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

 num. of constraints = 85
 dim. of socp   var  = 86,   num. of socp blk  =  1
 dim. of linear var  = 1000
*******************************************************************
   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|1.4e+02|2.3e+07| 3.149908e+04  0.000000e+00| 0:0:00| chol  1  1
 1|1.000|0.990|2.5e-07|1.6e+00|2.8e+05| 3.287095e+04 -1.101786e+02| 0:0:00| chol  1  1
 2|1.000|0.973|2.5e-07|7.8e-02|3.3e+04| 2.383526e+04 -2.371179e+01| 0:0:00| chol  1  1
 3|1.000|1.000|3.5e-08|1.1e-02|1.7e+03| 1.587025e+03 -2.379119e+01| 0:0:00| chol  1  1
 4|0.928|0.927|3.0e-08|1.8e-03|1.3e+02| 1.009917e+02 -2.360215e+01| 0:0:00| chol  1  1
 5|0.263|0.967|2.2e-08|1.7e-04|1.2e+02| 9.502862e+01 -2.292073e+01| 0:0:00| chol  1  1
 6|0.593|1.000|9.1e-09|1.1e-05|1.0e+02| 8.024784e+01 -2.336348e+01| 0:0:00| chol  1  1
 7|1.000|1.000|2.7e-11|1.1e-06|6.8e+01| 4.520785e+01 -2.255963e+01| 0:0:00| chol  1  1
 8|1.000|1.000|5.2e-12|1.1e-07|2.3e+01| 8.146919e-01 -2.177404e+01| 0:0:00| chol  1  1
 9|1.000|0.999|4.1e-12|1.1e-08|7.8e+00|-1.316497e+01 -2.095469e+01| 0:0:00| chol  1  1
10|1.000|1.000|3.4e-12|1.1e-09|3.6e+00|-1.715753e+01 -2.072881e+01| 0:0:00| chol  1  1
11|1.000|0.988|2.3e-12|1.2e-10|4.3e-01|-2.006024e+01 -2.049197e+01| 0:0:00| chol  1  1
12|0.935|0.956|2.3e-11|1.7e-11|4.0e-02|-2.041392e+01 -2.045427e+01| 0:0:00| chol  2  2
13|0.959|1.000|1.9e-12|2.6e-12|8.9e-03|-2.044300e+01 -2.045192e+01| 0:0:00| chol  2  2
14|1.000|1.000|2.0e-11|1.1e-12|1.6e-03|-2.044975e+01 -2.045131e+01| 0:0:00| chol  2  2
15|0.960|0.960|1.8e-11|1.5e-12|6.4e-05|-2.045109e+01 -2.045116e+01| 0:0:00| chol  5  5
16|1.000|1.000|2.8e-10|2.2e-12|2.3e-05|-2.045113e+01 -2.045115e+01| 0:0:00| chol  5  5
17|0.996|1.000|2.4e-10|3.4e-12|1.2e-06|-2.045115e+01 -2.045115e+01| 0:0:00|
  stop: max(relative gap, infeasibilities) < 1.00e-07
-------------------------------------------------------------------
 number of iterations   = 17
 primal objective value = -2.04511511e+01
 dual   objective value = -2.04511522e+01
 gap := trace(XZ)       = 1.15e-06
 relative gap           = 2.75e-08
 actual relative gap    = 2.77e-08
 rel. primal infeas     = 2.37e-10
 rel. dual   infeas     = 3.38e-12
 norm(X), norm(y), norm(Z) = 1.1e+01, 6.5e+01, 2.8e+01
 norm(A), norm(b), norm(C) = 1.4e+03, 9.6e+02, 7.8e+01
 Total CPU time (secs)  = 0.20
 CPU time per iteration = 0.01
 termination code       =  0
 DIMACS errors: 6.2e-10  0.0e+00  4.9e-12  0.0e+00  2.8e-08  2.8e-08
-------------------------------------------------------------------

ans =

   20.4512
```

```
 num. of constraints = 85
 dim. of socp   var  = 86,   num. of socp blk  =  1
 dim. of linear var  = 1000
*******************************************************************
   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|1.4e+02|7.0e+07| 9.979054e+04  0.000000e+00| 0:0:00| chol  1  1
 1|1.000|0.991|1.5e-07|1.6e+00|8.5e+05| 1.011748e+05 -1.904831e+02| 0:0:00| chol  1  1
 2|1.000|0.958|1.1e-07|1.6e-01|1.2e+05| 6.783097e+04 -8.404618e+00| 0:0:00| chol  1  1
 3|0.928|1.000|2.6e-08|3.0e-02|2.4e+04| 2.077047e+04 -1.957489e+01| 0:0:00| chol  1  1
 4|1.000|1.000|6.6e-09|9.1e-03|4.6e+03| 4.322235e+03 -1.427570e+01| 0:0:00| chol  1  1
 5|0.927|0.930|1.2e-09|1.5e-03|3.3e+02| 3.188426e+02 -1.023464e+01| 0:0:00| chol  1  1
 6|0.370|0.703|1.1e-09|5.0e-04|3.0e+02| 2.963076e+02 -7.192935e+00| 0:0:00| chol  1  1
 7|0.569|1.000|4.7e-10|9.1e-06|2.6e+02| 2.509913e+02 -8.490271e+00| 0:0:00| chol  1  1
 8|1.000|1.000|1.0e-11|9.1e-07|1.6e+02| 1.529801e+02 -5.981388e+00| 0:0:00| chol  1  1
 9|1.000|1.000|2.8e-12|9.1e-08|6.2e+01| 5.660454e+01 -5.673199e+00| 0:0:00| chol  1  1
10|1.000|1.000|4.6e-12|9.1e-09|2.6e+01| 2.015986e+01 -5.359407e+00| 0:0:00| chol  1  1
11|0.889|0.930|2.0e-12|1.5e-09|5.6e+00| 3.862331e-01 -5.216479e+00| 0:0:00| chol  1  1
12|1.000|1.000|2.5e-10|9.2e-11|3.3e+00|-1.861952e+00 -5.164621e+00| 0:0:00| chol  1  1
13|1.000|1.000|1.2e-11|1.1e-11|1.1e+00|-4.016706e+00 -5.143868e+00| 0:0:00| chol  2  2
14|1.000|1.000|5.9e-13|3.2e-12|3.8e-01|-4.752375e+00 -5.133178e+00| 0:0:00| chol  2  2
15|1.000|0.984|6.8e-13|1.1e-12|6.8e-02|-5.061243e+00 -5.129626e+00| 0:0:00| chol  2  2
16|0.973|0.979|1.9e-11|1.0e-12|2.3e-02|-5.106733e+00 -5.129363e+00| 0:0:00| chol  2  2
17|0.983|0.957|4.3e-12|1.5e-12|9.6e-04|-5.128201e+00 -5.129160e+00| 0:0:00| chol  3  3
18|1.000|0.999|2.5e-11|1.0e-12|7.8e-05|-5.129074e+00 -5.129152e+00| 0:0:00| chol  7  6
19|1.000|1.000|9.2e-11|1.5e-12|3.1e-06|-5.129149e+00 -5.129152e+00| 0:0:00| chol
  linsysolve: Schur complement matrix not positive definite
  switch to LU factor. lu 30  30
20|0.963|0.830|4.0e-10|2.5e-12|1.9e-07|-5.129152e+00 -5.129152e+00| 0:0:00|
  stop: max(relative gap, infeasibilities) < 1.00e-07
-------------------------------------------------------------------
 number of iterations   = 20
 primal objective value = -5.12915154e+00
 dual   objective value = -5.12915188e+00
 gap := trace(XZ)       = 1.93e-07
 relative gap           = 1.71e-08
 actual relative gap    = 3.02e-08
 rel. primal infeas     = 3.95e-10
 rel. dual   infeas     = 2.51e-12
 norm(X), norm(y), norm(Z) = 3.3e+01, 9.7e+01, 6.9e+01
 norm(A), norm(b), norm(C) = 1.8e+03, 2.2e+03, 7.8e+01
 Total CPU time (secs)  = 0.25
 CPU time per iteration = 0.01
 termination code       =  0
 DIMACS errors: 8.4e-10  0.0e+00  3.7e-12  0.0e+00  3.0e-08  1.7e-08
-------------------------------------------------------------------

ans =

    5.1292
```

```
Iteration   2   Total error is: 0.0092341

 num. of constraints = 85
 dim. of socp   var  = 86,   num. of socp blk  =  1
 dim. of linear var  = 1000
*******************************************************************
   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|1.4e+02|9.5e+07| 1.359841e+05  0.000000e+00| 0:0:00| chol  1  1
 1|1.000|0.991|1.9e-07|1.6e+00|1.1e+06| 1.374069e+05 -2.316511e+02| 0:0:00| chol  1  1
 2|1.000|0.961|1.3e-07|1.6e-01|1.6e+05| 9.178547e+04 -9.340282e+00| 0:0:00| chol  1  1
 3|0.964|1.000|2.6e-08|5.1e-02|2.4e+04| 1.852852e+04 -1.849867e+01| 0:0:00| chol  1  1
 4|1.000|1.000|9.4e-09|1.5e-02|3.1e+03| 2.831093e+03 -1.343489e+01| 0:0:00| chol  1  1
 5|0.797|0.803|2.5e-09|4.2e-03|6.5e+02| 6.287808e+02 -9.007858e+00| 0:0:00| chol  1  1
 6|0.419|1.000|1.6e-09|1.5e-04|5.7e+02| 5.663066e+02 -6.003562e+00| 0:0:00| chol  1  1
 7|1.000|1.000|4.8e-11|1.5e-05|4.1e+02| 4.054508e+02 -6.731112e+00| 0:0:00| chol  1  1
 8|1.000|1.000|7.2e-12|1.5e-06|1.9e+02| 1.836642e+02 -4.589284e+00| 0:0:00| chol  1  1
 9|1.000|1.000|2.6e-12|1.5e-07|6.7e+01| 6.367161e+01 -3.661969e+00| 0:0:00| chol  1  1
10|1.000|1.000|1.1e-13|1.5e-08|2.3e+01| 1.960774e+01 -3.424207e+00| 0:0:00| chol  1  1
11|0.981|0.968|1.5e-12|2.0e-09|4.2e+00| 9.084977e-01 -3.268412e+00| 0:0:00| chol  2  2
12|0.973|0.962|2.5e-12|2.2e-10|2.4e+00|-8.202587e-01 -3.219922e+00| 0:0:00| chol  2  2
13|1.000|1.000|2.5e-12|1.6e-11|1.3e+00|-1.900081e+00 -3.215575e+00| 0:0:00| chol  2  2
14|1.000|1.000|2.0e-12|2.5e-12|2.6e-01|-2.948344e+00 -3.205454e+00| 0:0:00| chol  2  2
15|1.000|1.000|2.4e-12|1.2e-12|1.1e-01|-3.092913e+00 -3.204710e+00| 0:0:00| chol  2  2
16|0.974|0.976|3.2e-12|1.0e-12|7.7e-03|-3.196417e+00 -3.204143e+00| 0:0:00| chol  3  3
17|0.982|0.984|1.3e-11|1.0e-12|1.4e-04|-3.203974e+00 -3.204118e+00| 0:0:00| chol  4  4
18|0.994|0.994|2.4e-11|1.5e-12|2.8e-06|-3.204114e+00 -3.204117e+00| 0:0:00| chol
  linsysolve: Schur complement matrix not positive definite
  switch to LU factor. lu 30   1
19|0.995|0.873|2.1e-10|2.4e-12|4.6e-08|-3.204117e+00 -3.204117e+00| 0:0:00|
  stop: max(relative gap, infeasibilities) < 1.00e-07
-------------------------------------------------------------------
 number of iterations   = 19
 primal objective value = -3.20411712e+00
 dual   objective value = -3.20411722e+00
 gap := trace(XZ)       = 4.56e-08
 relative gap           = 6.15e-09
 actual relative gap    = 1.24e-08
 rel. primal infeas     = 2.14e-10
 rel. dual   infeas     = 2.44e-12
 norm(X), norm(y), norm(Z) = 3.5e+01, 9.9e+01, 7.1e+01
 norm(A), norm(b), norm(C) = 1.9e+03, 2.2e+03, 7.8e+01
 Total CPU time (secs)  = 0.21
 CPU time per iteration = 0.01
 termination code       =  0
 DIMACS errors: 4.7e-10  0.0e+00  3.6e-12  0.0e+00  1.2e-08  6.1e-09
-------------------------------------------------------------------

ans =

    3.2041
```

```
Iteration   3   Total error is: 0.0072933

 num. of constraints = 85
 dim. of socp   var  = 86,   num. of socp blk  =  1
 dim. of linear var  = 1000
*******************************************************************
   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|1.4e+02|1.0e+08| 1.473472e+05  0.000000e+00| 0:0:00| chol  1  1
 1|1.000|0.991|1.5e-07|1.6e+00|1.2e+06| 1.487553e+05 -2.417877e+02| 0:0:00| chol  1  1
 2|1.000|0.960|1.0e-07|1.6e-01|1.8e+05| 9.938656e+04 -9.616226e+00| 0:0:00| chol  1  1
 3|0.950|1.000|2.3e-08|5.1e-02|2.8e+04| 2.199849e+04 -2.031680e+01| 0:0:00| chol  1  1
 4|1.000|1.000|8.9e-09|1.5e-02|4.1e+03| 3.721779e+03 -1.456204e+01| 0:0:00| chol  1  1
 5|0.844|0.850|2.1e-09|3.6e-03|6.4e+02| 6.165599e+02 -9.592720e+00| 0:0:00| chol  1  1
 6|0.360|0.957|1.5e-09|3.0e-04|5.7e+02| 5.677503e+02 -5.501760e+00| 0:0:00| chol  1  1
 7|0.631|1.000|5.5e-10|1.5e-05|4.9e+02| 4.770441e+02 -8.212555e+00| 0:0:00| chol  1  1
 8|1.000|1.000|1.5e-11|1.5e-06|3.2e+02| 3.181960e+02 -4.867486e+00| 0:0:00| chol  1  1
 9|0.992|1.000|1.9e-12|1.5e-07|1.2e+02| 1.134669e+02 -3.207235e+00| 0:0:00| chol  1  1
10|1.000|1.000|1.8e-13|1.5e-08|5.7e+01| 5.418845e+01 -2.574283e+00| 0:0:00| chol  1  1
11|1.000|1.000|2.2e-13|1.5e-09|1.1e+01| 8.543524e+00 -2.358314e+00| 0:0:00| chol  1  1
12|1.000|1.000|1.3e-12|1.5e-10|4.1e+00| 1.852699e+00 -2.259227e+00| 0:0:00| chol  1  2
13|0.811|1.000|2.5e-13|1.6e-11|2.0e+00|-2.386015e-01 -2.233905e+00| 0:0:00| chol  2  2
14|1.000|1.000|5.9e-13|2.5e-12|1.1e+00|-1.142641e+00 -2.219168e+00| 0:0:00| chol  2  1
15|1.000|1.000|3.1e-11|1.2e-12|3.6e-01|-1.850991e+00 -2.212838e+00| 0:0:00| chol  2  2
16|1.000|1.000|7.3e-13|1.5e-12|1.5e-01|-2.064005e+00 -2.209327e+00| 0:0:00| chol  1  1
17|0.980|1.000|2.5e-11|1.0e-12|2.2e-02|-2.185775e+00 -2.208239e+00| 0:0:00| chol  3  3
18|1.000|1.000|1.2e-11|1.5e-12|4.4e-03|-2.203683e+00 -2.208125e+00| 0:0:00| chol  3  3
19|0.968|0.971|1.5e-11|2.3e-12|1.5e-04|-2.207954e+00 -2.208108e+00| 0:0:00| chol  5  5
20|0.998|0.995|1.2e-10|3.1e-12|9.3e-06|-2.208098e+00 -2.208107e+00| 0:0:00| chol
  linsysolve: Schur complement matrix not positive definite
  switch to LU factor. lu 30 ^25
21|1.000|0.854|6.9e-10|5.0e-12|2.9e-07|-2.208107e+00 -2.208107e+00| 0:0:00|
  stop: max(relative gap, infeasibilities) < 1.00e-07
-------------------------------------------------------------------
 number of iterations   = 21
 primal objective value = -2.20810675e+00
 dual   objective value = -2.20810705e+00
 gap := trace(XZ)       = 2.90e-07
 relative gap           = 5.35e-08
 actual relative gap    = 5.39e-08
 rel. primal infeas     = 6.88e-10
 rel. dual   infeas     = 5.04e-12
 norm(X), norm(y), norm(Z) = 3.6e+01, 1.0e+02, 7.3e+01
 norm(A), norm(b), norm(C) = 1.9e+03, 2.4e+03, 7.8e+01
 Total CPU time (secs)  = 0.27
 CPU time per iteration = 0.01
 termination code       =  0
 DIMACS errors: 1.5e-09  0.0e+00  7.3e-12  0.0e+00  5.4e-08  5.4e-08
-------------------------------------------------------------------
```

```
ans =

    2.2081

Iteration   4   Total error is: 0.0060495

 num. of constraints = 85
 dim. of socp   var  = 86,   num. of socp blk  =  1
 dim. of linear var  = 1000
*******************************************************************
   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|1.4e+02|1.1e+08| 1.553206e+05  0.000000e+00| 0:0:00| chol  1  1
 1|1.000|0.991|1.4e-07|1.6e+00|1.3e+06| 1.567472e+05 -2.447039e+02| 0:0:00| chol  1  1
 2|1.000|0.961|8.4e-08|1.6e-01|1.9e+05| 1.047089e+05 -1.008008e+01| 0:0:00| chol  1  1
 3|0.948|1.000|2.1e-08|5.1e-02|3.0e+04| 2.311347e+04 -2.113447e+01| 0:0:00| chol  1  1
 4|1.000|1.000|8.7e-09|1.5e-02|4.4e+03| 4.019347e+03 -1.522725e+01| 0:0:00| chol  1  1
 5|0.861|0.868|2.0e-09|3.3e-03|6.1e+02| 5.919022e+02 -1.014363e+01| 0:0:00| chol  1  1
 6|0.341|0.862|1.4e-09|5.9e-04|5.6e+02| 5.489793e+02 -5.790740e+00| 0:0:00| chol  1  1
 7|0.561|1.000|6.6e-10|1.5e-05|4.8e+02| 4.734987e+02 -8.638412e+00| 0:0:00| chol  1  1
 8|1.000|1.000|1.9e-11|1.5e-06|3.3e+02| 3.296851e+02 -4.600041e+00| 0:0:00| chol  1  1
 9|1.000|1.000|1.3e-12|1.5e-07|1.5e+02| 1.443208e+02 -3.371412e+00| 0:0:00| chol  1  1
10|1.000|1.000|1.1e-13|1.5e-08|6.0e+01| 5.776568e+01 -2.155411e+00| 0:0:00| chol  1  1
11|1.000|1.000|3.7e-13|1.5e-09|2.0e+01| 1.834765e+01 -2.015149e+00| 0:0:00| chol  1  1
12|1.000|1.000|1.4e-12|1.5e-10|7.5e+00| 5.678379e+00 -1.815284e+00| 0:0:00| chol  1  1
13|0.823|0.927|4.0e-13|2.6e-11|2.4e+00| 6.537485e-01 -1.749333e+00| 0:0:00| chol  1  1
14|1.000|1.000|1.5e-10|2.5e-12|1.5e+00|-1.930666e-01 -1.728331e+00| 0:0:00| chol  1  1
15|0.949|1.000|1.1e-11|1.7e-12|5.0e-01|-1.216627e+00 -1.719087e+00| 0:0:00| chol  1  1
16|1.000|1.000|8.8e-12|2.2e-12|2.4e-01|-1.469898e+00 -1.712499e+00| 0:0:00| chol  1  2
17|0.996|1.000|4.9e-13|1.8e-12|5.3e-02|-1.656906e+00 -1.710193e+00| 0:0:00| chol  2  2
18|1.000|1.000|3.7e-12|1.0e-12|2.4e-02|-1.685447e+00 -1.709756e+00| 0:0:00| chol  2  2
19|0.953|0.973|1.6e-12|1.0e-12|2.8e-03|-1.706744e+00 -1.709580e+00| 0:0:00| chol  3  3
20|0.955|0.990|5.6e-12|1.0e-12|2.7e-04|-1.709305e+00 -1.709572e+00| 0:0:00| chol  5  5
21|1.000|1.000|2.8e-11|1.1e-12|2.9e-05|-1.709543e+00 -1.709572e+00| 0:0:00| chol
  linsysolve: Schur complement matrix not positive definite
  switch to LU factor. lu 30   1
22|1.000|1.000|4.1e-11|1.7e-12|1.4e-06|-1.709571e+00 -1.709572e+00| 0:0:00| lu 11  30
23|0.980|0.881|8.1e-09|2.7e-12|4.7e-08|-1.709572e+00 -1.709572e+00| 0:0:00|
  stop: max(relative gap, infeasibilities) < 1.00e-07
-------------------------------------------------------------------
 number of iterations   = 23
 primal objective value = -1.70957231e+00
 dual   objective value = -1.70957219e+00
 gap := trace(XZ)       = 4.72e-08
 relative gap           = 1.07e-08
 actual relative gap    = -2.76e-08
 rel. primal infeas     = 8.12e-09
 rel. dual   infeas     = 2.70e-12
 norm(X), norm(y), norm(Z) = 3.6e+01, 1.0e+02, 7.4e+01
 norm(A), norm(b), norm(C) = 1.9e+03, 2.4e+03, 7.8e+01
 Total CPU time (secs)  = 0.27
```

```
 CPU time per iteration = 0.01
 termination code       =  0
 DIMACS errors: 1.8e-08  0.0e+00  3.9e-12  0.0e+00  -2.8e-08  1.1e-08
------------------------------------------------------------------

ans =

    1.7096

Iteration   5   Total error is: 0.0053177

 num. of constraints = 85
 dim. of socp   var  = 86,   num. of socp blk  =  1
 dim. of linear var  = 1000
*******************************************************************
   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|1.4e+02|9.8e+07| 1.399181e+05  0.000000e+00| 0:0:00| chol  1  1
 1|1.000|0.991|1.4e-07|1.6e+00|1.2e+06| 1.413216e+05 -2.417710e+02| 0:0:00| chol  1  1
 2|1.000|0.957|9.4e-08|1.6e-01|1.7e+05| 9.452023e+04 -1.023777e+01| 0:0:00| chol  1  1
 3|0.925|1.000|2.4e-08|5.1e-02|3.1e+04| 2.454155e+04 -2.232361e+01| 0:0:00| chol  1  1
 4|1.000|1.000|9.9e-09|1.5e-02|4.8e+03| 4.392143e+03 -1.611386e+01| 0:0:00| chol  1  1
 5|0.887|0.894|1.8e-09|3.0e-03|5.5e+02| 5.255071e+02 -1.085122e+01| 0:0:00| chol  1  1
 6|0.281|0.839|1.4e-09|6.1e-04|5.0e+02| 4.966499e+02 -5.787363e+00| 0:0:00| chol  1  1
 7|0.565|1.000|6.3e-10|1.5e-05|4.4e+02| 4.289871e+02 -9.564166e+00| 0:0:00| chol  1  1
 8|1.000|1.000|1.8e-11|1.5e-06|2.9e+02| 2.819971e+02 -3.839264e+00| 0:0:00| chol  1  1
 9|0.946|1.000|2.5e-12|1.5e-07|9.8e+01| 9.502385e+01 -3.089038e+00| 0:0:00| chol  1  1
10|1.000|1.000|9.0e-14|1.5e-08|4.8e+01| 4.629505e+01 -2.046918e+00| 0:0:00| chol  1  1
11|0.922|1.000|9.8e-14|1.5e-09|1.4e+01| 1.180964e+01 -1.735068e+00| 0:0:00| chol  1  1
12|1.000|1.000|4.5e-12|1.5e-10|7.3e+00| 5.828904e+00 -1.497494e+00| 0:0:00| chol  1  1
13|0.927|1.000|3.9e-11|1.6e-11|3.0e+00| 1.559431e+00 -1.470460e+00| 0:0:00| chol  1  1
14|1.000|1.000|4.0e-12|3.0e-12|1.5e+00| 1.305987e-01 -1.410025e+00| 0:0:00| chol  1  1
15|1.000|1.000|5.1e-12|1.2e-12|4.0e-01|-9.892143e-01 -1.385618e+00| 0:0:00| chol  1  2
16|1.000|1.000|1.0e-12|1.0e-12|1.6e-01|-1.216240e+00 -1.378533e+00| 0:0:00| chol  1  1
17|0.970|1.000|2.1e-11|1.0e-12|2.6e-02|-1.348657e+00 -1.374992e+00| 0:0:00| chol  2  2
18|0.957|1.000|2.9e-11|1.5e-12|6.7e-03|-1.368106e+00 -1.374782e+00| 0:0:00| chol  3  3
19|1.000|0.882|2.5e-11|2.4e-12|1.1e-03|-1.373670e+00 -1.374722e+00| 0:0:00| chol  3  3
20|0.823|0.816|5.5e-11|3.8e-12|3.1e-04|-1.374408e+00 -1.374717e+00| 0:0:00| chol  5  6
21|0.909|0.861|2.1e-10|5.6e-12|1.1e-04|-1.374609e+00 -1.374716e+00| 0:0:00| chol
  linsysolve: Schur complement matrix not positive definite
  switch to LU factor. lu 30 ^14
22|0.963|1.000|1.8e-08|7.6e-12|5.1e-05|-1.374664e+00 -1.374715e+00| 0:0:00| lu 30 ^ 4
23|1.000|1.000|2.3e-09|1.1e-11|2.2e-05|-1.374693e+00 -1.374715e+00| 0:0:00| lu 30   6
24|1.000|1.000|5.7e-10|1.7e-11|1.3e-06|-1.374714e+00 -1.374715e+00| 0:0:00| lu 30  30
25|0.943|0.837|3.5e-09|2.8e-11|1.1e-07|-1.374715e+00 -1.374715e+00| 0:0:00|
  stop: max(relative gap, infeasibilities) < 1.00e-07
------------------------------------------------------------------
 number of iterations   = 25
 primal objective value = -1.37471461e+00
 dual   objective value = -1.37471503e+00
 gap := trace(XZ)       = 1.08e-07
```

```
 relative gap           = 2.87e-08
 actual relative gap    = 1.14e-07
 rel. primal infeas     = 3.51e-09
 rel. dual   infeas     = 2.84e-11
 norm(X), norm(y), norm(Z) = 3.6e+01, 1.0e+02, 7.5e+01
 norm(A), norm(b), norm(C) = 1.9e+03, 2.3e+03, 7.8e+01
 Total CPU time (secs)  = 0.31
 CPU time per iteration = 0.01
 termination code       =  0
 DIMACS errors: 8.0e-09  0.0e+00  4.1e-11  0.0e+00  1.1e-07  2.9e-08
------------------------------------------------------------------

ans =

    1.3747

Iteration   6   Total error is: 0.0047629

 num. of constraints = 85
 dim. of socp   var  = 86,   num. of socp blk  =  1
 dim. of linear var  = 1000
*******************************************************************
   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|1.4e+02|7.0e+07| 1.005662e+05  0.000000e+00| 0:0:00| chol  1  1
 1|1.000|0.991|1.5e-07|1.6e+00|8.6e+05| 1.017533e+05 -1.884872e+02| 0:0:00| chol  1  1
 2|1.000|0.947|1.1e-07|1.8e-01|1.3e+05| 6.865149e+04 -7.879733e+00| 0:0:00| chol  1  1
 3|0.809|1.000|4.1e-08|3.0e-02|3.8e+04| 3.264671e+04 -2.759266e+01| 0:0:00| chol  1  1
 4|1.000|1.000|5.4e-09|9.1e-03|8.2e+03| 7.746124e+03 -1.849900e+01| 0:0:00| chol  1  1
 5|0.943|0.960|1.3e-09|3.0e-03|4.7e+02| 4.452312e+02 -1.187309e+01| 0:0:00| chol  1  1
 6|0.314|1.000|1.1e-09|2.7e-04|4.2e+02| 4.151206e+02 -5.335463e+00| 0:0:00| chol  1  1
 7|1.000|1.000|2.0e-11|2.7e-05|3.0e+02| 2.975459e+02 -5.194821e+00| 0:0:00| chol  1  1
 8|1.000|0.968|7.0e-12|3.5e-06|9.1e+01| 8.935750e+01 -1.888329e+00| 0:0:00| chol  1  1
 9|1.000|1.000|7.7e-12|2.7e-07|4.4e+01| 4.261200e+01 -1.406548e+00| 0:0:00| chol  1  1
10|0.986|0.960|7.4e-14|3.7e-08|1.1e+01| 9.889045e+00 -8.990871e-01| 0:0:00| chol  1  1
11|1.000|1.000|1.3e-10|2.7e-09|6.5e+00| 5.748809e+00 -7.482257e-01| 0:0:00| chol  1  1
12|1.000|1.000|2.5e-11|2.7e-10|2.5e+00| 1.782070e+00 -6.768142e-01| 0:0:00| chol  1  1
13|1.000|1.000|6.2e-12|3.0e-11|8.7e-01| 2.332851e-01 -6.413764e-01| 0:0:00| chol  1  2
14|1.000|1.000|2.8e-13|4.0e-12|2.6e-01|-3.701995e-01 -6.277476e-01| 0:0:00| chol  2  2
15|1.000|1.000|1.6e-12|1.3e-12|8.2e-02|-5.417112e-01 -6.235716e-01| 0:0:00| chol  2  2
16|1.000|1.000|4.5e-12|1.0e-12|2.0e-02|-6.027699e-01 -6.222730e-01| 0:0:00| chol  2  2
17|1.000|0.950|9.5e-12|1.1e-12|5.7e-03|-6.163398e-01 -6.220481e-01| 0:0:00| chol  2  3
18|0.590|0.978|2.2e-11|1.5e-12|2.6e-03|-6.194028e-01 -6.220316e-01| 0:0:00| chol  3  3
19|0.969|0.944|2.4e-11|2.3e-12|2.1e-04|-6.218067e-01 -6.220134e-01| 0:0:00| chol  4  4
20|0.974|1.000|1.4e-11|3.4e-12|3.5e-05|-6.219776e-01 -6.220122e-01| 0:0:00| chol
  linsysolve: Schur complement matrix not positive definite
  switch to LU factor. lu 30   1
21|1.000|1.000|1.0e-10|2.8e-12|6.4e-06|-6.220057e-01 -6.220121e-01| 0:0:00| lu 30 ^10
22|0.989|0.804|1.1e-09|4.8e-12|2.3e-07|-6.220117e-01 -6.220121e-01| 0:0:00| lu 11 ^15
23|1.000|0.948|1.3e-08|6.6e-12|5.8e-08|-6.220118e-01 -6.220121e-01| 0:0:00|
  stop: max(relative gap, infeasibilities) < 1.00e-07
```

```
-----------------------------------------------------------------
 number of iterations   = 23
 primal objective value = -6.22011804e-01
 dual   objective value = -6.22012139e-01
 gap := trace(XZ)       = 5.76e-08
 relative gap           = 2.57e-08
 actual relative gap    = 1.50e-07
 rel. primal infeas     = 1.32e-08
 rel. dual   infeas     = 6.65e-12
 norm(X), norm(y), norm(Z) = 3.7e+01, 1.0e+02, 7.6e+01
 norm(A), norm(b), norm(C) = 2.0e+03, 2.2e+03, 7.8e+01
 Total CPU time (secs)  = 0.31
 CPU time per iteration = 0.01
 termination code       =  0
 DIMACS errors: 2.9e-08  0.0e+00  9.7e-12  0.0e+00  1.5e-07  2.6e-08
-----------------------------------------------------------------

ans =

    0.6220

Iteration   7   Total error is: 0.0031799

 num. of constraints = 85
 dim. of socp   var  = 86,   num. of socp blk  =  1
 dim. of linear var  = 1000
*****************************************************************
   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|1.4e+02|7.2e+07| 1.034705e+05  0.000000e+00| 0:0:00| chol  1  1
 1|1.000|0.991|1.5e-07|1.6e+00|8.8e+05| 1.046753e+05 -1.958096e+02| 0:0:00| chol  1  1
 2|1.000|0.947|1.1e-07|1.8e-01|1.3e+05| 7.063251e+04 -8.143572e+00| 0:0:00| chol  1  1
 3|0.798|1.000|4.2e-08|3.0e-02|4.0e+04| 3.452450e+04 -2.879133e+01| 0:0:00| chol  1  1
 4|1.000|1.000|5.7e-09|9.1e-03|8.6e+03| 8.193124e+03 -1.902868e+01| 0:0:00| chol  1  1
 5|0.945|0.964|1.4e-09|3.0e-03|4.8e+02| 4.551338e+02 -1.220608e+01| 0:0:00| chol  1  1
 6|0.305|1.000|1.2e-09|2.7e-04|4.3e+02| 4.246803e+02 -5.489677e+00| 0:0:00| chol  1  1
 7|1.000|1.000|2.5e-11|2.7e-05|3.1e+02| 3.045542e+02 -4.536133e+00| 0:0:00| chol  1  1
 8|1.000|0.943|7.4e-12|4.1e-06|8.4e+01| 8.268436e+01 -1.515804e+00| 0:0:00| chol  1  1
 9|1.000|1.000|5.8e-12|2.7e-07|4.4e+01| 4.252235e+01 -1.044224e+00| 0:0:00| chol  1  1
10|0.960|0.944|2.2e-13|4.1e-08|1.1e+01| 1.013064e+01 -5.246081e-01| 0:0:00| chol  1  1
11|1.000|1.000|1.2e-10|2.7e-09|6.4e+00| 6.030541e+00 -3.761187e-01| 0:0:00| chol  1  1
12|1.000|1.000|4.3e-12|2.7e-10|2.3e+00| 2.043254e+00 -2.991571e-01| 0:0:00| chol  1  1
13|1.000|1.000|1.4e-11|2.8e-11|8.6e-01| 5.962652e-01 -2.656224e-01| 0:0:00| chol  1  1
14|1.000|1.000|6.3e-13|4.2e-12|2.5e-01|-5.247383e-03 -2.513303e-01| 0:0:00| chol  2  1
15|1.000|1.000|4.0e-12|1.3e-12|8.4e-02|-1.636312e-01 -2.475135e-01| 0:0:00| chol  2  2
16|1.000|1.000|1.1e-12|1.0e-12|2.0e-02|-2.264363e-01 -2.461673e-01| 0:0:00| chol  2  2
17|1.000|0.933|3.0e-12|1.1e-12|6.0e-03|-2.399684e-01 -2.459661e-01| 0:0:00| chol  2  2
18|0.719|0.904|6.1e-11|1.1e-12|2.1e-03|-2.438586e-01 -2.459379e-01| 0:0:00| chol  3  3
19|0.971|0.937|1.9e-11|1.6e-12|8.8e-05|-2.458339e-01 -2.459215e-01| 0:0:00| chol  5  5
20|0.980|0.988|6.4e-11|2.3e-12|1.4e-05|-2.459069e-01 -2.459207e-01| 0:0:00| chol
  linsysolve: Schur complement matrix not positive definite
```

```
  switch to LU factor. lu 30 ^25
21|1.000|1.000|2.5e-10|3.4e-12|1.7e-06|-2.459191e-01 -2.459207e-01| 0:0:00| lu 30 ^30
22|1.000|0.935|1.8e-09|5.3e-12|9.6e-08|-2.459206e-01 -2.459207e-01| 0:0:00|
  stop: max(relative gap, infeasibilities) < 1.00e-07
-----------------------------------------------------------------
 number of iterations   = 22
 primal objective value = -2.45920576e-01
 dual   objective value = -2.45920693e-01
 gap := trace(XZ)       = 9.57e-08
 relative gap           = 6.42e-08
 actual relative gap    = 7.86e-08
 rel. primal infeas     = 1.80e-09
 rel. dual   infeas     = 5.28e-12
 norm(X), norm(y), norm(Z) = 3.7e+01, 1.0e+02, 7.6e+01
 norm(A), norm(b), norm(C) = 2.0e+03, 2.2e+03, 7.8e+01
 Total CPU time (secs)  = 0.27
 CPU time per iteration = 0.01
 termination code       =  0
 DIMACS errors: 4.0e-09  0.0e+00  7.7e-12  0.0e+00  7.9e-08  6.4e-08
-----------------------------------------------------------------

ans =

    0.2459

Iteration   8   Total error is: 0.0019511
The total representation error of the testing signals is: 0.015602
>>
```