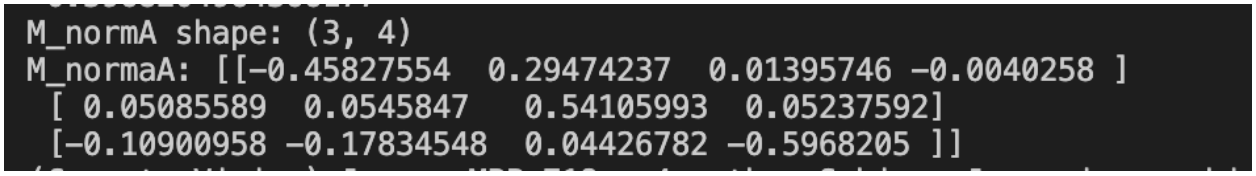
James Schiavo
jcs188
ECE1390

1a)
i) M_normaA: [[-0.45827554 0.29474237 0.01395746 -0.0040258]
[0.05085589 0.0545847   0.54105993 0.05237592]
[-0.10900958 -0.17834548 0.04426782 -0.5968205]]



ii) u_first: [1.04675229]
v_first: [-0.36260293]
u_last: [0.14190608]
v_last: [-0.45184301]

iii) Residual: 3.90314792173

1b)
i) Average residual: [[3.43935967 10.40523264 14.04318674]
[4.56810265 11.02032941 14.45870545]
[5.69140015 11.33223215 14.74144255]
[6.5135745 11.55864321 15.02628164]
[7.28105562 12.07180149 15.24241212]
[7.88463501 12.49544297 15.4872192]
[8.71646229 12.97675314 15.83360448]
[9.36461644 13.24730444 15.97530998]
[9.71244517 13.40190066 16.22882661]
[9.82287545 13.82274049 16.46879581]]

ii) The differences between the results for different Ks is very apparent due to overconstraining. You can see the affects of overconstraining the system by the higher average residual value when using a larger point set since it will make more errors.

iii) Best M matrix: [[-0.45791747 0.29506749 0.00675326 -0.00390071]
[0.05138258 0.05391832 0.54217645 0.05229688]
[-0.10651186 -0.17858938 0.0338192 -0.59713118]]

1c) Camera Center: [-1.5343684 -2.37450323 0.28509566]

2a) FINAL F: [[-6.60675944e-07 7.90642197e-06 -1.88480992e-03]
[8.82674944e-06 1.21863596e-06 1.72276843e-02]

[-9.08539064e-04 -2.64201801e-02 1.00000000e+00]]

2b) Fundamental matrix F: [[-5.35883058e-07 7.89972529e-06 -1.88480998e-03]
 [8.83820595e-06 1.21802118e-06 1.72276843e-02]
 [-9.08539027e-04 -2.64201801e-02 1.00000000e+00]]