	1	✓
1											
13	1.000	0.652	2.3e-13	1.8e-09	1.4e-01	-2.985528e+00	-3.129219e+00	0:0:00	chol	1	✓
1											
14	0.998	0.988	8.0e-11	6.1e-11	4.9e-02	-3.080845e+00	-3.129519e+00	0:0:00	chol	1	✓
1											
15	0.982	0.977	7.5e-13	6.7e-12	9.2e-04	-3.126845e+00	-3.127761e+00	0:0:00	chol	1	✓

```

1
16|0.943|0.980|4.7e-11|1.5e-12|5.6e-05|-3.127677e+00 -3.127733e+00| 0:0:00| chol 2✓
2
17|1.000|1.000|3.8e-12|1.5e-12|5.1e-06|-3.127728e+00 -3.127733e+00| 0:0:00| chol 2✓
2
18|0.997|0.999|4.3e-13|1.0e-12|6.4e-08|-3.127733e+00 -3.127733e+00| 0:0:00|
  stop: max(relative gap, infeasibilities) < 1.00e-07
-----
number of iterations    = 18
primal objective value = -3.12773250e+00
dual   objective value = -3.12773257e+00
gap := trace(XZ)       = 6.37e-08
relative gap           = 8.78e-09
actual relative gap    = 8.81e-09
rel. primal infeas     = 4.32e-13
rel. dual   infeas     = 1.00e-12
norm(X), norm(y), norm(Z) = 2.8e+01, 7.8e+01, 5.6e+01
norm(A), norm(b), norm(C) = 9.4e+01, 5.4e+02, 5.8e+01
Total CPU time (secs)   = 0.13
CPU time per iteration = 0.01
termination code        = 0
DIMACS errors: 4.3e-13  0.0e+00  1.4e-12  0.0e+00  8.8e-09  8.8e-09
-----

ans =

    3.1277

Iteration    5    Total error is: 0.023516

num. of constraints = 33
dim. of socp var   = 34,   num. of socp blk   = 1
dim. of linear var = 174
*****
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|3.7e+00|1.4e+06| 3.796285e+04  0.000000e+00| 0:0:00| chol 1✓
1
1|0.882|0.880|1.2e-01|5.3e-01|2.2e+05| 3.395919e+04  1.197140e+02| 0:0:00| chol 1✓
1
2|0.741|0.734|3.1e-02|1.8e-01|1.1e+05| 3.549649e+04  2.422860e+01| 0:0:00| chol 1✓
1
3|0.909|0.902|2.8e-03|4.2e-02|4.6e+04| 2.745026e+04 -1.900051e+02| 0:0:00| chol 1✓
1
4|1.000|1.000|3.6e-08|1.5e-02|5.1e+03| 3.302822e+03 -2.191090e+02| 0:0:00| chol 1✓
1
5|0.700|0.681|4.8e-08|7.6e-03|2.8e+03| 2.126961e+03 -1.109163e+02| 0:0:00| chol 1✓
1
6|1.000|1.000|3.3e-08|1.3e-03|1.5e+03| 1.395201e+03 -6.082946e+01| 0:0:00| chol 1✓
1

```

```

7|1.000|1.000|2.2e-09|3.8e-04|5.9e+02| 5.597226e+02 -2.526626e+01| 0:0:00| chol 1✓
1
8|1.000|1.000|4.6e-10|1.1e-04|2.5e+02| 2.375811e+02 -1.548971e+01| 0:0:00| chol 1✓
1
9|1.000|1.000|6.6e-11|1.1e-05|8.5e+01| 7.942039e+01 -5.292675e+00| 0:0:00| chol 1✓
1
10|0.986|1.000|9.5e-13|1.1e-06|1.6e+01| 1.250458e+01 -3.659870e+00| 0:0:00| chol 1✓
1
11|1.000|1.000|3.5e-14|1.1e-07|5.5e+00| 2.278526e+00 -3.209452e+00| 0:0:00| chol 1✓
1
12|0.940|0.949|2.0e-14|1.7e-08|4.0e-01|-2.735438e+00 -3.137136e+00| 0:0:00| chol 1✓
1
13|1.000|0.650|5.3e-13|6.6e-09|1.7e-01|-2.938507e+00 -3.113183e+00| 0:0:00| chol 1✓
1
14|0.783|0.803|3.8e-11|1.4e-09|6.5e-02|-3.048650e+00 -3.113994e+00| 0:0:00| chol 1✓
1
15|0.995|0.960|7.6e-12|6.8e-11|3.6e-03|-3.107177e+00 -3.110731e+00| 0:0:00| chol 1✓
1
16|0.986|0.988|6.1e-13|3.5e-12|4.8e-05|-3.110568e+00 -3.110617e+00| 0:0:00| chol 1✓
1
17|1.000|0.995|8.0e-11|1.0e-12|2.0e-06|-3.110613e+00 -3.110615e+00| 0:0:00| chol 2✓
2
18|1.000|1.000|8.8e-13|1.5e-12|9.7e-08|-3.110615e+00 -3.110615e+00| 0:0:00|
stop: max(relative gap, infeasibilities) < 1.00e-07

```

```

-----
number of iterations    = 18
primal objective value = -3.11061506e+00
dual   objective value = -3.11061516e+00
gap := trace(XZ)       = 9.71e-08
relative gap           = 1.34e-08
actual relative gap    = 1.34e-08
rel. primal infeas     = 8.76e-13
rel. dual   infeas     = 1.50e-12
norm(X), norm(y), norm(Z) = 2.8e+01, 7.8e+01, 5.6e+01
norm(A), norm(b), norm(C) = 9.5e+01, 5.5e+02, 5.8e+01
Total CPU time (secs)   = 0.13
CPU time per iteration = 0.01
termination code        = 0
DIMACS errors: 8.8e-13  0.0e+00  2.1e-12  0.0e+00  1.3e-08  1.3e-08
-----

```

ans =

3.1106

Iteration 6 Total error is: 0.023405

```

num. of constraints = 33
dim. of socp var = 34, num. of socp blk = 1
dim. of linear var = 174
*****
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	3.8e+00	1.4e+06	3.856252e+04	0.000000e+00	0:0:00	chol	1✓	
1	0.882	0.880	1.2e-01	5.4e-01	2.3e+05	3.448151e+04	1.219776e+02	0:0:00	chol	1✓	
2	0.740	0.733	3.1e-02	1.8e-01	1.1e+05	3.605922e+04	2.496769e+01	0:0:00	chol	1✓	
3	0.902	0.894	3.0e-03	4.4e-02	4.7e+04	2.806257e+04	-1.928781e+02	0:0:00	chol	1✓	
4	1.000	1.000	3.5e-08	1.5e-02	6.2e+03	4.116541e+03	-2.313001e+02	0:0:00	chol	1✓	
5	0.700	0.687	4.3e-08	7.6e-03	2.8e+03	2.162644e+03	-1.232052e+02	0:0:00	chol	1✓	
6	1.000	1.000	4.3e-08	1.3e-03	1.6e+03	1.478020e+03	-6.537992e+01	0:0:00	chol	1✓	
7	1.000	1.000	2.3e-09	3.8e-04	6.9e+02	6.593169e+02	-2.624733e+01	0:0:00	chol	1✓	
8	1.000	1.000	3.7e-10	1.1e-04	2.8e+02	2.559501e+02	-2.140555e+01	0:0:00	chol	1✓	
9	1.000	1.000	7.7e-11	1.1e-05	1.2e+02	1.099828e+02	-5.559883e+00	0:0:00	chol	1✓	
10	0.933	1.000	5.2e-12	1.1e-06	2.4e+01	2.014194e+01	-4.057024e+00	0:0:00	chol	1✓	
11	1.000	1.000	2.0e-15	1.1e-07	9.4e+00	6.181035e+00	-3.237638e+00	0:0:00	chol	1✓	
12	0.939	0.968	1.1e-14	1.5e-08	7.0e-01	-2.428870e+00	-3.126428e+00	0:0:00	chol	1✓	
13	0.885	0.962	2.7e-13	1.7e-09	2.2e-01	-2.877912e+00	-3.096074e+00	0:0:00	chol	1✓	
14	0.631	0.703	4.9e-14	5.8e-10	1.0e-01	-2.996090e+00	-3.099431e+00	0:0:00	chol	1✓	
15	1.000	0.939	2.2e-12	4.7e-11	7.2e-03	-3.086639e+00	-3.093883e+00	0:0:00	chol	1✓	
16	0.975	0.984	2.8e-12	2.9e-12	1.8e-04	-3.093479e+00	-3.093661e+00	0:0:00	chol	1✓	
17	1.000	1.000	6.6e-11	1.0e-12	1.6e-05	-3.093641e+00	-3.093657e+00	0:0:00	chol	1✓	
18	1.000	1.000	4.5e-11	1.5e-12	5.9e-07	-3.093657e+00	-3.093657e+00	0:0:00			

stop: max(relative gap, infeasibilities) < 1.00e-07

number of iterations = 18
 primal objective value = -3.09365669e+00
 dual objective value = -3.09365728e+00
 gap := trace(XZ) = 5.91e-07
 relative gap = 8.22e-08
 actual relative gap = 8.22e-08
 rel. primal infeas = 4.51e-11
 rel. dual infeas = 1.50e-12
 norm(X), norm(y), norm(Z) = 2.8e+01, 7.8e+01, 5.6e+01
 norm(A), norm(b), norm(C) = 9.6e+01, 5.6e+02, 5.8e+01
 Total CPU time (secs) = 0.14
 CPU time per iteration = 0.01

```

termination code      = 0
DIMACS errors: 4.5e-11 0.0e+00 2.1e-12 0.0e+00 8.2e-08 8.2e-08
-----

```

```
ans =
```

```
3.0937
```

```
Iteration 7 Total error is: 0.023297
```

```

num. of constraints = 33
dim. of socp var = 34, num. of socp blk = 1
dim. of linear var = 174

```

```
*****
```

```
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|3.8e+00|1.5e+06| 3.916892e+04 0.000000e+00| 0:0:00| chol 1✓
1
1|0.882|0.880|1.2e-01|5.4e-01|2.3e+05| 3.500969e+04 1.242731e+02| 0:0:00| chol 1✓
1
2|0.739|0.731|3.1e-02|1.8e-01|1.2e+05| 3.662847e+04 2.571601e+01| 0:0:00| chol 1✓
1
3|0.895|0.886|3.2e-03|4.5e-02|4.9e+04| 2.867951e+04 -1.957873e+02| 0:0:00| chol 1✓
1
4|1.000|1.000|3.4e-08|1.5e-02|7.4e+03| 5.032602e+03 -2.442450e+02| 0:0:00| chol 1✓
1
5|0.703|0.693|3.9e-08|7.5e-03|2.8e+03| 2.170375e+03 -1.355247e+02| 0:0:00| chol 1✓
1
6|0.886|1.000|5.2e-08|1.3e-03|1.7e+03| 1.606010e+03 -7.013752e+01| 0:0:00| chol 1✓
1
7|1.000|1.000|2.4e-09|3.8e-04|8.4e+02| 7.956261e+02 -3.096963e+01| 0:0:00| chol 1✓
1
8|1.000|1.000|3.9e-10|1.1e-04|3.3e+02| 3.059614e+02 -2.265490e+01| 0:0:00| chol 1✓
1
9|1.000|1.000|8.3e-11|1.1e-05|1.3e+02| 1.241069e+02 -6.097907e+00| 0:0:00| chol 1✓
1
10|0.957|1.000|3.6e-12|1.1e-06|2.9e+01| 2.483404e+01 -4.366892e+00| 0:0:00| chol 1✓
1
11|1.000|1.000|3.4e-14|1.1e-07|1.2e+01| 8.288241e+00 -3.285056e+00| 0:0:00| chol 1✓
1
12|0.943|0.961|3.5e-14|1.6e-08|8.2e-01|-2.296104e+00 -3.112570e+00| 0:0:00| chol 1✓
1
13|0.781|1.000|1.5e-13|1.2e-09|2.5e-01|-2.828609e+00 -3.081711e+00| 0:0:00| chol 1✓
1
14|0.821|1.000|1.0e-12|1.2e-10|9.2e-02|-2.988370e+00 -3.079963e+00| 0:0:00| chol 1✓
1
15|0.933|0.960|1.9e-11|1.7e-11|8.7e-03|-3.068294e+00 -3.076966e+00| 0:0:00| chol 1✓
1
16|0.996|0.990|2.9e-11|2.8e-12|2.6e-04|-3.076610e+00 -3.076865e+00| 0:0:00| chol 1✓
1

```

```

17|0.988|0.989|1.7e-12|2.3e-12|3.0e-06|-3.076860e+00 -3.076863e+00| 0:0:00| chol 2✓
2
18|1.000|1.000|1.5e-11|1.0e-12|6.8e-08|-3.076862e+00 -3.076863e+00| 0:0:00|
  stop: max(relative gap, infeasibilities) < 1.00e-07

```

```

-----
number of iterations    = 18
primal objective value = -3.07686245e+00
dual   objective value = -3.07686251e+00
gap := trace(XZ)       = 6.83e-08
relative gap           = 9.55e-09
actual relative gap    = 9.31e-09
rel. primal infeas     = 1.49e-11
rel. dual   infeas     = 1.00e-12
norm(X), norm(y), norm(Z) = 2.8e+01, 7.8e+01, 5.6e+01
norm(A), norm(b), norm(C) = 9.8e+01, 5.7e+02, 5.8e+01
Total CPU time (secs)   = 0.14
CPU time per iteration = 0.01
termination code        = 0
DIMACS errors: 1.5e-11  0.0e+00  1.4e-12  0.0e+00  9.3e-09  9.5e-09
-----

```

```
ans =
```

```
3.0769
```

```
Iteration    8    Total error is: 0.023189
```

```
The total representation error of the testing signals is: 0.11932
```

```
>>
```