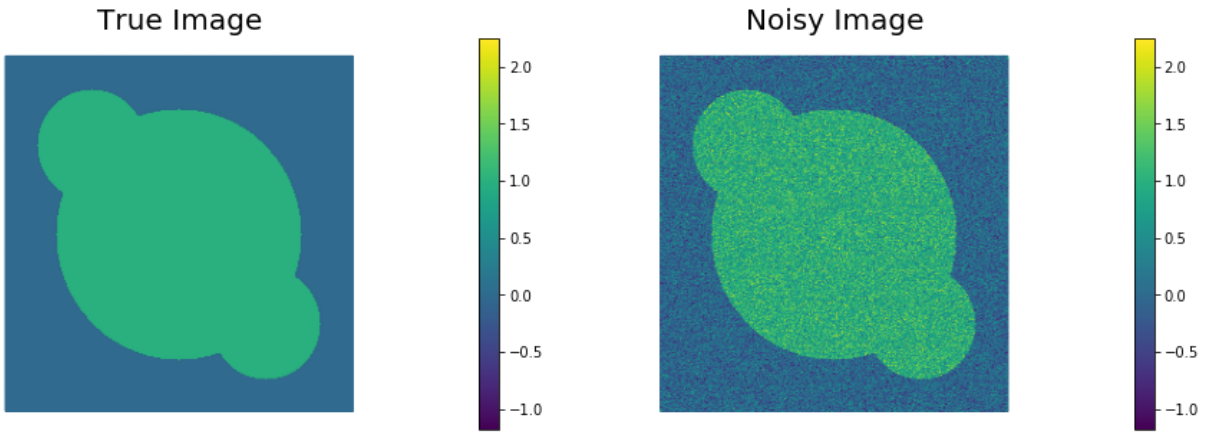
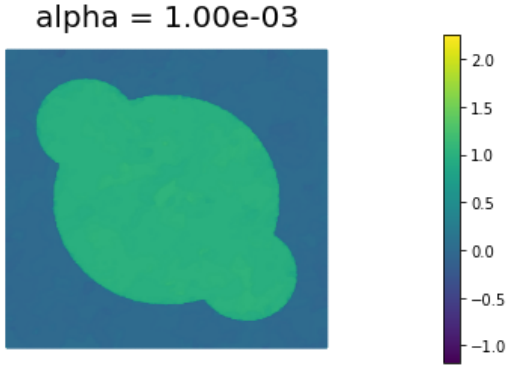
Out[1]: Toggle Code

Not showing the code to save space... This is simply just changing the nx and ny variables in the original code to 512, and setting $\alpha = 10^{-3}$ and $\beta = 10^{-2}$.



It	cost	||g||	(g,m_hat)	alpha_m	tol_cg	cg_it
0	8.260748e-02	7.478885e-04	-3.484335e-01	1.000000e+00	5.000000e-01	1
1	3.858014e-02	5.343510e-04	-8.201775e-02	1.000000e+00	5.000000e-01	1
2	3.529863e-02	4.490560e-04	-5.900333e-03	1.000000e+00	5.000000e-01	1
3	3.481471e-02	3.025374e-04	-7.166163e-04	1.000000e+00	5.000000e-01	1
4	3.466944e-02	2.018551e-04	-1.758879e-04	1.000000e+00	4.626002e-01	1
5	3.461762e-02	1.323255e-04	-6.063050e-05	1.000000e+00	3.778646e-01	1
6	3.459254e-02	9.850139e-05	-2.917246e-05	1.000000e+00	3.059413e-01	2
7	3.457665e-02	7.095766e-05	-1.874617e-05	1.000000e+00	2.639596e-01	2
8	3.456679e-02	5.056672e-05	-1.199533e-05	1.000000e+00	2.240350e-01	2
9	3.456113e-02	3.133892e-05	-7.302405e-06	1.000000e+00	1.891249e-01	3
10	3.455847e-02	1.814084e-05	-3.536808e-06	1.000000e+00	1.488875e-01	4
11	3.455748e-02	1.021648e-05	-1.356181e-06	1.000000e+00	1.132779e-01	6
12	3.455718e-02	5.614398e-06	-3.944729e-07	1.000000e+00	8.500940e-02	6
13	3.455709e-02	2.882788e-06	-1.200481e-07	1.000000e+00	6.301848e-02	7
14	3.455706e-02	1.141588e-06	-3.922506e-08	1.000000e+00	4.515675e-02	6
15	3.455705e-02	3.462273e-07	-7.812335e-09	1.000000e+00	2.841653e-02	8
16	3.455705e-02	7.772410e-08	-8.240646e-10	1.000000e+00	1.564937e-02	9
17	3.455705e-02	1.284781e-08	-4.773727e-11	1.000000e+00	7.414710e-03	11
18	3.455705e-02	1.298081e-09	-1.374647e-12	1.000000e+00	3.014608e-03	12

```
Norm of the gradient less than tolerance
Inexact Newton CG converged in  18 nonlinear iterations and  84 linear iterations.
Final norm of the gradient 1.2980812186947334e-09
Value of the cost functional 0.03455705385369036
```



With increasing resolution, the number of nonlinear iterations remains relatively the same (increase from 16 --> 16 --> 18 iterations). However, the number of linear iterations increase significantly (increase from 39 --> 60 --> 84 iterations).