HIMMELBLAU

Mk function: @(x)hessf(x)
x0 = [5.00 ; 5.00]

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.. #  0: R=        NaN| f(x)=        890 | x(1)=          5 | x(2)=          5 | step=        NaN   | crate=        NaN | ||gradf||=     655.35
NF #  1: R=    0.71831| f(x)=     114.81 | x(1)=     3.6856 | x(2)=     3.4849 | step=          1   | crate=        NaN | ||gradf||=     172.52
NF #  2: R=    0.64708| f(x)=     9.4933 | x(1)=     3.0779 | x(2)=      2.609 | step=          1   | crate=        NaN | ||gradf||=     37.497
NF #  3: R=    0.46067| f(x)=    0.46668 | x(1)=     2.9665 | x(2)=     2.1716 | step=          1   | crate=     0.4233 | ||gradf||=     5.9624
NF #  4: R=    0.30708| f(x)=  0.0053798 | x(1)=     2.9956 | x(2)=     2.0193 | step=          1   | crate=    0.34376 | ||gradf||=    0.57799
NF #  5: R=    0.24684| f(x)= 1.1589e-06 | x(1)=     2.9999 | x(2)=     2.0003 | step=          1   | crate=    0.12551 | ||gradf||=  0.0084733
NF #  6: R=    0.23958| f(x)= 5.7423e-14 | x(1)=          3 | x(2)=          2 | step=          1   | crate=   0.014914 | ||gradf||= 1.8826e-06
NF #  7: R=    0.23947| f(x)= 1.5777e-28 | x(1)=          3 | x(2)=          2 | step=          1   | crate= 0.00022281 | ||gradf||= 1.1291e-13

Mk function: @(x)hessf(x)
Hessian approximation at last iterate (rank = 2, condition = 3.199764e+00, eigenvalues = (25.7157, 82.2843)):
                      74                         20
                      20          34.0000000000001

Hessian (exact) at last iterate (rank = 2, condition = 3.199764e+00, eigenvalues = (25.7157, 82.2843)):
                      74                         20
                      20          34.0000000000001

  x0 = [5.00 ; 5.00]
   x = [3.00000000 ; 2.00000000]
f(x) = 1.5777218e-28
 #it = 7  #f = 22  #gradf = 8  #hessf = 7
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Mk function: @(x)diag(diag(hessf(x)))
x0 = [5.00 ; 5.00]

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.. #  0: R=        NaN| f(x)=        890 | x(1)=          5 | x(2)=          5 | step=        NaN   | crate=        NaN | ||gradf||=     655.35
NF #  1: R=    0.94558| f(x)=     73.485 | x(1)=     3.4676 | x(2)=     3.3061 | step=          1   | crate=        NaN | ||gradf||=     130.18
NF #  2: R=    0.97044| f(x)=     3.0801 | x(1)=     2.8196 | x(2)=     2.4115 | step=          1   | crate=        NaN | ||gradf||=     15.015
NF #  3: R=    0.87335| f(x)=    0.54529 | x(1)=     2.8819 | x(2)=     2.1483 | step=          1   | crate=    0.24484 | ||gradf||=     6.1814
NF #  4: R=     0.6174| f(x)=   0.086525 | x(1)=      2.962 | x(2)=     2.0706 | step=          1   | crate=    0.41236 | ||gradf||=     2.2132
NF #  5: R=    0.52117| f(x)=   0.014009 | x(1)=     2.9809 | x(2)=     2.0236 | step=          1   | crate=    0.45392 | ||gradf||=     1.0271
NF #  6: R=    0.48216| f(x)=  0.0022249 | x(1)=     2.9937 | x(2)=     2.0113 | step=          1   | crate=    0.35117 | ||gradf||=    0.35453
NF #  7: R=    0.46905| f(x)= 0.00035471 | x(1)=      2.997 | x(2)=     2.0038 | step=          1   | crate=    0.46185 | ||gradf||=    0.16454
NF #  8: R=    0.46301| f(x)= 5.6382e-05 | x(1)=      2.999 | x(2)=     2.0018 | step=          1   | crate=    0.34409 | ||gradf||=   0.056478
NF #  9: R=    0.46098| f(x)= 8.9677e-06 | x(1)=     2.9995 | x(2)=     2.0006 | step=          1   | crate=    0.46335 | ||gradf||=    0.02619
NF # 10: R=    0.46002| f(x)= 1.4257e-06 | x(1)=     2.9998 | x(2)=     2.0003 | step=          1   | crate=    0.34309 | ||gradf||=  0.0089821
NF # 11: R=     0.4597| f(x)= 2.2667e-07 | x(1)=     2.9999 | x(2)=     2.0001 | step=          1   | crate=     0.4636 | ||gradf||=  0.0041646
NF # 12: R=    0.45955| f(x)= 3.6037e-08 | x(1)=          3 | x(2)=          2 | step=          1   | crate=    0.34293 | ||gradf||=  0.0014281
NF # 13: R=     0.4595| f(x)= 5.7293e-09 | x(1)=          3 | x(2)=          2 | step=          1   | crate=    0.46363 | ||gradf||= 0.00066212
NF # 14: R=    0.45947| f(x)= 9.1085e-10 | x(1)=          3 | x(2)=          2 | step=          1   | crate=     0.3429 | ||gradf||= 0.00022704
NF # 15: R=    0.45947| f(x)= 1.4481e-10 | x(1)=          3 | x(2)=          2 | step=          1   | crate=    0.46364 | ||gradf||= 0.00010527
NF # 16: R=    0.45946| f(x)= 2.3022e-11 | x(1)=          3 | x(2)=          2 | step=          1   | crate=     0.3429 | ||gradf||= 3.6096e-05
NF # 17: R=    0.45946| f(x)= 3.6601e-12 | x(1)=          3 | x(2)=          2 | step=          1   | crate=    0.46364 | ||gradf||= 1.6735e-05
NF # 18: R=    0.45946| f(x)=  5.819e-13 | x(1)=          3 | x(2)=          2 | step=          1   | crate=     0.3429 | ||gradf||= 5.7386e-06
NF # 19: R=    0.45946| f(x)= 9.2511e-14 | x(1)=          3 | x(2)=          2 | step=          1   | crate=    0.46364 | ||gradf||= 2.6606e-06
NF # 20: R=    0.45946| f(x)= 1.4708e-14 | x(1)=          3 | x(2)=          2 | step=          1   | crate=     0.3429 | ||gradf||= 9.1233e-07

Mk function: @(x)diag(diag(hessf(x)))
Hessian approximation at last iterate (rank = 2, condition = 2.176470e+00, eigenvalues = (34, 74)):
          73.9999989369146                         0
                         0          34.0000013255468

Hessian (exact) at last iterate (rank = 2, condition = 3.199764e+00, eigenvalues = (25.7157, 82.2843)):
          73.9999989369146          20.0000000504203
          20.0000000504203          34.0000013255468

  x0 = [5.00 ; 5.00]
   x = [2.99999998 ; 2.00000003]
f(x) = 1.4707689e-14
 #it = 20  #f = 61  #gradf = 21  #hessf = 20
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Mk function: @(x)hessf(x0)
x0 = [5.00 ; 5.00]

```
.. #  0: R=        NaN| f(x)=        890 | x(1)=          5 | x(2)=          5 | step=        NaN   | crate=        NaN | ||gradf||=     655.35
NF #  1: R=    0.71831| f(x)=     114.81 | x(1)=     3.6856 | x(2)=     3.4849 | step=          1   | crate=        NaN | ||gradf||=     172.52
NF #  2: R=    0.71831| f(x)=     44.699 | x(1)=     3.3601 | x(2)=     3.0693 | step=          1   | crate=        NaN | ||gradf||=     96.184
NF #  3: R=    0.71831| f(x)=     21.582 | x(1)=     3.1908 | x(2)=     2.8281 | step=          1   | crate=    0.55813 | ||gradf||=      61.64
NF #  4: R=    0.71831| f(x)=     11.759 | x(1)=     3.0916 | x(2)=     2.6667 | step=          1   | crate=    0.64265 | ||gradf||=     42.488
NF #  5: R=    0.71831| f(x)=     6.9714 | x(1)=     3.0308 | x(2)=     2.5504 | step=          1   | crate=    0.69282 | ||gradf||=     30.715
NF #  6: R=    0.71831| f(x)=     4.4105 | x(1)=     2.9931 | x(2)=     2.4626 | step=          1   | crate=    0.72872 | ||gradf||=      23.01
NF #  7: R=    0.71831| f(x)=     2.9393 | x(1)=       2.97 | x(2)=     2.3939 | step=          1   | crate=    0.75754 | ||gradf||=     17.747
NF #  8: R=    0.71831| f(x)=     2.0427 | x(1)=     2.9565 | x(2)=     2.3389 | step=          1   | crate=    0.78224 | ||gradf||=     14.034
NF #  9: R=    0.71831| f(x)=     1.4676 | x(1)=     2.9493 | x(2)=     2.2939 | step=          1   | crate=    0.80387 | ||gradf||=     11.343
NF # 10: R=    0.71831| f(x)=     1.0823 | x(1)=     2.9463 | x(2)=     2.2566 | step=          1   | crate=    0.82264 | ||gradf||=     9.3444
NF # 11: R=    0.71831| f(x)=    0.81444 | x(1)=      2.946 | x(2)=     2.2252 | step=          1   | crate=    0.83851 | ||gradf||=     7.8238
NF # 12: R=    0.71831| f(x)=     0.6224 | x(1)=     2.9475 | x(2)=     2.1984 | step=          1   | crate=    0.85149 | ||gradf||=     6.6404
NF # 13: R=    0.71831| f(x)=    0.48129 | x(1)=       2.95 | x(2)=     2.1755 | step=          1   | crate=    0.86179 | ||gradf||=     5.6993
NF # 14: R=    0.71831| f(x)=    0.37555 | x(1)=     2.9531 | x(2)=     2.1557 | step=          1   | crate=    0.86976 | ||gradf||=     4.9357
NF # 15: R=    0.71831| f(x)=    0.29509 | x(1)=     2.9565 | x(2)=     2.1385 | step=          1   | crate=    0.87585 | ||gradf||=     4.3053
NF # 16: R=    0.71831| f(x)=    0.23314 | x(1)=       2.96 | x(2)=     2.1234 | step=          1   | crate=    0.88047 | ||gradf||=      3.777
NF # 17: R=    0.71831| f(x)=    0.18501 | x(1)=     2.9634 | x(2)=     2.1102 | step=          1   | crate=    0.88399 | ||gradf||=     3.3287
NF # 18: R=    0.71831| f(x)=    0.14733 | x(1)=     2.9667 | x(2)=     2.0985 | step=          1   | crate=    0.88669 | ||gradf||=     2.9443
NF # 19: R=    0.71831| f(x)=    0.11766 | x(1)=     2.9698 | x(2)=     2.0882 | step=          1   | crate=    0.88882 | ||gradf||=      2.612
NF # 20: R=    0.71831| f(x)=   0.094204 | x(1)=     2.9727 | x(2)=     2.0791 | step=          1   | crate=    0.89052 | ||gradf||=     2.3229
NF # 21: R=    0.71831| f(x)=   0.075579 | x(1)=     2.9753 | x(2)=     2.0709 | step=          1   | crate=    0.89191 | ||gradf||=     2.0699
NF # 22: R=    0.71831| f(x)=   0.060745 | x(1)=     2.9777 | x(2)=     2.0637 | step=          1   | crate=    0.89309 | ||gradf||=     1.8476
NF # 23: R=    0.71831| f(x)=   0.048899 | x(1)=     2.9799 | x(2)=     2.0572 | step=          1   | crate=    0.89409 | ||gradf||=     1.6514
NF # 24: R=    0.71831| f(x)=   0.039417 | x(1)=     2.9819 | x(2)=     2.0514 | step=          1   | crate=    0.89497 | ||gradf||=     1.4779
NF # 25: R=    0.71831| f(x)=   0.031813 | x(1)=     2.9837 | x(2)=     2.0463 | step=          1   | crate=    0.89574 | ||gradf||=     1.3241
NF # 26: R=    0.71831| f(x)=   0.025703 | x(1)=     2.9854 | x(2)=     2.0416 | step=          1   | crate=    0.89644 | ||gradf||=     1.1873
NF # 27: R=    0.71831| f(x)=   0.020786 | x(1)=     2.9868 | x(2)=     2.0375 | step=          1   | crate=    0.89706 | ||gradf||=     1.0655
NF # 28: R=    0.71831| f(x)=   0.016825 | x(1)=     2.9882 | x(2)=     2.0337 | step=          1   | crate=    0.89763 | ||gradf||=    0.95681
NF # 29: R=    0.71831| f(x)=   0.013629 | x(1)=     2.9893 | x(2)=     2.0304 | step=          1   | crate=    0.89814 | ||gradf||=    0.85976
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NF # 30: R=    0.71831| f(x)=   0.011047 | x(1)=     2.9904 | x(2)=     2.0274 | step=         1   | crate=     0.8986 | ||gradf||=    0.77298
NF # 31: R=    0.71831| f(x)=  0.0089606 | x(1)=     2.9914 | x(2)=     2.0247 | step=         1   | crate=    0.89903 | ||gradf||=    0.69528
NF # 32: R=    0.71831| f(x)=   0.007272 | x(1)=     2.9922 | x(2)=     2.0223 | step=         1   | crate=    0.89941 | ||gradf||=    0.62566
NF # 33: R=    0.71831| f(x)=  0.0059045 | x(1)=      2.993 | x(2)=     2.0201 | step=         1   | crate=    0.89976 | ||gradf||=    0.56323
NF # 34: R=    0.71831| f(x)=  0.0047964 | x(1)=     2.9937 | x(2)=     2.0181 | step=         1   | crate=    0.90008 | ||gradf||=    0.50719
NF # 35: R=    0.71831| f(x)=  0.0038978 | x(1)=     2.9943 | x(2)=     2.0163 | step=         1   | crate=    0.90037 | ||gradf||=    0.45686
NF # 36: R=    0.71831| f(x)=  0.0031687 | x(1)=     2.9949 | x(2)=     2.0147 | step=         1   | crate=    0.90063 | ||gradf||=    0.41164
NF # 37: R=    0.71831| f(x)=  0.0025768 | x(1)=     2.9954 | x(2)=     2.0133 | step=         1   | crate=    0.90087 | ||gradf||=    0.37099
NF # 38: R=    0.71831| f(x)=  0.0020961 | x(1)=     2.9958 | x(2)=      2.012 | step=         1   | crate=    0.90109 | ||gradf||=    0.33442
NF # 39: R=    0.71831| f(x)=  0.0017055 | x(1)=     2.9963 | x(2)=     2.0108 | step=         1   | crate=    0.90128 | ||gradf||=    0.30151
NF # 40: R=    0.71831| f(x)=  0.0013881 | x(1)=     2.9966 | x(2)=     2.0098 | step=         1   | crate=    0.90146 | ||gradf||=    0.27188
NF # 41: R=    0.71831| f(x)=    0.00113 | x(1)=      2.997 | x(2)=     2.0088 | step=         1   | crate=    0.90162 | ||gradf||=    0.24521
NF # 42: R=    0.71831| f(x)= 0.00092001 | x(1)=     2.9973 | x(2)=     2.0079 | step=         1   | crate=    0.90177 | ||gradf||=    0.22118
NF # 43: R=    0.71831| f(x)= 0.00074921 | x(1)=     2.9975 | x(2)=     2.0072 | step=         1   | crate=     0.9019 | ||gradf||=    0.19953
NF # 44: R=    0.71831| f(x)= 0.00061021 | x(1)=     2.9978 | x(2)=     2.0065 | step=         1   | crate=    0.90202 | ||gradf||=    0.18003
NF # 45: R=    0.71831| f(x)= 0.00049707 | x(1)=      2.998 | x(2)=     2.0058 | step=         1   | crate=    0.90213 | ||gradf||=    0.16244
NF # 46: R=    0.71831| f(x)= 0.00040496 | x(1)=     2.9982 | x(2)=     2.0053 | step=         1   | crate=    0.90223 | ||gradf||=    0.14659
NF # 47: R=    0.71831| f(x)= 0.00032995 | x(1)=     2.9984 | x(2)=     2.0048 | step=         1   | crate=    0.90231 | ||gradf||=    0.13229
NF # 48: R=    0.71831| f(x)= 0.00026887 | x(1)=     2.9985 | x(2)=     2.0043 | step=         1   | crate=    0.90239 | ||gradf||=     0.1194
NF # 49: R=    0.71831| f(x)= 0.00021912 | x(1)=     2.9987 | x(2)=     2.0039 | step=         1   | crate=    0.90247 | ||gradf||=    0.10777
NF # 50: R=    0.71831| f(x)= 0.00017858 | x(1)=     2.9988 | x(2)=     2.0035 | step=         1   | crate=    0.90253 | ||gradf||=   0.097275
NF # 51: R=    0.71831| f(x)= 0.00014556 | x(1)=     2.9989 | x(2)=     2.0032 | step=         1   | crate=    0.90259 | ||gradf||=    0.08781
NF # 52: R=    0.71831| f(x)= 0.00011865 | x(1)=      2.999 | x(2)=     2.0029 | step=         1   | crate=    0.90264 | ||gradf||=   0.079269
NF # 53: R=    0.71831| f(x)= 9.6725e-05 | x(1)=     2.9991 | x(2)=     2.0026 | step=         1   | crate=    0.90269 | ||gradf||=   0.071563
NF # 54: R=    0.71831| f(x)= 7.8854e-05 | x(1)=     2.9992 | x(2)=     2.0023 | step=         1   | crate=    0.90274 | ||gradf||=   0.064608
NF # 55: R=    0.71831| f(x)= 6.4288e-05 | x(1)=     2.9993 | x(2)=     2.0021 | step=         1   | crate=    0.90278 | ||gradf||=   0.058331
NF # 56: R=    0.71831| f(x)= 5.2415e-05 | x(1)=     2.9993 | x(2)=     2.0019 | step=         1   | crate=    0.90281 | ||gradf||=   0.052666
NF # 57: R=    0.71831| f(x)= 4.2736e-05 | x(1)=     2.9994 | x(2)=     2.0017 | step=         1   | crate=    0.90284 | ||gradf||=   0.047552
NF # 58: R=    0.71831| f(x)= 3.4847e-05 | x(1)=     2.9995 | x(2)=     2.0015 | step=         1   | crate=    0.90287 | ||gradf||=   0.042936
NF # 59: R=    0.71831| f(x)= 2.8414e-05 | x(1)=     2.9995 | x(2)=     2.0014 | step=         1   | crate=     0.9029 | ||gradf||=   0.038769
NF # 60: R=    0.71831| f(x)=  2.317e-05 | x(1)=     2.9996 | x(2)=     2.0013 | step=         1   | crate=    0.90292 | ||gradf||=   0.035007
NF # 61: R=    0.71831| f(x)= 1.8894e-05 | x(1)=     2.9996 | x(2)=     2.0011 | step=         1   | crate=    0.90294 | ||gradf||=   0.031611
NF # 62: R=    0.71831| f(x)= 1.5408e-05 | x(1)=     2.9996 | x(2)=      2.001 | step=         1   | crate=    0.90296 | ||gradf||=   0.028544
NF # 63: R=    0.71831| f(x)= 1.2565e-05 | x(1)=     2.9997 | x(2)=     2.0009 | step=         1   | crate=    0.90298 | ||gradf||=   0.025776
NF # 64: R=    0.71831| f(x)= 1.0247e-05 | x(1)=     2.9997 | x(2)=     2.0008 | step=         1   | crate=      0.903 | ||gradf||=   0.023276
NF # 65: R=    0.71831| f(x)= 8.3566e-06 | x(1)=     2.9997 | x(2)=     2.0008 | step=         1   | crate=    0.90301 | ||gradf||=   0.021019
NF # 66: R=    0.71831| f(x)= 6.8151e-06 | x(1)=     2.9998 | x(2)=     2.0007 | step=         1   | crate=    0.90302 | ||gradf||=   0.018982
NF # 67: R=    0.71831| f(x)= 5.5581e-06 | x(1)=     2.9998 | x(2)=     2.0006 | step=         1   | crate=    0.90304 | ||gradf||=   0.017141
NF # 68: R=    0.71831| f(x)=  4.533e-06 | x(1)=     2.9998 | x(2)=     2.0006 | step=         1   | crate=    0.90305 | ||gradf||=    0.01548
NF # 69: R=    0.71831| f(x)=  3.697e-06 | x(1)=     2.9998 | x(2)=     2.0005 | step=         1   | crate=    0.90305 | ||gradf||=   0.013979
NF # 70: R=    0.71831| f(x)= 3.0152e-06 | x(1)=     2.9998 | x(2)=     2.0005 | step=         1   | crate=    0.90306 | ||gradf||=   0.012624
NF # 71: R=    0.71831| f(x)= 2.4592e-06 | x(1)=     2.9999 | x(2)=     2.0004 | step=         1   | crate=    0.90307 | ||gradf||=   0.011401
NF # 72: R=    0.71831| f(x)= 2.0057e-06 | x(1)=     2.9999 | x(2)=     2.0004 | step=         1   | crate=    0.90308 | ||gradf||=   0.010296
NF # 73: R=    0.71831| f(x)= 1.6359e-06 | x(1)=     2.9999 | x(2)=     2.0003 | step=         1   | crate=    0.90308 | ||gradf||=  0.0092984
NF # 74: R=    0.71831| f(x)= 1.3342e-06 | x(1)=     2.9999 | x(2)=     2.0003 | step=         1   | crate=    0.90309 | ||gradf||=  0.0083974
NF # 75: R=    0.71831| f(x)= 1.0882e-06 | x(1)=     2.9999 | x(2)=     2.0003 | step=         1   | crate=     0.9031 | ||gradf||=  0.0075837
NF # 76: R=    0.71831| f(x)= 8.8757e-07 | x(1)=     2.9999 | x(2)=     2.0002 | step=         1   | crate=     0.9031 | ||gradf||=  0.0068489
NF # 77: R=    0.71831| f(x)= 7.2393e-07 | x(1)=     2.9999 | x(2)=     2.0002 | step=         1   | crate=     0.9031 | ||gradf||=  0.0061853
NF # 78: R=    0.71831| f(x)= 5.9046e-07 | x(1)=     2.9999 | x(2)=     2.0002 | step=         1   | crate=    0.90311 | ||gradf||=  0.0055861
NF # 79: R=    0.71831| f(x)=  4.816e-07 | x(1)=     2.9999 | x(2)=     2.0002 | step=         1   | crate=    0.90311 | ||gradf||=  0.0050449
NF # 80: R=    0.71831| f(x)= 3.9281e-07 | x(1)=     2.9999 | x(2)=     2.0002 | step=         1   | crate=    0.90311 | ||gradf||=  0.0045561
NF # 81: R=    0.71831| f(x)= 3.2039e-07 | x(1)=     2.9999 | x(2)=     2.0001 | step=         1   | crate=    0.90312 | ||gradf||=  0.0041147
NF # 82: R=    0.71831| f(x)= 2.6132e-07 | x(1)=          3 | x(2)=     2.0001 | step=         1   | crate=    0.90312 | ||gradf||=  0.0037161
NF # 83: R=    0.71831| f(x)= 2.1315e-07 | x(1)=          3 | x(2)=     2.0001 | step=         1   | crate=    0.90312 | ||gradf||=  0.0033561
NF # 84: R=    0.71831| f(x)= 1.7385e-07 | x(1)=          3 | x(2)=     2.0001 | step=         1   | crate=    0.90312 | ||gradf||=   0.003031
NF # 85: R=    0.71831| f(x)=  1.418e-07 | x(1)=          3 | x(2)=     2.0001 | step=         1   | crate=    0.90313 | ||gradf||=  0.0027374
NF # 86: R=    0.71831| f(x)= 1.1566e-07 | x(1)=          3 | x(2)=     2.0001 | step=         1   | crate=    0.90313 | ||gradf||=  0.0024722
NF # 87: R=    0.71831| f(x)=  9.434e-08 | x(1)=          3 | x(2)=     2.0001 | step=         1   | crate=    0.90313 | ||gradf||=  0.0022327
NF # 88: R=    0.71831| f(x)= 7.6949e-08 | x(1)=          3 | x(2)=     2.0001 | step=         1   | crate=    0.90313 | ||gradf||=  0.0020165
NF # 89: R=    0.71831| f(x)= 6.2764e-08 | x(1)=          3 | x(2)=     2.0001 | step=         1   | crate=    0.90313 | ||gradf||=  0.0018211
NF # 90: R=    0.71831| f(x)= 5.1194e-08 | x(1)=          3 | x(2)=     2.0001 | step=         1   | crate=    0.90313 | ||gradf||=  0.0016447
NF # 91: R=    0.71831| f(x)= 4.1757e-08 | x(1)=          3 | x(2)=     2.0001 | step=         1   | crate=    0.90313 | ||gradf||=  0.0014854
NF # 92: R=    0.71831| f(x)= 3.4059e-08 | x(1)=          3 | x(2)=          2 | step=         1   | crate=    0.90313 | ||gradf||=  0.0013415
NF # 93: R=    0.71831| f(x)= 2.7781e-08 | x(1)=          3 | x(2)=          2 | step=         1   | crate=    0.90314 | ||gradf||=  0.0012116
NF # 94: R=    0.71831| f(x)=  2.266e-08 | x(1)=          3 | x(2)=          2 | step=         1   | crate=    0.90314 | ||gradf||=  0.0010942
NF # 95: R=    0.71831| f(x)= 1.8482e-08 | x(1)=          3 | x(2)=          2 | step=         1   | crate=    0.90314 | ||gradf||= 0.00098824
NF # 96: R=    0.71831| f(x)= 1.5075e-08 | x(1)=          3 | x(2)=          2 | step=         1   | crate=    0.90314 | ||gradf||= 0.00089252
NF # 97: R=    0.71831| f(x)= 1.2296e-08 | x(1)=          3 | x(2)=          2 | step=         1   | crate=    0.90314 | ||gradf||= 0.00080607
NF # 98: R=    0.71831| f(x)=  1.003e-08 | x(1)=          3 | x(2)=          2 | step=         1   | crate=    0.90314 | ||gradf||= 0.00072799
NF # 99: R=    0.71831| f(x)= 8.1809e-09 | x(1)=          3 | x(2)=          2 | step=         1   | crate=    0.90314 | ||gradf||= 0.00065748
NF #100: R=    0.71831| f(x)= 6.6729e-09 | x(1)=          3 | x(2)=          2 | step=         1   | crate=    0.90314 | ||gradf||=  0.0005938

Mk function: @(x)hessf(x0)
Hessian approximation at last iterate (rank = 2, condition = 1.332715e+00, eigenvalues = (245.208, 326.792)):
   278    40
    40   294

Hessian (exact) at last iterate (rank = 2, condition = 3.199664e+00, eigenvalues = (25.7165, 82.2841)):
          73.9995565485379          20.0000564310929
          20.0000564310929          34.0010006324777

  x0 = [5.00 ; 5.00]
   x = [2.99999265 ; 2.00002146]
f(x) = 6.6728755e-09
 #it = 100  #f = 301  #gradf = 101  #hessf = 100



================================================================================================
```