Testing Nelder Mead

```
close all;
clear;
clc;
x0 = [-2;2];
f1 = figure();
[x, fval, iter] = nelder_mead(x0, 'report');
legend('[-2,2]');
x0 = [-1.2; 1];
f2 = figure();
[x, fval, iter] = nelder_mead(x0, 'report');
legend('[-1.2, 1]');

x0 = [5;5];
f3 = figure();
[x, fval, iter] = nelder_mead(x0, 'report');
legend('[5,5]');

x0 = [1;1];
f4 = figure();
[x, fval, iter] = nelder_mead(x0, 'report');
legend('[1,1]');

movegui(f1,'west');
movegui(f2,'north');
movegui(f3,'east');
movegui(f4,'south');
```

```
 Iter                    Best x                     f(best x)
  Action
    1  |  [  -1.950000e+00,    2.050000e+00]'  |   3.158281e+02  |
        Expand  |
    2  |  [  -1.850000e+00,    2.000000e+00]'  |   2.104731e+02  |
        Expand  |
    3  |  [  -1.800000e+00,    2.175000e+00]'  |   1.212625e+02  |
        Expand  |
    4  |  [  -1.575000e+00,    2.162500e+00]'  |   1.675098e+01  |
       Reflect  |
    5  |  [  -1.525000e+00,    2.337500e+00]'  |   6.389727e+00  |
 Outside contract  |
    6  |  [  -1.525000e+00,    2.337500e+00]'  |   6.389727e+00  |
 Inside contract  |
    7  |  [  -1.525000e+00,    2.337500e+00]'  |   6.389727e+00  |
 Inside contract  |
    8  |  [  -1.525000e+00,    2.337500e+00]'  |   6.389727e+00  |
 Inside contract  |
    9  |  [  -1.525000e+00,    2.337500e+00]'  |   6.389727e+00  |
 Inside contract  |
   10  |  [  -1.525000e+00,    2.337500e+00]'  |   6.389727e+00  |
 Inside contract  |
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```
Iter                    Best x                    f(best x)
 Action
  11  |  [  -1.515625e+00,    2.293750e+00]'  |   6.329504e+00  |
Inside contract  |
  12  |  [  -1.515625e+00,    2.293750e+00]'  |   6.329504e+00  |
       Expand  |
  13  |  [  -1.488672e+00,    2.217969e+00]'  |   6.193821e+00  |
      Reflect  |
  14  |  [  -1.488672e+00,    2.217969e+00]'  |   6.193821e+00  |
       Expand  |
  15  |  [  -1.442969e+00,    2.054687e+00]'  |   6.043564e+00  |
       Expand  |
  16  |  [  -1.409180e+00,    1.988672e+00]'  |   5.804979e+00  |
       Expand  |
  17  |  [  -1.300879e+00,    1.629102e+00]'  |   5.693270e+00  |
       Expand  |
  18  |  [  -1.179150e+00,    1.317285e+00]'  |   5.283211e+00  |
Inside contract  |
  19  |  [  -1.179150e+00,    1.317285e+00]'  |   5.283211e+00  |
       Expand  |
  20  |  [  -1.153864e+00,    1.314124e+00]'  |   4.668979e+00  |
Outside contract  |
Iter                    Best x                    f(best x)
 Action
  21  |  [  -1.153864e+00,    1.314124e+00]'  |   4.668979e+00  |
       Expand  |
  22  |  [  -1.003687e+00,    9.987503e-01]'  |   4.022224e+00  |
      Reflect  |
  23  |  [  -1.003687e+00,    9.987503e-01]'  |   4.022224e+00  |
       Expand  |
  24  |  [  -8.029373e-01,    6.770538e-01]'  |   3.355206e+00  |
      Reflect  |
  25  |  [  -8.029373e-01,    6.770538e-01]'  |   3.355206e+00  |
Inside contract  |
  26  |  [  -8.029373e-01,    6.770538e-01]'  |   3.355206e+00  |
      Reflect  |
  27  |  [  -6.527611e-01,    3.616806e-01]'  |   3.146567e+00  |
      Reflect  |
  28  |  [  -6.527611e-01,    3.616806e-01]'  |   3.146567e+00  |
      Reflect  |
  29  |  [  -5.689865e-01,    2.523407e-01]'  |   2.971585e+00  |
Inside contract  |
  30  |  [  -6.650183e-01,    4.373623e-01]'  |   2.774674e+00  |
       Expand  |
Iter                    Best x                    f(best x)
 Action
  31  |  [  -5.454850e-01,    3.111933e-01]'  |   2.407127e+00  |
Inside contract  |
  32  |  [  -5.454850e-01,    3.111933e-01]'  |   2.407127e+00  |
      Reflect  |
  33  |  [  -4.675858e-01,    1.871402e-01]'  |   2.253010e+00  |
       Expand  |
  34  |  [  -3.453681e-01,    1.208818e-01]'  |   1.810272e+00  |
      Reflect  |
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  35  |  [  -3.453681e-01,    1.208818e-01]'  |   1.810272e+00  |
      Reflect  |
  36  |  [  -3.453681e-01,    1.208818e-01]'  |   1.810272e+00  |
      Reflect  |
  37  |  [  -2.231504e-01,    5.462332e-02]'  |   1.498427e+00  |
Inside contract  |
  38  |  [  -2.231504e-01,    5.462332e-02]'  |   1.498427e+00  |
Outside contract  |
  39  |  [  -1.557452e-01,   -1.260234e-02]'  |   1.471605e+00  |
      Reflect  |
  40  |  [  -1.641403e-01,    3.285957e-02]'  |   1.358724e+00  |
      Reflect  |
Iter                    Best x                     f(best x)
 Action
  41  |  [  -1.641403e-01,    3.285957e-02]'  |   1.358724e+00  |
       Expand  |
  42  |  [  -7.982282e-02,    2.294490e-02]'  |   1.193484e+00  |
Inside contract  |
  43  |  [  -7.982282e-02,    2.294490e-02]'  |   1.193484e+00  |
       Expand  |
  44  |  [   4.450893e-02,   -3.614968e-02]'  |   1.058358e+00  |
       Expand  |
  45  |  [   1.657458e-01,   -1.334331e-02]'  |   8.625664e-01  |
Inside contract  |
  46  |  [   1.657458e-01,   -1.334331e-02]'  |   8.625664e-01  |
       Expand  |
  47  |  [   1.785793e-01,    5.093319e-02]'  |   7.109940e-01  |
Outside contract  |
  48  |  [   2.519177e-01,    2.864281e-02]'  |   6.808685e-01  |
      Reflect  |
  49  |  [   2.647512e-01,    9.291932e-02]'  |   5.926939e-01  |
      Reflect  |
  50  |  [   2.647512e-01,    9.291932e-02]'  |   5.926939e-01  |
      Reflect  |
Iter                    Best x                     f(best x)
 Action
  51  |  [   3.509231e-01,    1.349054e-01]'  |   4.351268e-01  |
Inside contract  |
  52  |  [   3.509231e-01,    1.349054e-01]'  |   4.351268e-01  |
      Reflect  |
  53  |  [   3.509231e-01,    1.349054e-01]'  |   4.351268e-01  |
       Expand  |
  54  |  [   4.941608e-01,    2.192020e-01]'  |   3.183378e-01  |
      Reflect  |
  55  |  [   4.941608e-01,    2.192020e-01]'  |   3.183378e-01  |
      Reflect  |
  56  |  [   5.791863e-01,    3.041473e-01]'  |   2.751130e-01  |
Inside contract  |
  57  |  [   4.863111e-01,    2.407627e-01]'  |   2.656946e-01  |
       Expand  |
  58  |  [   6.099245e-01,    3.789608e-01]'  |   1.569931e-01  |
Inside contract  |
  59  |  [   6.099245e-01,    3.789608e-01]'  |   1.569931e-01  |
      Reflect  |
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  60  |  [   6.099245e-01,    3.789608e-01]'  |   1.569931e-01  |
      Reflect  |
Iter                    Best x                     f(best x)
 Action
  61  |  [   7.335380e-01,    5.171590e-01]'  |   1.147622e-01  |
Outside contract  |
  62  |  [   7.335380e-01,    5.171590e-01]'  |   1.147622e-01  |
Outside contract  |
  63  |  [   7.431643e-01,    5.355052e-01]'  |   9.414803e-02  |
Inside contract  |
  64  |  [   7.011576e-01,    4.879103e-01]'  |   9.068442e-02  |
      Reflect  |
  65  |  [   7.107840e-01,    5.062566e-01]'  |   8.375465e-02  |
Inside contract  |
  66  |  [   7.245675e-01,    5.162943e-01]'  |   8.343862e-02  |
       Expand  |
  67  |  [   7.507120e-01,    5.580057e-01]'  |   6.523898e-02  |
      Reflect  |
  68  |  [   7.507120e-01,    5.580057e-01]'  |   6.523898e-02  |
      Reflect  |
  69  |  [   7.507120e-01,    5.580057e-01]'  |   6.523898e-02  |
       Expand  |
  70  |  [   7.830369e-01,    6.155539e-01]'  |   4.765240e-02  |
Inside contract  |
Iter                    Best x                     f(best x)
 Action
  71  |  [   7.830369e-01,    6.155539e-01]'  |   4.765240e-02  |
       Expand  |
  72  |  [   8.412672e-01,    7.047204e-01]'  |   2.610219e-02  |
      Reflect  |
  73  |  [   8.412672e-01,    7.047204e-01]'  |   2.610219e-02  |
      Reflect  |
  74  |  [   9.037772e-01,    8.111734e-01]'  |   1.243951e-02  |
Inside contract  |
  75  |  [   9.037772e-01,    8.111734e-01]'  |   1.243951e-02  |
      Reflect  |
  76  |  [   9.215445e-01,    8.464300e-01]'  |   6.947282e-03  |
Inside contract  |
  77  |  [   9.215445e-01,    8.464300e-01]'  |   6.947282e-03  |
Outside contract  |
  78  |  [   9.215445e-01,    8.464300e-01]'  |   6.947282e-03  |
       Expand  |
  79  |  [   9.638635e-01,    9.238099e-01]'  |   4.033717e-03  |
       Expand  |
  80  |  [   9.759772e-01,    9.533440e-01]'  |   6.431367e-04  |
Outside contract  |
Iter                    Best x                     f(best x)
 Action
  81  |  [   9.759772e-01,    9.533440e-01]'  |   6.431367e-04  |
      Reflect  |
  82  |  [   1.006222e+00,    1.014185e+00]'  |   3.284287e-04  |
Inside contract  |
  83  |  [   9.926039e-01,    9.842074e-01]'  |   1.660159e-04  |
Inside contract  |
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  84  |  [   9.926039e-01,    9.842074e-01]'  |   1.660159e-04  |
Inside contract  |
  85  |  [   9.981857e-01,    9.972117e-01]'  |   7.335327e-05  |
      Reflect  |
  86  |  [   9.981857e-01,    9.972117e-01]'  |   7.335327e-05  |
Outside contract  |
  87  |  [   1.004658e+00,    1.009667e+00]'  |   3.250343e-05  |
Inside contract  |
  88  |  [   1.002258e+00,    1.004294e+00]'  |   1.027209e-05  |
Inside contract  |
  89  |  [   1.002258e+00,    1.004294e+00]'  |   1.027209e-05  |
      Reflect  |
  90  |  [   9.984220e-01,    9.967234e-01]'  |   4.004098e-06  |
Inside contract  |
Iter                    Best x                     f(best x)
 Action
  91  |  [   1.000581e+00,    1.001302e+00]'  |   2.298450e-06  |
Inside contract  |
  92  |  [   1.000880e+00,    1.001654e+00]'  |   1.918767e-06  |
Inside contract  |
  93  |  [   9.995762e-01,    9.991007e-01]'  |   4.491255e-07  |
Inside contract  |
  94  |  [   1.000405e+00,    1.000840e+00]'  |   2.568809e-07  |
Outside contract  |
  95  |  [   1.000405e+00,    1.000840e+00]'  |   2.568809e-07  |
Inside contract  |
  96  |  [   9.997757e-01,    9.995424e-01]'  |   5.827700e-08  |
Inside contract  |
  97  |  [   9.997757e-01,    9.995424e-01]'  |   5.827700e-08  |
Inside contract  |
  98  |  [   1.000101e+00,    1.000220e+00]'  |   4.681356e-08  |
      Reflect  |
  99  |  [   1.000058e+00,    1.000103e+00]'  |   2.252663e-08  |
Inside contract  |
Iterarion limit reached.
Iter                    Best x                     f(best x)
 Action
   1  |  [  -1.150000e+00,    1.050000e+00]'  |   1.204812e+01  |
       Expand  |
   2  |  [  -1.050000e+00,    1.000000e+00]'  |   5.253125e+00  |
      Reflect  |
   3  |  [  -1.050000e+00,    1.100000e+00]'  |   4.203125e+00  |
Outside contract  |
   4  |  [  -1.050000e+00,    1.100000e+00]'  |   4.203125e+00  |
Inside contract  |
   5  |  [  -1.050000e+00,    1.100000e+00]'  |   4.203125e+00  |
Inside contract  |
   6  |  [  -1.031250e+00,    1.056250e+00]'  |   4.131199e+00  |
Inside contract  |
   7  |  [  -1.031250e+00,    1.056250e+00]'  |   4.131199e+00  |
       Expand  |
   8  |  [  -9.773437e-01,    9.804688e-01]'  |   3.973735e+00  |
       Expand  |
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   9  |  [  -9.722656e-01,    9.269531e-01]'  |   3.923494e+00  |
       Expand  |
  10  |  [  -8.619141e-01,    7.486328e-01]'  |   3.470015e+00  |
      Reflect  |
Iter                    Best x                     f(best x)
 Action
  11  |  [  -8.619141e-01,    7.486328e-01]'  |   3.470015e+00  |
      Reflect  |
  12  |  [  -7.464844e-01,    5.167969e-01]'  |   3.213764e+00  |
       Expand  |
  13  |  [  -6.989258e-01,    5.079102e-01]'  |   2.924035e+00  |
      Reflect  |
  14  |  [  -5.834961e-01,    2.760742e-01]'  |   2.922112e+00  |
       Expand  |
  15  |  [  -4.306641e-01,    1.423828e-01]'  |   2.232463e+00  |
Inside contract  |
  16  |  [  -4.306641e-01,    1.423828e-01]'  |   2.232463e+00  |
      Reflect  |
  17  |  [  -4.501709e-01,    2.248779e-01]'  |   2.152387e+00  |
      Reflect  |
  18  |  [  -2.778320e-01,    8.691406e-03]'  |   2.102069e+00  |
       Expand  |
  19  |  [  -2.306763e-01,    6.558838e-02]'  |   1.529883e+00  |
Inside contract  |
  20  |  [  -2.306763e-01,    6.558838e-02]'  |   1.529883e+00  |
Inside contract  |
Iter                    Best x                     f(best x)
 Action
  21  |  [  -2.306763e-01,    6.558838e-02]'  |   1.529883e+00  |
      Reflect  |
  22  |  [  -1.631020e-01,   -1.192551e-02]'  |   1.501245e+00  |
       Expand  |
  23  |  [  -2.139091e-02,   -2.649574e-02]'  |   1.115888e+00  |
Inside contract  |
  24  |  [  -2.139091e-02,   -2.649574e-02]'  |   1.115888e+00  |
       Expand  |
  25  |  [   5.192552e-02,    1.889071e-02]'  |   9.250713e-01  |
      Reflect  |
  26  |  [   5.192552e-02,    1.889071e-02]'  |   9.250713e-01  |
      Reflect  |
  27  |  [   2.653124e-01,    1.459255e-02]'  |   8.511088e-01  |
Outside contract  |
  28  |  [   1.419304e-01,    4.050940e-02]'  |   7.777573e-01  |
Inside contract  |
  29  |  [   1.277735e-01,    2.322085e-02]'  |   7.655329e-01  |
Inside contract  |
  30  |  [   2.000822e-01,    2.322884e-02]'  |   6.681061e-01  |
      Reflect  |
Iter                    Best x                     f(best x)
 Action
  31  |  [   2.000822e-01,    2.322884e-02]'  |   6.681061e-01  |
Inside contract  |
  32  |  [   2.000822e-01,    2.322884e-02]'  |   6.681061e-01  |
      Reflect  |
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  33  |  [   2.000822e-01,    2.322884e-02]'  |   6.681061e-01  |
       Expand  |
  34  |  [   2.411644e-01,    5.132474e-02]'  |   5.805039e-01  |
      Reflect  |
  35  |  [   2.411644e-01,    5.132474e-02]'  |   5.805039e-01  |
      Reflect  |
  36  |  [   3.077833e-01,    6.645822e-02]'  |   5.590965e-01  |
      Reflect  |
  37  |  [   2.822467e-01,    7.942064e-02]'  |   5.151757e-01  |
      Reflect  |
  38  |  [   3.488656e-01,    9.455412e-02]'  |   4.977050e-01  |
      Reflect  |
  39  |  [   3.233290e-01,    1.075165e-01]'  |   4.587687e-01  |
      Reflect  |
  40  |  [   3.899479e-01,    1.226500e-01]'  |   4.586544e-01  |
      Reflect  |
Iter                    Best x                     f(best x)
 Action
  41  |  [   3.644113e-01,    1.356124e-01]'  |   4.047665e-01  |
      Reflect  |
  42  |  [   3.644113e-01,    1.356124e-01]'  |   4.047665e-01  |
      Reflect  |
  43  |  [   4.054935e-01,    1.637084e-01]'  |   3.534893e-01  |
Inside contract  |
  44  |  [   4.054935e-01,    1.637084e-01]'  |   3.534893e-01  |
      Reflect  |
  45  |  [   4.054935e-01,    1.637084e-01]'  |   3.534893e-01  |
       Expand  |
  46  |  [   4.658681e-01,    2.126048e-01]'  |   2.872579e-01  |
Inside contract  |
  47  |  [   4.658681e-01,    2.126048e-01]'  |   2.872579e-01  |
      Reflect  |
  48  |  [   4.658681e-01,    2.126048e-01]'  |   2.872579e-01  |
       Expand  |
  49  |  [   5.681753e-01,    3.006380e-01]'  |   2.356911e-01  |
       Expand  |
  50  |  [   5.455617e-01,    3.056156e-01]'  |   2.128791e-01  |
      Reflect  |
Iter                    Best x                     f(best x)
 Action
  51  |  [   6.478689e-01,    3.936488e-01]'  |   1.920411e-01  |
      Reflect  |
  52  |  [   6.252553e-01,    3.986264e-01]'  |   1.463353e-01  |
Inside contract  |
  53  |  [   6.252553e-01,    3.986264e-01]'  |   1.463353e-01  |
Inside contract  |
  54  |  [   6.252553e-01,    3.986264e-01]'  |   1.463353e-01  |
       Expand  |
  55  |  [   6.977798e-01,    4.724866e-01]'  |   1.121019e-01  |
       Expand  |
  56  |  [   7.285251e-01,    5.382693e-01]'  |   7.935441e-02  |
Outside contract  |
  57  |  [   7.285251e-01,    5.382693e-01]'  |   7.935441e-02  |
       Expand  |
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  58  |  [   8.328795e-01,    7.005612e-01]'  |   3.265293e-02  |
Inside contract  |
  59  |  [   8.328795e-01,    7.005612e-01]'  |   3.265293e-02  |
      Reflect  |
  60  |  [   8.732561e-01,    7.513764e-01]'  |   2.860759e-02  |
      Reflect  |
Iter                    Best x                     f(best x)
 Action
  61  |  [   9.372340e-01,    8.628532e-01]'  |   2.813348e-02  |
Inside contract  |
  62  |  [   8.690623e-01,    7.538380e-01]'  |   1.734953e-02  |
       Expand  |
  63  |  [   9.629322e-01,    9.222839e-01]'  |   3.828756e-03  |
Outside contract  |
  64  |  [   9.629322e-01,    9.222839e-01]'  |   3.828756e-03  |
      Reflect  |
  65  |  [   9.992488e-01,    9.941108e-01]'  |   1.925491e-03  |
Inside contract  |
  66  |  [   9.992488e-01,    9.941108e-01]'  |   1.925491e-03  |
      Reflect  |
  67  |  [   9.992488e-01,    9.941108e-01]'  |   1.925491e-03  |
Inside contract  |
  68  |  [   9.663174e-01,    9.354327e-01]'  |   1.411234e-03  |
Inside contract  |
  69  |  [   9.811672e-01,    9.642649e-01]'  |   6.029919e-04  |
Inside contract  |
  70  |  [   9.864955e-01,    9.719798e-01]'  |   3.248545e-04  |
      Reflect  |
Iter                    Best x                     f(best x)
 Action
  71  |  [   9.864955e-01,    9.719798e-01]'  |   3.248545e-04  |
Inside contract  |
  72  |  [   9.875438e-01,    9.753304e-01]'  |   1.559230e-04  |
Inside contract  |
  73  |  [   9.875438e-01,    9.753304e-01]'  |   1.559230e-04  |
      Reflect  |
  74  |  [   9.952308e-01,    9.905841e-01]'  |   2.373961e-05  |
Inside contract  |
  75  |  [   9.952308e-01,    9.905841e-01]'  |   2.373961e-05  |
      Reflect  |
  76  |  [   9.952308e-01,    9.905841e-01]'  |   2.373961e-05  |
      Reflect  |
  77  |  [   1.002918e+00,    1.005838e+00]'  |   8.517405e-06  |
Inside contract  |
  78  |  [   9.997731e-01,    9.992800e-01]'  |   7.140359e-06  |
Inside contract  |
  79  |  [   9.982881e-01,    9.965715e-01]'  |   2.936460e-06  |
Inside contract  |
  80  |  [   1.000974e+00,    1.001882e+00]'  |   1.405817e-06  |
Outside contract  |
Iter                    Best x                     f(best x)
 Action
  81  |  [   9.995602e-01,    9.991999e-01]'  |   8.231564e-07  |
Inside contract  |
```

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  82  |  [   9.992777e-01,    9.985562e-01]'  |   5.217939e-07  |
Inside contract  |
  83  |  [   1.000197e+00,    1.000380e+00]'  |   5.621152e-08  |
Inside contract  |
  84  |  [   1.000197e+00,    1.000380e+00]'  |   5.621152e-08  |
Outside contract  |
  85  |  [   1.000197e+00,    1.000380e+00]'  |   5.621152e-08  |
Inside contract  |
  86  |  [   9.999347e-01,    9.998888e-01]'  |   4.160435e-08  |
      Reflect  |
  87  |  [   9.998862e-01,    9.997614e-01]'  |   2.521673e-08  |
Inside contract  |
  88  |  [   1.000054e+00,    1.000102e+00]'  |   4.930513e-09  |
Inside contract  |
  89  |  [   1.000054e+00,    1.000102e+00]'  |   4.930513e-09  |
Inside contract  |
  90  |  [   1.000054e+00,    1.000102e+00]'  |   4.930513e-09  |
Inside contract  |
Iter                    Best x                     f(best x)
 Action
  91  |  [   9.999737e-01,    9.999452e-01]'  |   1.223287e-09  |
Inside contract  |
  92  |  [   9.999830e-01,    9.999671e-01]'  |   4.268003e-10  |
Inside contract  |
  93  |  [   9.999830e-01,    9.999671e-01]'  |   4.268003e-10  |
      Reflect  |
  94  |  [   9.999830e-01,    9.999671e-01]'  |   4.268003e-10  |
Inside contract  |
  95  |  [   1.000010e+00,    1.000019e+00]'  |   1.570888e-10  |
Inside contract  |
  96  |  [   1.000011e+00,    1.000022e+00]'  |   1.487285e-10  |
Inside contract  |
  97  |  [   9.999967e-01,    9.999939e-01]'  |   3.972401e-11  |
Inside contract  |
  98  |  [   9.999967e-01,    9.999939e-01]'  |   3.972401e-11  |
Outside contract  |
  99  |  [   9.999973e-01,    9.999946e-01]'  |   7.702900e-12  |
Inside contract  |
Iterarion limit reached.
Iter                    Best x                     f(best x)
 Action
   1  |  [   5.000000e+00,    5.000000e+00]'  |   4.001600e+04  |
       Expand  |
   2  |  [   4.975000e+00,    5.175000e+00]'  |   3.833631e+04  |
       Expand  |
   3  |  [   4.862500e+00,    5.162500e+00]'  |   3.417116e+04  |
       Expand  |
   4  |  [   4.756250e+00,    5.506250e+00]'  |   2.930871e+04  |
       Expand  |
   5  |  [   4.478125e+00,    5.653125e+00]'  |   2.074948e+04  |
       Expand  |
   6  |  [   4.126563e+00,    6.414063e+00]'  |   1.127644e+04  |
       Expand  |
```

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   7  |  [   3.394531e+00,    7.088281e+00]'  |   1.972267e+03  |
      Reflect  |
   8  |  [   3.042969e+00,    7.849219e+00]'  |   2.031078e+02  |
      Reflect  |
   9  |  [   3.042969e+00,    7.849219e+00]'  |   2.031078e+02  |
Inside contract  |
  10  |  [   3.042969e+00,    7.849219e+00]'  |   2.031078e+02  |
Inside contract  |
Iter                    Best x                     f(best x)
 Action
  11  |  [   2.675146e+00,    8.133350e+00]'  |   9.824747e+01  |
      Reflect  |
  12  |  [   2.675146e+00,    8.133350e+00]'  |   9.824747e+01  |
Inside contract  |
  13  |  [   2.860864e+00,    8.044263e+00]'  |   5.430709e+00  |
      Reflect  |
  14  |  [   2.860864e+00,    8.044263e+00]'  |   5.430709e+00  |
Inside contract  |
  15  |  [   2.860864e+00,    8.044263e+00]'  |   5.430709e+00  |
Inside contract  |
  16  |  [   2.811725e+00,    7.987067e+00]'  |   3.942828e+00  |
Outside contract  |
  17  |  [   2.811725e+00,    7.987067e+00]'  |   3.942828e+00  |
Inside contract  |
  18  |  [   2.840269e+00,    8.045729e+00]'  |   3.432386e+00  |
      Reflect  |
  19  |  [   2.840269e+00,    8.045729e+00]'  |   3.432386e+00  |
Inside contract  |
  20  |  [   2.822022e+00,    7.986334e+00]'  |   3.370494e+00  |
Inside contract  |
Iter                    Best x                     f(best x)
 Action
  21  |  [   2.822022e+00,    7.986334e+00]'  |   3.370494e+00  |
      Reflect  |
  22  |  [   2.809512e+00,    7.911357e+00]'  |   3.306736e+00  |
Inside contract  |
  23  |  [   2.809512e+00,    7.911357e+00]'  |   3.306736e+00  |
      Reflect  |
  24  |  [   2.809252e+00,    7.884822e+00]'  |   3.278398e+00  |
       Expand  |
  25  |  [   2.784620e+00,    7.774671e+00]'  |   3.227147e+00  |
       Expand  |
  26  |  [   2.771785e+00,    7.666525e+00]'  |   3.165677e+00  |
       Expand  |
  27  |  [   2.716103e+00,    7.392151e+00]'  |   2.967311e+00  |
      Reflect  |
  28  |  [   2.703268e+00,    7.284005e+00]'  |   2.957066e+00  |
       Expand  |
  29  |  [   2.585487e+00,    6.681183e+00]'  |   2.515039e+00  |
      Reflect  |
  30  |  [   2.585487e+00,    6.681183e+00]'  |   2.515039e+00  |
      Reflect  |
Iter                    Best x                     f(best x)
 Action
```

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  31  |  [   2.454871e+00,    5.970215e+00]'  |   2.432255e+00  |
      Expand  |
  32  |  [   2.415234e+00,    5.831022e+00]'  |   2.003432e+00  |
Inside contract  |
  33  |  [   2.415234e+00,    5.831022e+00]'  |   2.003432e+00  |
Outside contract  |
  34  |  [   2.415234e+00,    5.831022e+00]'  |   2.003432e+00  |
      Expand  |
  35  |  [   2.302350e+00,    5.324234e+00]'  |   1.750961e+00  |
     Reflect  |
  36  |  [   2.250892e+00,    5.048922e+00]'  |   1.595675e+00  |
     Reflect  |
  37  |  [   2.138007e+00,    4.542133e+00]'  |   1.378822e+00  |
Inside contract  |
  38  |  [   2.138007e+00,    4.542133e+00]'  |   1.378822e+00  |
      Expand  |
  39  |  [   2.077827e+00,    4.305178e+00]'  |   1.176565e+00  |
Inside contract  |
  40  |  [   2.077827e+00,    4.305178e+00]'  |   1.176565e+00  |
     Reflect  |
Iter                    Best x                     f(best x)
 Action
  41  |  [   2.077827e+00,    4.305178e+00]'  |   1.176565e+00  |
     Reflect  |
  42  |  [   1.977496e+00,    3.868588e+00]'  |   1.131078e+00  |
     Reflect  |
  43  |  [   2.017647e+00,    4.068223e+00]'  |   1.036322e+00  |
     Reflect  |
  44  |  [   2.017647e+00,    4.068223e+00]'  |   1.036322e+00  |
     Reflect  |
  45  |  [   1.957467e+00,    3.831268e+00]'  |   9.167600e-01  |
Inside contract  |
  46  |  [   1.957467e+00,    3.831268e+00]'  |   9.167600e-01  |
     Reflect  |
  47  |  [   1.892256e+00,    3.553734e+00]'  |   8.684873e-01  |
      Expand  |
  48  |  [   1.869712e+00,    3.496124e+00]'  |   7.564085e-01  |
     Reflect  |
  49  |  [   1.869712e+00,    3.496124e+00]'  |   7.564085e-01  |
      Expand  |
  50  |  [   1.726808e+00,    2.964604e+00]'  |   5.580492e-01  |
     Reflect  |
Iter                    Best x                     f(best x)
 Action
  51  |  [   1.726808e+00,    2.964604e+00]'  |   5.580492e-01  |
     Reflect  |
  52  |  [   1.649114e+00,    2.710617e+00]'  |   4.293799e-01  |
Inside contract  |
  53  |  [   1.649114e+00,    2.710617e+00]'  |   4.293799e-01  |
Inside contract  |
  54  |  [   1.649114e+00,    2.710617e+00]'  |   4.293799e-01  |
      Expand  |
  55  |  [   1.591019e+00,    2.544832e+00]'  |   3.675031e-01  |
     Reflect  |
```

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  56  |  [   1.526158e+00,    2.316707e+00]'  |   2.923439e-01  |
       Expand  |
  57  |  [   1.377536e+00,    1.871074e+00]'  |   2.129297e-01  |
Inside contract  |
  58  |  [   1.377536e+00,    1.871074e+00]'  |   2.129297e-01  |
      Reflect  |
  59  |  [   1.372811e+00,    1.873728e+00]'  |   1.508328e-01  |
Inside contract  |
  60  |  [   1.372811e+00,    1.873728e+00]'  |   1.508328e-01  |
Inside contract  |
Iter                    Best x                     f(best x)
 Action
  61  |  [   1.372811e+00,    1.873728e+00]'  |   1.508328e-01  |
Inside contract  |
  62  |  [   1.372811e+00,    1.873728e+00]'  |   1.508328e-01  |
      Reflect  |
  63  |  [   1.372811e+00,    1.873728e+00]'  |   1.508328e-01  |
       Expand  |
  64  |  [   1.319431e+00,    1.730097e+00]'  |   1.137030e-01  |
      Reflect  |
  65  |  [   1.319431e+00,    1.730097e+00]'  |   1.137030e-01  |
Inside contract  |
  66  |  [   1.319431e+00,    1.730097e+00]'  |   1.137030e-01  |
      Reflect  |
  67  |  [   1.319431e+00,    1.730097e+00]'  |   1.137030e-01  |
      Reflect  |
  68  |  [   1.319431e+00,    1.730097e+00]'  |   1.137030e-01  |
       Expand  |
  69  |  [   1.266050e+00,    1.586465e+00]'  |   9.773910e-02  |
Inside contract  |
  70  |  [   1.266050e+00,    1.586465e+00]'  |   9.773910e-02  |
       Expand  |
Iter                    Best x                     f(best x)
 Action
  71  |  [   1.235707e+00,    1.513602e+00]'  |   7.343476e-02  |
Inside contract  |
  72  |  [   1.235707e+00,    1.513602e+00]'  |   7.343476e-02  |
       Expand  |
  73  |  [   1.247365e+00,    1.557045e+00]'  |   6.131613e-02  |
       Expand  |
  74  |  [   1.156735e+00,    1.326539e+00]'  |   3.778191e-02  |
       Expand  |
  75  |  [   1.134736e+00,    1.298172e+00]'  |   2.927789e-02  |
Outside contract  |
  76  |  [   1.094920e+00,    1.190011e+00]'  |   1.682281e-02  |
      Reflect  |
  77  |  [   1.072921e+00,    1.161645e+00]'  |   1.630996e-02  |
Outside contract  |
  78  |  [   1.058513e+00,    1.114655e+00]'  |   6.781615e-03  |
      Reflect  |
  79  |  [   1.058513e+00,    1.114655e+00]'  |   6.781615e-03  |
      Reflect  |
  80  |  [   1.022106e+00,    1.039300e+00]'  |   3.405956e-03  |
Inside contract  |
```

```
 Iter                    Best x                     f(best x)
  Action
    81  |  [   1.038412e+00,    1.081633e+00]'  |   2.586950e-03  |
        Reflect  |
    82  |  [   1.002005e+00,    1.006278e+00]'  |   5.164705e-04  |
 Inside contract  |
    83  |  [   1.002005e+00,    1.006278e+00]'  |   5.164705e-04  |
 Outside contract  |
    84  |  [   9.981658e-01,    9.951125e-01]'  |   1.528034e-04  |
 Inside contract  |
    85  |  [   1.010621e+00,    1.021161e+00]'  |   1.165820e-04  |
 Inside contract  |
    86  |  [   1.003199e+00,    1.007207e+00]'  |   7.400229e-05  |
 Inside contract  |
    87  |  [   1.002538e+00,    1.004648e+00]'  |   2.528784e-05  |
        Reflect  |
    88  |  [   1.002538e+00,    1.004648e+00]'  |   2.528784e-05  |
 Inside contract  |
    89  |  [   1.001013e+00,    1.002439e+00]'  |   1.800468e-05  |
 Inside contract  |
    90  |  [   9.984458e-01,    9.971192e-01]'  |   7.484378e-06  |
 Inside contract  |
 Iter                    Best x                     f(best x)
  Action
    91  |  [   1.001134e+00,    1.002214e+00]'  |   1.587572e-06  |
 Outside contract  |
    92  |  [   9.991781e-01,    9.982801e-01]'  |   1.265456e-06  |
 Inside contract  |
    93  |  [   9.993009e-01,    9.986831e-01]'  |   1.142237e-06  |
 Inside contract  |
    94  |  [   1.000187e+00,    1.000348e+00]'  |   1.002496e-07  |
 Inside contract  |
    95  |  [   1.000187e+00,    1.000348e+00]'  |   1.002496e-07  |
 Inside contract  |
    96  |  [   1.000187e+00,    1.000348e+00]'  |   1.002496e-07  |
        Reflect  |
    97  |  [   1.000187e+00,    1.000348e+00]'  |   1.002496e-07  |
 Inside contract  |
    98  |  [   9.998998e-01,    9.998141e-01]'  |   3.086885e-08  |
 Inside contract  |
    99  |  [   9.998998e-01,    9.998141e-01]'  |   3.086885e-08  |
 Inside contract  |
Iterarion limit reached.
 Iter                    Best x                     f(best x)
  Action
     1  |  [   1.000000e+00,    1.000000e+00]'  |   0.000000e+00  |
 Outside contract  |
     2  |  [   1.000000e+00,    1.000000e+00]'  |   0.000000e+00  |
 Inside contract  |
     3  |  [   1.000000e+00,    1.000000e+00]'  |   0.000000e+00  |
 Inside contract  |
     4  |  [   1.000000e+00,    1.000000e+00]'  |   0.000000e+00  |
 Inside contract  |
```

```
   5  |  [   1.000000e+00,    1.000000e+00]'  |   0.000000e+00  |
Inside contract  |
   6  |  [   1.000000e+00,    1.000000e+00]'  |   0.000000e+00  |
Inside contract  |
   7  |  [   1.000000e+00,    1.000000e+00]'  |   0.000000e+00  |
Inside contract  |
   8  |  [   1.000000e+00,    1.000000e+00]'  |   0.000000e+00  |
Inside contract  |
   9  |  [   1.000000e+00,    1.000000e+00]'  |   0.000000e+00  |
Inside contract  |
  10  |  [   1.000000e+00,    1.000000e+00]'  |   0.000000e+00  |
Inside contract  |
Iter                    Best x                    f(best x)
 Action
  11  |  [   1.000000e+00,    1.000000e+00]'  |   0.000000e+00  |
Outside contract  |
  12  |  [   1.000000e+00,    1.000000e+00]'  |   0.000000e+00  |
Outside contract  |
  13  |  [   1.000000e+00,    1.000000e+00]'  |   0.000000e+00  |
Outside contract  |
  14  |  [   1.000000e+00,    1.000000e+00]'  |   0.000000e+00  |
Outside contract  |
  15  |  [   1.000000e+00,    1.000000e+00]'  |   0.000000e+00  |
Outside contract  |
  16  |  [   1.000000e+00,    1.000000e+00]'  |   0.000000e+00  |
Outside contract  |
  17  |  [   1.000000e+00,    1.000000e+00]'  |   0.000000e+00  |
Outside contract  |
  18  |  [   1.000000e+00,    1.000000e+00]'  |   0.000000e+00  |
Outside contract  |
  19  |  [   1.000000e+00,    1.000000e+00]'  |   0.000000e+00  |
Outside contract  |
  20  |  [   1.000000e+00,    1.000000e+00]'  |   0.000000e+00  |
Outside contract  |
Iter                    Best x                    f(best x)
 Action
  21  |  [   1.000000e+00,    1.000000e+00]'  |   0.000000e+00  |
Outside contract  |
  22  |  [   1.000000e+00,    1.000000e+00]'  |   0.000000e+00  |
Outside contract  |
  23  |  [   1.000000e+00,    1.000000e+00]'  |   0.000000e+00  |
Outside contract  |
  24  |  [   1.000000e+00,    1.000000e+00]'  |   0.000000e+00  |
Outside contract  |
  25  |  [   1.000000e+00,    1.000000e+00]'  |   0.000000e+00  |
Outside contract  |
  26  |  [   1.000000e+00,    1.000000e+00]'  |   0.000000e+00  |
Outside contract  |
  27  |  [   1.000000e+00,    1.000000e+00]'  |   0.000000e+00  |
Outside contract  |
  28  |  [   1.000000e+00,    1.000000e+00]'  |   0.000000e+00  |
Outside contract  |
  29  |  [   1.000000e+00,    1.000000e+00]'  |   0.000000e+00  |
Outside contract  |
```

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    30    |   [    1.000000e+00,     1.000000e+00]'   |    0.000000e+00   |
 Outside contract   |
 Iter                        Best x                         f(best x)
  Action
    31    |   [    1.000000e+00,     1.000000e+00]'   |    0.000000e+00   |
 Outside contract   |
Successful termination.
```
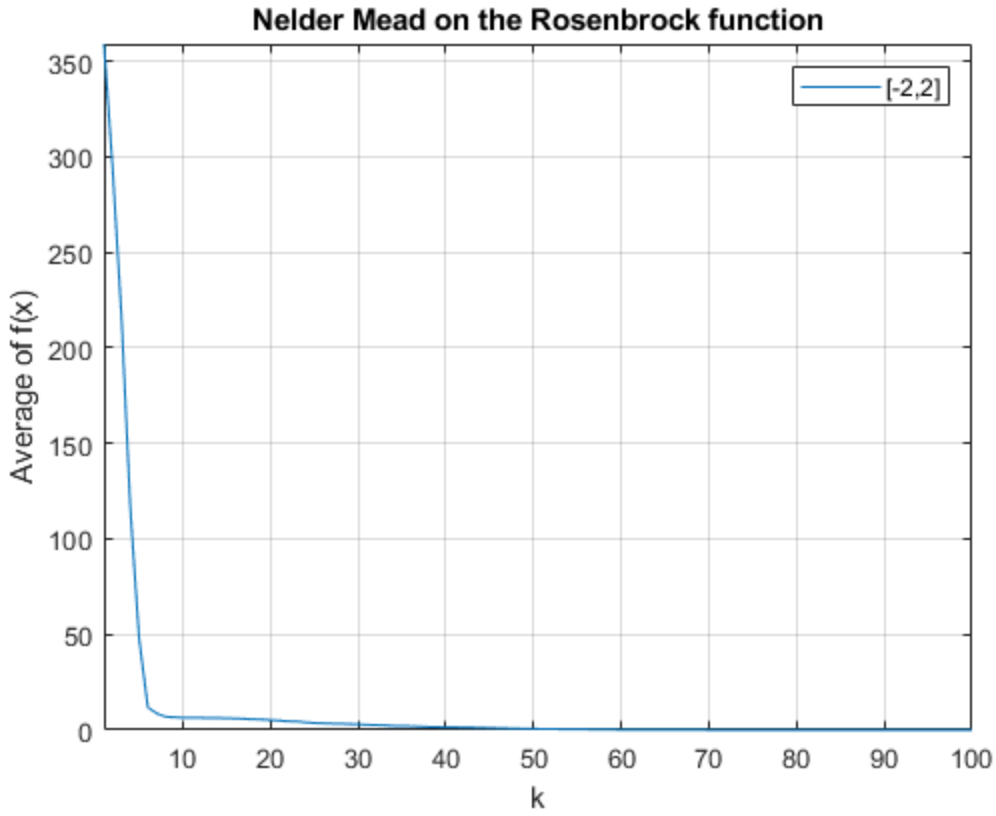
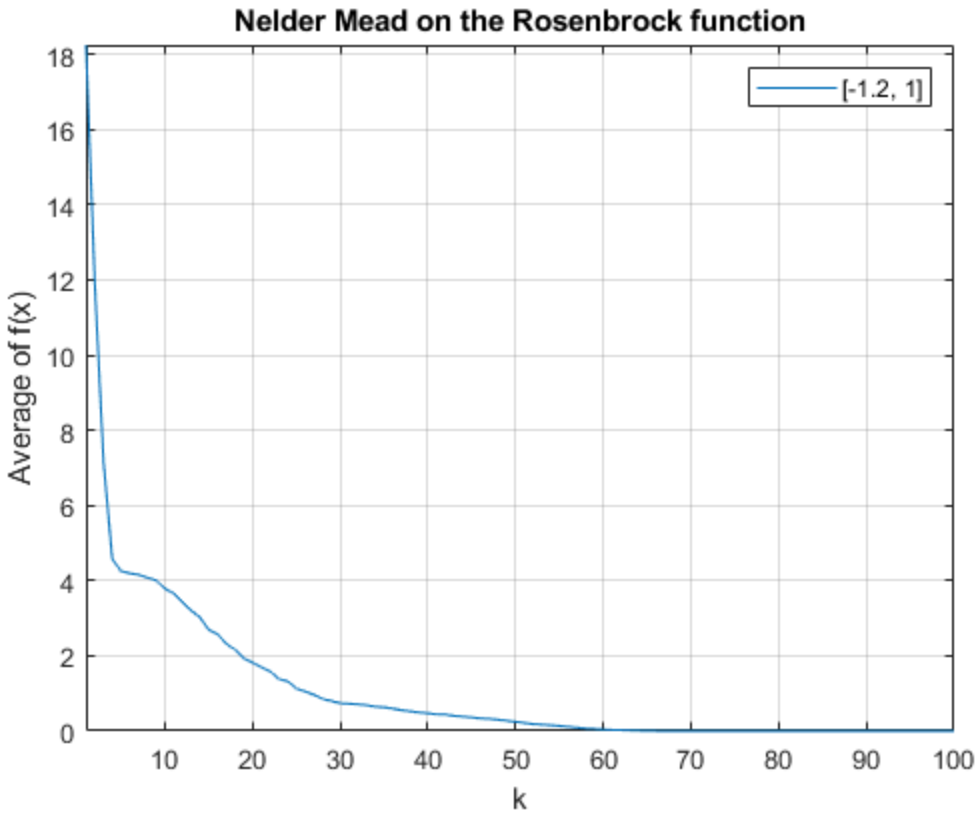
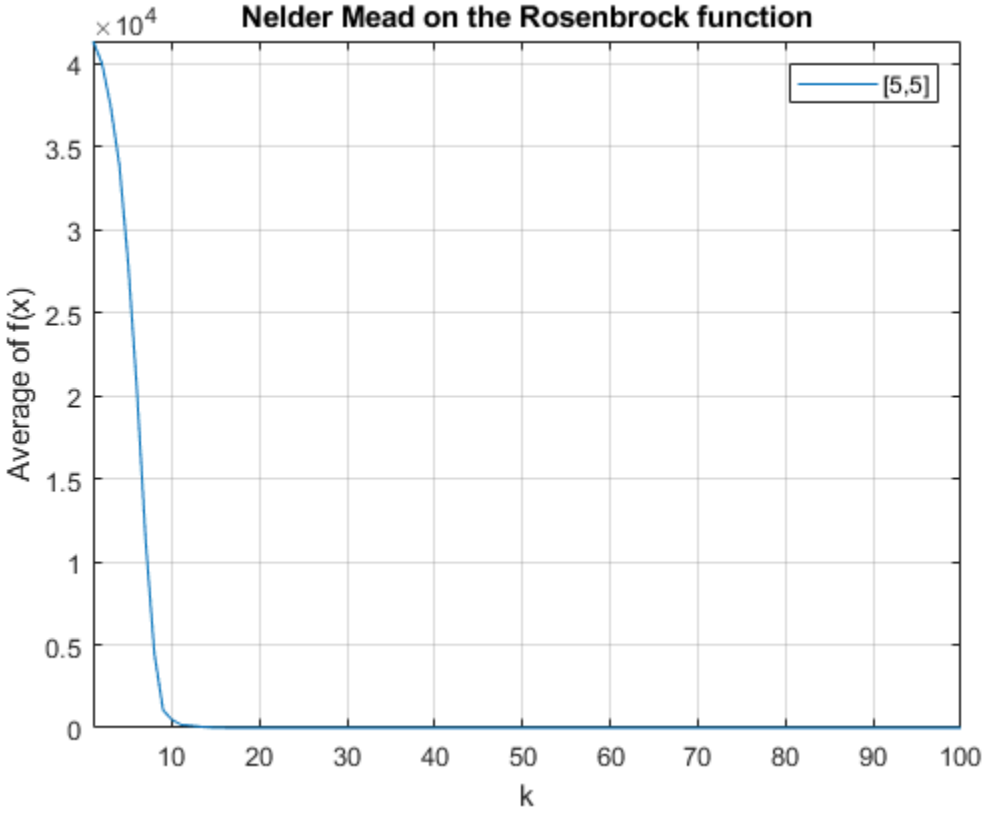
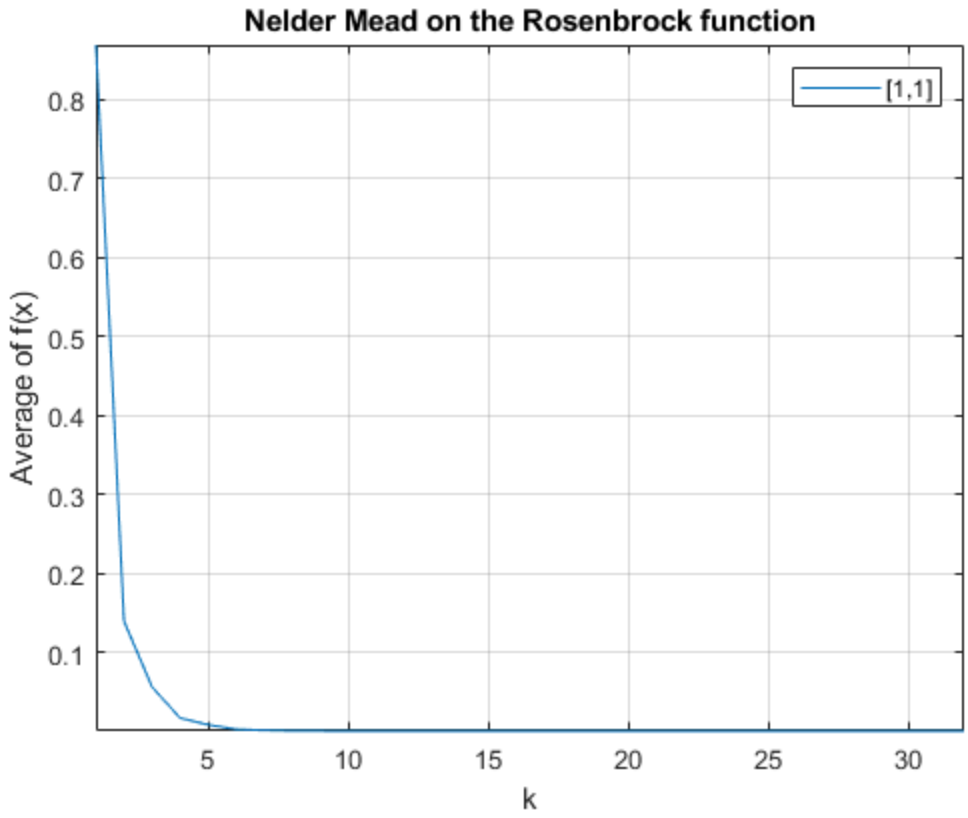




Nelder Mead on the Rosenbrock function
[-1.2, 1]
Average of f(x)
k
0
2
4
6
8
10
12
14
16
18
10
20
30
40
50
60
70
80
90
100


Nelder Mead on the Rosenbrock function
×10^4
[5,5]
Average of f(x)
k
0
0.5
1
1.5
2
2.5
3
3.5
4
10
20
30
40
50
60
70
80
90
100



1c

```
x0 = [1.2;1.2];
f1 = figure();
[x, fval, iter] = nelder_mead(x0, 'report');
legend('[1.2,1.2]');
f2 = figure();
plot_iter_rosenbrock(iter);
legend('[1.2,1.2]');

x0 = [-1.2; 1];
f3 = figure();
[x, fval, iter] = nelder_mead(x0, 'report');
legend('[-1.2, 1]');


f4 = figure();
plot_iter_rosenbrock(iter(:, 1:size(iter, 2)-1));
legend('[-1.2, 1]');


movegui(f1,'west');
movegui(f2,'north');
movegui(f3,'east');
movegui(f4,'south');
```

```
Iter                    Best x                    f(best x)
 Action
   1  |  [   1.200000e+00,    1.200000e+00]'  |   5.800000e+00  |
       Expand  |
   2  |  [   1.175000e+00,    1.375000e+00]'  |   3.378906e-02  |
      Reflect  |
   3  |  [   1.175000e+00,    1.375000e+00]'  |   3.378906e-02  |
Inside contract  |
   4  |  [   1.175000e+00,    1.375000e+00]'  |   3.378906e-02  |
Inside contract  |
   5  |  [   1.175000e+00,    1.375000e+00]'  |   3.378906e-02  |
Inside contract  |
   6  |  [   1.175000e+00,    1.375000e+00]'  |   3.378906e-02  |
Inside contract  |
   7  |  [   1.175000e+00,    1.375000e+00]'  |   3.378906e-02  |
Inside contract  |
   8  |  [   1.157617e+00,    1.344336e+00]'  |   2.665656e-02  |
Outside contract  |
   9  |  [   1.157617e+00,    1.344336e+00]'  |   2.665656e-02  |
Inside contract  |
  10  |  [   1.157617e+00,    1.344336e+00]'  |   2.665656e-02  |
      Reflect  |
Iter                    Best x                    f(best x)
 Action
  11  |  [   1.158069e+00,    1.338391e+00]'  |   2.573233e-02  |
       Expand  |
  12  |  [   1.135419e+00,    1.290570e+00]'  |   1.853267e-02  |
      Reflect  |
  13  |  [   1.135419e+00,    1.290570e+00]'  |   1.853267e-02  |
       Expand  |
  14  |  [   1.090796e+00,    1.186011e+00]'  |   9.706919e-03  |
       Expand  |
  15  |  [   1.067581e+00,    1.145621e+00]'  |   8.037790e-03  |
      Reflect  |
  16  |  [   1.022958e+00,    1.041061e+00]'  |   3.424146e-03  |
      Reflect  |
  17  |  [   9.997437e-01,    1.000671e+00]'  |   1.402552e-04  |
Inside contract  |
  18  |  [   9.997437e-01,    1.000671e+00]'  |   1.402552e-04  |
Inside contract  |
  19  |  [   9.997437e-01,    1.000671e+00]'  |   1.402552e-04  |
Inside contract  |
  20  |  [   9.997437e-01,    1.000671e+00]'  |   1.402552e-04  |
      Reflect  |
Iter                    Best x                    f(best x)
 Action
  21  |  [   9.997437e-01,    1.000671e+00]'  |   1.402552e-04  |
Outside contract  |
  22  |  [   9.997437e-01,    1.000671e+00]'  |   1.402552e-04  |
Inside contract  |
  23  |  [   9.945023e-01,    9.882396e-01]'  |   9.347845e-05  |
      Reflect  |
  24  |  [   1.008052e+00,    1.016652e+00]'  |   8.813325e-05  |
Inside contract  |
```

```
  25  |  [   1.000510e+00,    1.001559e+00]'  |   2.913836e-05  |
Inside contract  |
  26  |  [   9.993918e-01,    9.986724e-01]'  |   1.616118e-06  |
Outside contract  |
  27  |  [   9.993918e-01,    9.986724e-01]'  |   1.616118e-06  |
Inside contract  |
  28  |  [   9.993918e-01,    9.986724e-01]'  |   1.616118e-06  |
Outside contract  |
  29  |  [   1.000902e+00,    1.001888e+00]'  |   1.488268e-06  |
Inside contract  |
  30  |  [   1.000902e+00,    1.001888e+00]'  |   1.488268e-06  |
Inside contract  |
Iter                    Best x                     f(best x)
 Action
  31  |  [   9.998246e-01,    9.996442e-01]'  |   3.339035e-08  |
      Reflect  |
  32  |  [   9.998246e-01,    9.996442e-01]'  |   3.339035e-08  |
Inside contract  |
  33  |  [   9.998246e-01,    9.996442e-01]'  |   3.339035e-08  |
Outside contract  |
  34  |  [   9.998246e-01,    9.996442e-01]'  |   3.339035e-08  |
Inside contract  |
  35  |  [   9.998246e-01,    9.996442e-01]'  |   3.339035e-08  |
      Reflect  |
  36  |  [   9.998246e-01,    9.996442e-01]'  |   3.339035e-08  |
Inside contract  |
  37  |  [   1.000148e+00,    1.000300e+00]'  |   2.447593e-08  |
Inside contract  |
  38  |  [   1.000148e+00,    1.000300e+00]'  |   2.447593e-08  |
Inside contract  |
  39  |  [   9.999793e-01,    9.999547e-01]'  |   1.913642e-09  |
      Reflect  |
  40  |  [   9.999793e-01,    9.999547e-01]'  |   1.913642e-09  |
Inside contract  |
Iter                    Best x                     f(best x)
 Action
  41  |  [   9.999793e-01,    9.999547e-01]'  |   1.913642e-09  |
Inside contract  |
  42  |  [   9.999793e-01,    9.999547e-01]'  |   1.913642e-09  |
Outside contract  |
  43  |  [   9.999611e-01,    9.999215e-01]'  |   1.554230e-09  |
Inside contract  |
  44  |  [   9.999929e-01,    9.999877e-01]'  |   4.191439e-10  |
Inside contract  |
  45  |  [   9.999929e-01,    9.999877e-01]'  |   4.191439e-10  |
      Reflect  |
  46  |  [   1.000010e+00,    1.000021e+00]'  |   1.886976e-10  |
Inside contract  |
  47  |  [   9.999898e-01,    9.999795e-01]'  |   1.050036e-10  |
      Reflect  |
  48  |  [   9.999898e-01,    9.999795e-01]'  |   1.050036e-10  |
Inside contract  |
  49  |  [   1.000004e+00,    1.000008e+00]'  |   2.062783e-11  |
Inside contract  |
```

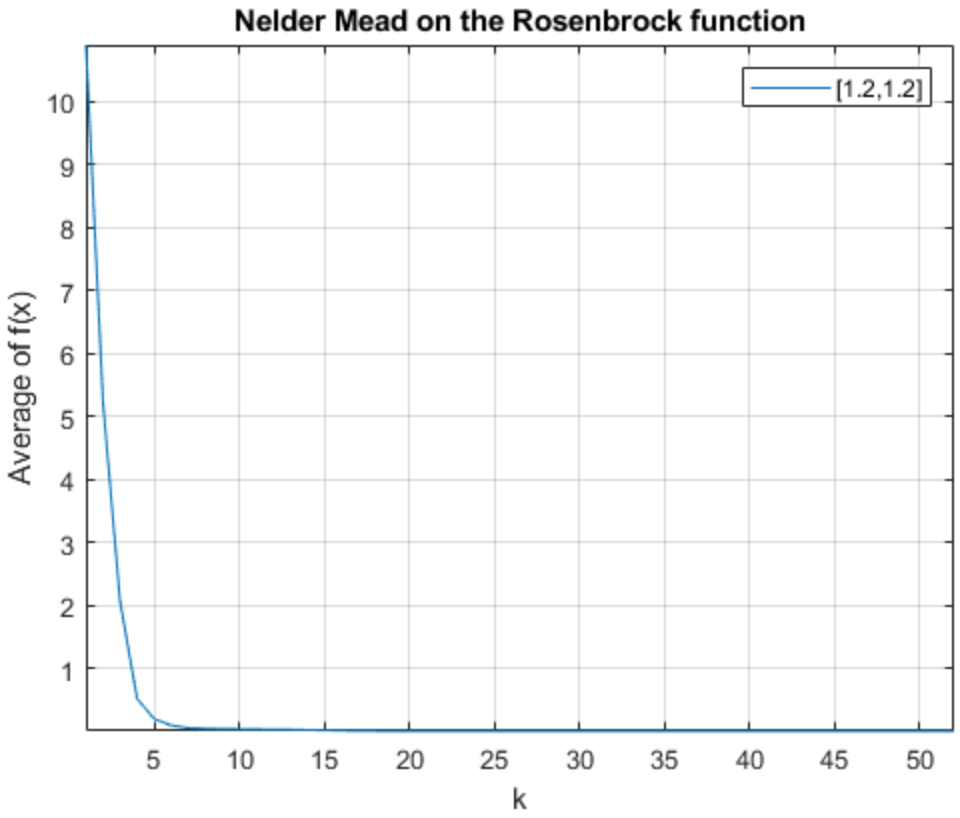
```
  50  |  [   1.000004e+00,    1.000008e+00]'  |   2.062783e-11  |
 Inside contract  |
 Iter                    Best x                     f(best x)
  Action
  51  |  [   9.999964e-01,    9.999927e-01]'  |   1.440835e-11  |
 Inside contract  |
Successful termination.
 Iter                    Best x                     f(best x)
  Action
   1  |  [  -1.150000e+00,    1.050000e+00]'  |   1.204812e+01  |
       Expand  |
   2  |  [  -1.050000e+00,    1.000000e+00]'  |   5.253125e+00  |
      Reflect  |
   3  |  [  -1.050000e+00,    1.100000e+00]'  |   4.203125e+00  |
 Outside contract  |
   4  |  [  -1.050000e+00,    1.100000e+00]'  |   4.203125e+00  |
 Inside contract  |
   5  |  [  -1.050000e+00,    1.100000e+00]'  |   4.203125e+00  |
 Inside contract  |
   6  |  [  -1.031250e+00,    1.056250e+00]'  |   4.131199e+00  |
 Inside contract  |
   7  |  [  -1.031250e+00,    1.056250e+00]'  |   4.131199e+00  |
       Expand  |
   8  |  [  -9.773437e-01,    9.804688e-01]'  |   3.973735e+00  |
       Expand  |
   9  |  [  -9.722656e-01,    9.269531e-01]'  |   3.923494e+00  |
       Expand  |
  10  |  [  -8.619141e-01,    7.486328e-01]'  |   3.470015e+00  |
      Reflect  |
 Iter                    Best x                     f(best x)
  Action
  11  |  [  -8.619141e-01,    7.486328e-01]'  |   3.470015e+00  |
      Reflect  |
  12  |  [  -7.464844e-01,    5.167969e-01]'  |   3.213764e+00  |
       Expand  |
  13  |  [  -6.989258e-01,    5.079102e-01]'  |   2.924035e+00  |
      Reflect  |
  14  |  [  -5.834961e-01,    2.760742e-01]'  |   2.922112e+00  |
       Expand  |
  15  |  [  -4.306641e-01,    1.423828e-01]'  |   2.232463e+00  |
 Inside contract  |
  16  |  [  -4.306641e-01,    1.423828e-01]'  |   2.232463e+00  |
      Reflect  |
  17  |  [  -4.501709e-01,    2.248779e-01]'  |   2.152387e+00  |
      Reflect  |
  18  |  [  -2.778320e-01,    8.691406e-03]'  |   2.102069e+00  |
       Expand  |
  19  |  [  -2.306763e-01,    6.558838e-02]'  |   1.529883e+00  |
 Inside contract  |
  20  |  [  -2.306763e-01,    6.558838e-02]'  |   1.529883e+00  |
 Inside contract  |
 Iter                    Best x                     f(best x)
  Action
```

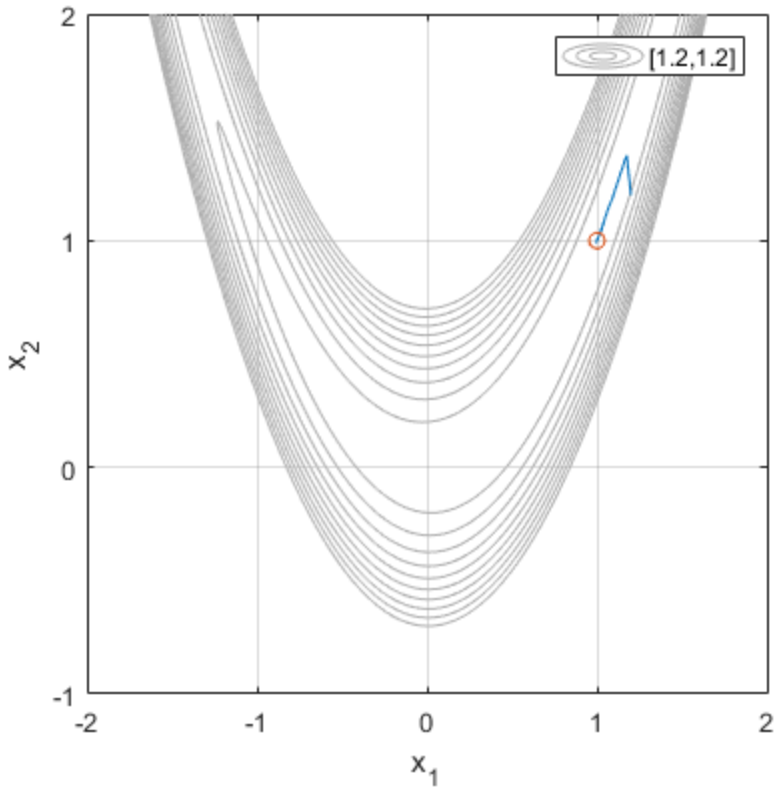
```
  21  |  [  -2.306763e-01,    6.558838e-02]'  |   1.529883e+00  |
      Reflect  |
  22  |  [  -1.631020e-01,   -1.192551e-02]'  |   1.501245e+00  |
       Expand  |
  23  |  [  -2.139091e-02,   -2.649574e-02]'  |   1.115888e+00  |
Inside contract  |
  24  |  [  -2.139091e-02,   -2.649574e-02]'  |   1.115888e+00  |
       Expand  |
  25  |  [   5.192552e-02,    1.889071e-02]'  |   9.250713e-01  |
      Reflect  |
  26  |  [   5.192552e-02,    1.889071e-02]'  |   9.250713e-01  |
      Reflect  |
  27  |  [   2.653124e-01,    1.459255e-02]'  |   8.511088e-01  |
Outside contract  |
  28  |  [   1.419304e-01,    4.050940e-02]'  |   7.777573e-01  |
Inside contract  |
  29  |  [   1.277735e-01,    2.322085e-02]'  |   7.655329e-01  |
Inside contract  |
  30  |  [   2.000822e-01,    2.322884e-02]'  |   6.681061e-01  |
      Reflect  |
Iter                    Best x                     f(best x)
 Action
  31  |  [   2.000822e-01,    2.322884e-02]'  |   6.681061e-01  |
Inside contract  |
  32  |  [   2.000822e-01,    2.322884e-02]'  |   6.681061e-01  |
      Reflect  |
  33  |  [   2.000822e-01,    2.322884e-02]'  |   6.681061e-01  |
       Expand  |
  34  |  [   2.411644e-01,    5.132474e-02]'  |   5.805039e-01  |
      Reflect  |
  35  |  [   2.411644e-01,    5.132474e-02]'  |   5.805039e-01  |
      Reflect  |
  36  |  [   3.077833e-01,    6.645822e-02]'  |   5.590965e-01  |
      Reflect  |
  37  |  [   2.822467e-01,    7.942064e-02]'  |   5.151757e-01  |
      Reflect  |
  38  |  [   3.488656e-01,    9.455412e-02]'  |   4.977050e-01  |
      Reflect  |
  39  |  [   3.233290e-01,    1.075165e-01]'  |   4.587687e-01  |
      Reflect  |
  40  |  [   3.899479e-01,    1.226500e-01]'  |   4.586544e-01  |
      Reflect  |
Iter                    Best x                     f(best x)
 Action
  41  |  [   3.644113e-01,    1.356124e-01]'  |   4.047665e-01  |
      Reflect  |
  42  |  [   3.644113e-01,    1.356124e-01]'  |   4.047665e-01  |
      Reflect  |
  43  |  [   4.054935e-01,    1.637084e-01]'  |   3.534893e-01  |
Inside contract  |
  44  |  [   4.054935e-01,    1.637084e-01]'  |   3.534893e-01  |
      Reflect  |
  45  |  [   4.054935e-01,    1.637084e-01]'  |   3.534893e-01  |
       Expand  |
```

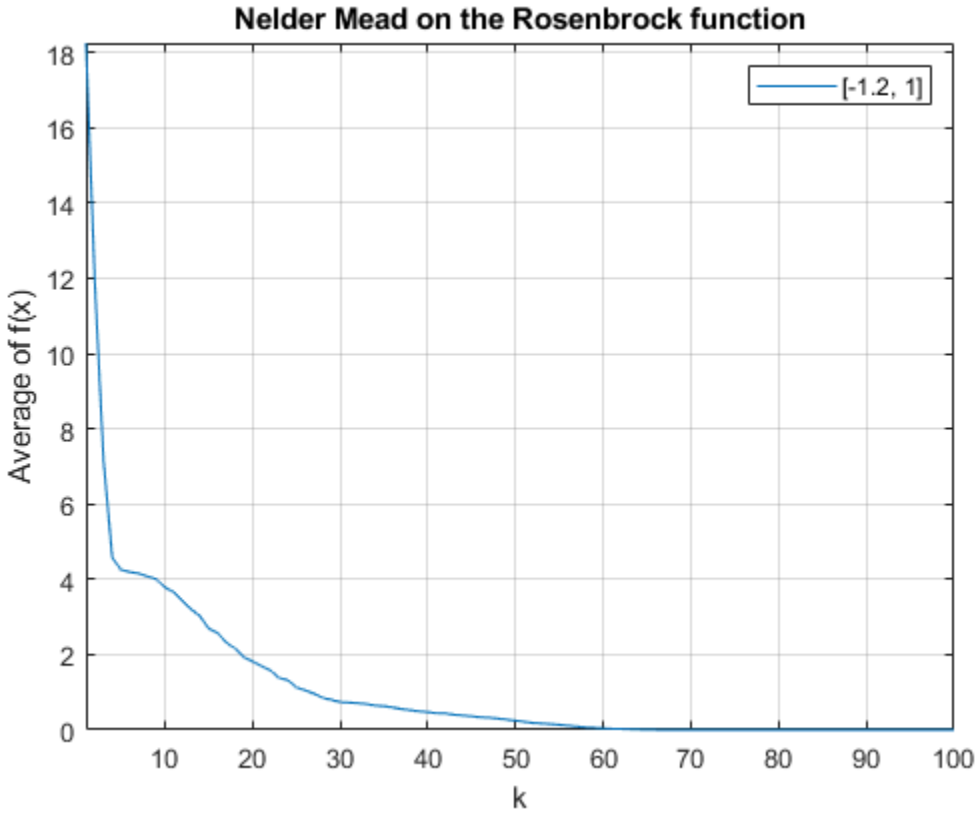
```
  46  |  [   4.658681e-01,    2.126048e-01]'  |   2.872579e-01  |
Inside contract  |
  47  |  [   4.658681e-01,    2.126048e-01]'  |   2.872579e-01  |
      Reflect  |
  48  |  [   4.658681e-01,    2.126048e-01]'  |   2.872579e-01  |
       Expand  |
  49  |  [   5.681753e-01,    3.006380e-01]'  |   2.356911e-01  |
       Expand  |
  50  |  [   5.455617e-01,    3.056156e-01]'  |   2.128791e-01  |
      Reflect  |
Iter                    Best x                     f(best x)
 Action
  51  |  [   6.478689e-01,    3.936488e-01]'  |   1.920411e-01  |
      Reflect  |
  52  |  [   6.252553e-01,    3.986264e-01]'  |   1.463353e-01  |
Inside contract  |
  53  |  [   6.252553e-01,    3.986264e-01]'  |   1.463353e-01  |
Inside contract  |
  54  |  [   6.252553e-01,    3.986264e-01]'  |   1.463353e-01  |
       Expand  |
  55  |  [   6.977798e-01,    4.724866e-01]'  |   1.121019e-01  |
       Expand  |
  56  |  [   7.285251e-01,    5.382693e-01]'  |   7.935441e-02  |
Outside contract  |
  57  |  [   7.285251e-01,    5.382693e-01]'  |   7.935441e-02  |
       Expand  |
  58  |  [   8.328795e-01,    7.005612e-01]'  |   3.265293e-02  |
Inside contract  |
  59  |  [   8.328795e-01,    7.005612e-01]'  |   3.265293e-02  |
      Reflect  |
  60  |  [   8.732561e-01,    7.513764e-01]'  |   2.860759e-02  |
      Reflect  |
Iter                    Best x                     f(best x)
 Action
  61  |  [   9.372340e-01,    8.628532e-01]'  |   2.813348e-02  |
Inside contract  |
  62  |  [   8.690623e-01,    7.538380e-01]'  |   1.734953e-02  |
       Expand  |
  63  |  [   9.629322e-01,    9.222839e-01]'  |   3.828756e-03  |
Outside contract  |
  64  |  [   9.629322e-01,    9.222839e-01]'  |   3.828756e-03  |
      Reflect  |
  65  |  [   9.992488e-01,    9.941108e-01]'  |   1.925491e-03  |
Inside contract  |
  66  |  [   9.992488e-01,    9.941108e-01]'  |   1.925491e-03  |
      Reflect  |
  67  |  [   9.992488e-01,    9.941108e-01]'  |   1.925491e-03  |
Inside contract  |
  68  |  [   9.663174e-01,    9.354327e-01]'  |   1.411234e-03  |
Inside contract  |
  69  |  [   9.811672e-01,    9.642649e-01]'  |   6.029919e-04  |
Inside contract  |
  70  |  [   9.864955e-01,    9.719798e-01]'  |   3.248545e-04  |
      Reflect  |
```

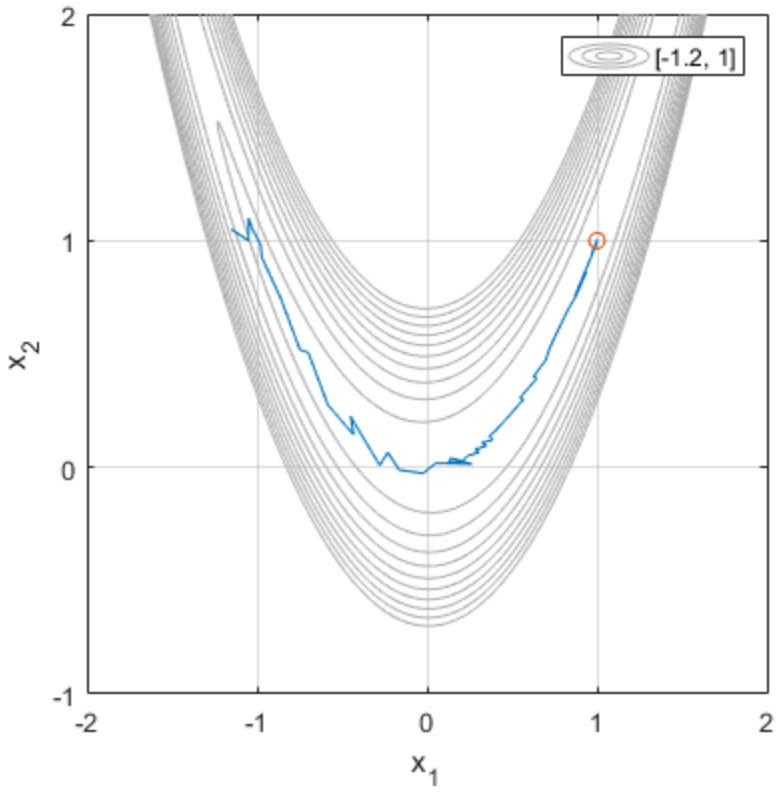
```
Iter                    Best x                     f(best x)
 Action
  71  |  [   9.864955e-01,    9.719798e-01]'  |   3.248545e-04  |
Inside contract  |
  72  |  [   9.875438e-01,    9.753304e-01]'  |   1.559230e-04  |
Inside contract  |
  73  |  [   9.875438e-01,    9.753304e-01]'  |   1.559230e-04  |
      Reflect  |
  74  |  [   9.952308e-01,    9.905841e-01]'  |   2.373961e-05  |
Inside contract  |
  75  |  [   9.952308e-01,    9.905841e-01]'  |   2.373961e-05  |
      Reflect  |
  76  |  [   9.952308e-01,    9.905841e-01]'  |   2.373961e-05  |
      Reflect  |
  77  |  [   1.002918e+00,    1.005838e+00]'  |   8.517405e-06  |
Inside contract  |
  78  |  [   9.997731e-01,    9.992800e-01]'  |   7.140359e-06  |
Inside contract  |
  79  |  [   9.982881e-01,    9.965715e-01]'  |   2.936460e-06  |
Inside contract  |
  80  |  [   1.000974e+00,    1.001882e+00]'  |   1.405817e-06  |
Outside contract  |
Iter                    Best x                     f(best x)
 Action
  81  |  [   9.995602e-01,    9.991999e-01]'  |   8.231564e-07  |
Inside contract  |
  82  |  [   9.992777e-01,    9.985562e-01]'  |   5.217939e-07  |
Inside contract  |
  83  |  [   1.000197e+00,    1.000380e+00]'  |   5.621152e-08  |
Inside contract  |
  84  |  [   1.000197e+00,    1.000380e+00]'  |   5.621152e-08  |
Outside contract  |
  85  |  [   1.000197e+00,    1.000380e+00]'  |   5.621152e-08  |
Inside contract  |
  86  |  [   9.999347e-01,    9.998888e-01]'  |   4.160435e-08  |
      Reflect  |
  87  |  [   9.998862e-01,    9.997614e-01]'  |   2.521673e-08  |
Inside contract  |
  88  |  [   1.000054e+00,    1.000102e+00]'  |   4.930513e-09  |
Inside contract  |
  89  |  [   1.000054e+00,    1.000102e+00]'  |   4.930513e-09  |
Inside contract  |
  90  |  [   1.000054e+00,    1.000102e+00]'  |   4.930513e-09  |
Inside contract  |
Iter                    Best x                     f(best x)
 Action
  91  |  [   9.999737e-01,    9.999452e-01]'  |   1.223287e-09  |
Inside contract  |
  92  |  [   9.999830e-01,    9.999671e-01]'  |   4.268003e-10  |
Inside contract  |
  93  |  [   9.999830e-01,    9.999671e-01]'  |   4.268003e-10  |
      Reflect  |
  94  |  [   9.999830e-01,    9.999671e-01]'  |   4.268003e-10  |
Inside contract  |
```

```
   95  |  [   1.000010e+00,    1.000019e+00]'  |   1.570888e-10  |
 Inside contract  |
   96  |  [   1.000011e+00,    1.000022e+00]'  |   1.487285e-10  |
 Inside contract  |
   97  |  [   9.999967e-01,    9.999939e-01]'  |   3.972401e-11  |
 Inside contract  |
   98  |  [   9.999967e-01,    9.999939e-01]'  |   3.972401e-11  |
 Outside contract  |
   99  |  [   9.999973e-01,    9.999946e-01]'  |   7.702900e-12  |
 Inside contract  |
Iterarion limit reached.
```




[1.2,1.2]
2
1
0
-1
-2
-1
0
1
2
x2
x1


Nelder Mead on the Rosenbrock function
[-1.2, 1]
18
16
14
12
10
8
6
4
2
0
10
20
30
40
50
60
70
80
90
100
Average of f(x)
k



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