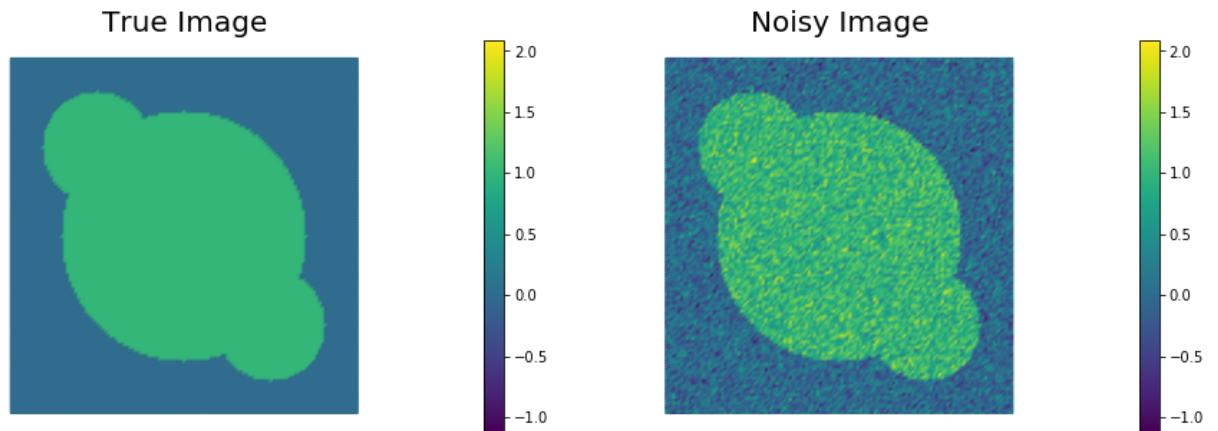Toggle Code

Part c (comments at end)

Not showing the code to save space... This is simply just changing the nx and ny variables in the original code to 128, and setting $\alpha = 10^{-3}$ and $\beta = 10^{-2}$.

True Image

Noisy Image

It	cost	||g||	(g,m_hat)	alpha_m	tol_cg	cg_it
0	6.481724e-02	2.473939e-03	-3.521540e-01	1.000000e+00	5.000000e-01	1
1	2.638124e-02	8.307224e-04	-7.168639e-02	1.000000e+00	5.000000e-01	1
2	2.441356e-02	5.342725e-04	-3.821957e-03	1.000000e+00	3.889516e-01	1
3	2.408310e-02	3.716204e-04	-4.265658e-04	1.000000e+00	3.119241e-01	1
4	2.392574e-02	2.671125e-04	-1.902518e-04	1.000000e+00	2.601461e-01	1
5	2.382109e-02	1.820026e-04	-1.324349e-04	1.000000e+00	2.205538e-01	1
6	2.376390e-02	1.173789e-04	-7.695945e-05	1.000000e+00	1.820566e-01	2
7	2.374153e-02	7.196415e-05	-3.063237e-05	1.000000e+00	1.462051e-01	2
8	2.373428e-02	4.158159e-05	-9.907232e-06	1.000000e+00	1.144790e-01	2
9	2.373210e-02	2.290914e-05	-2.953604e-06	1.000000e+00	8.701981e-02	2
10	2.373141e-02	9.780293e-06	-1.007406e-06	1.000000e+00	6.459099e-02	2
11	2.373129e-02	4.053540e-06	-1.645529e-07	1.000000e+00	4.220302e-02	3
12	2.373127e-02	1.379172e-06	-3.204120e-08	1.000000e+00	2.716970e-02	3
13	2.373127e-02	3.658624e-07	-4.223841e-09	1.000000e+00	1.584808e-02	4
14	2.373127e-02	7.612258e-08	-3.647224e-10	1.000000e+00	8.162561e-03	4
15	2.373127e-02	1.290831e-08	-2.296664e-11	1.000000e+00	3.723268e-03	4
16	2.373127e-02	1.542050e-09	-9.290155e-13	1.000000e+00	1.533212e-03	5

```
Norm of the gradient less than tolerance
Inexact Newton CG converged in   16 nonlinear iterations and   39 linear iterations.
Final norm of the gradient 1.5420502033367086e-09
Value of the cost functional 0.023731268739310744
```


alpha = 1.00e-03