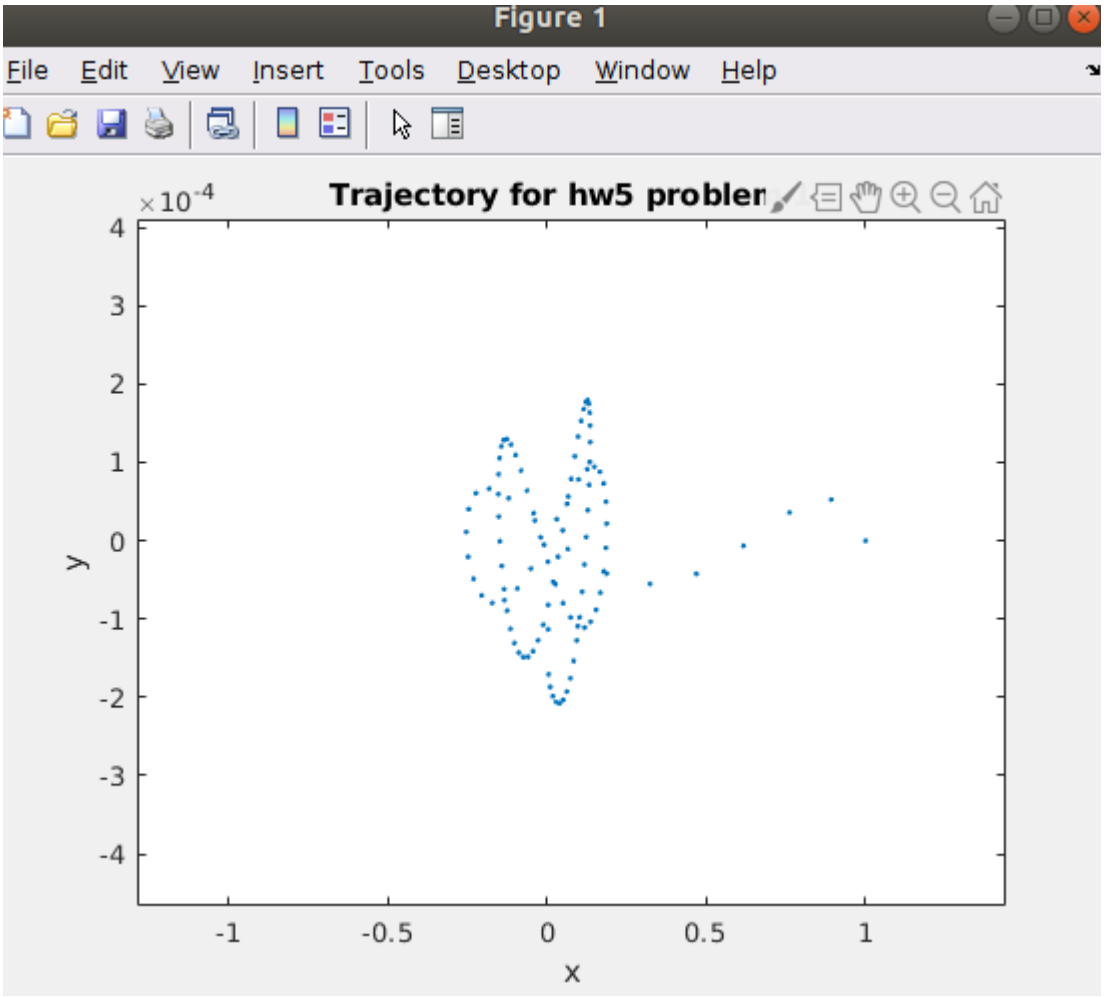
Active Learning HW 5 Ergodic Control and Exploration

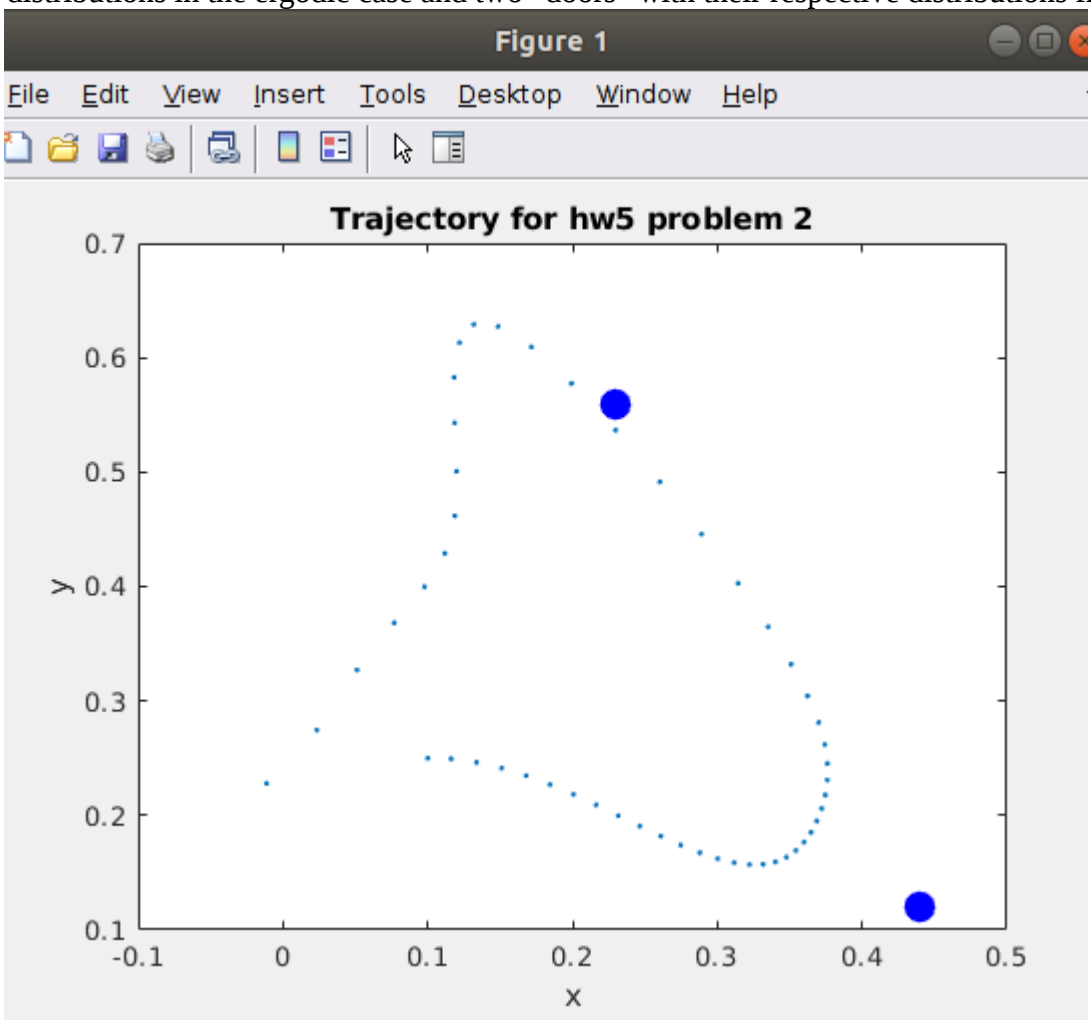
1)



The distribution centered at (0,0) describes the information, so an ergodic trajectory will both explore and go toward higher information as t→infinity. This explains the looping we see. Also, note that although the top left scale says * 10^-4, that only applies to the y-axis. The x-axis is scaled appropriately, and the initial conditions are (1,0).

2)

Ergodic exploration vs infotaxis with two high sources of information represented as a meshing of two Gaussian distributions in the ergodic case and two “doors” with their respective distributions from hw4.



This first case is the ergodic case where the two blue dots represent the doors. The starting point here is (0.1,0.25). Both doors are have their vicinities explored, however the direct door location itself is less explored than in the infotaxis. Then, the algorithm goes on to explore more beyond the doors.

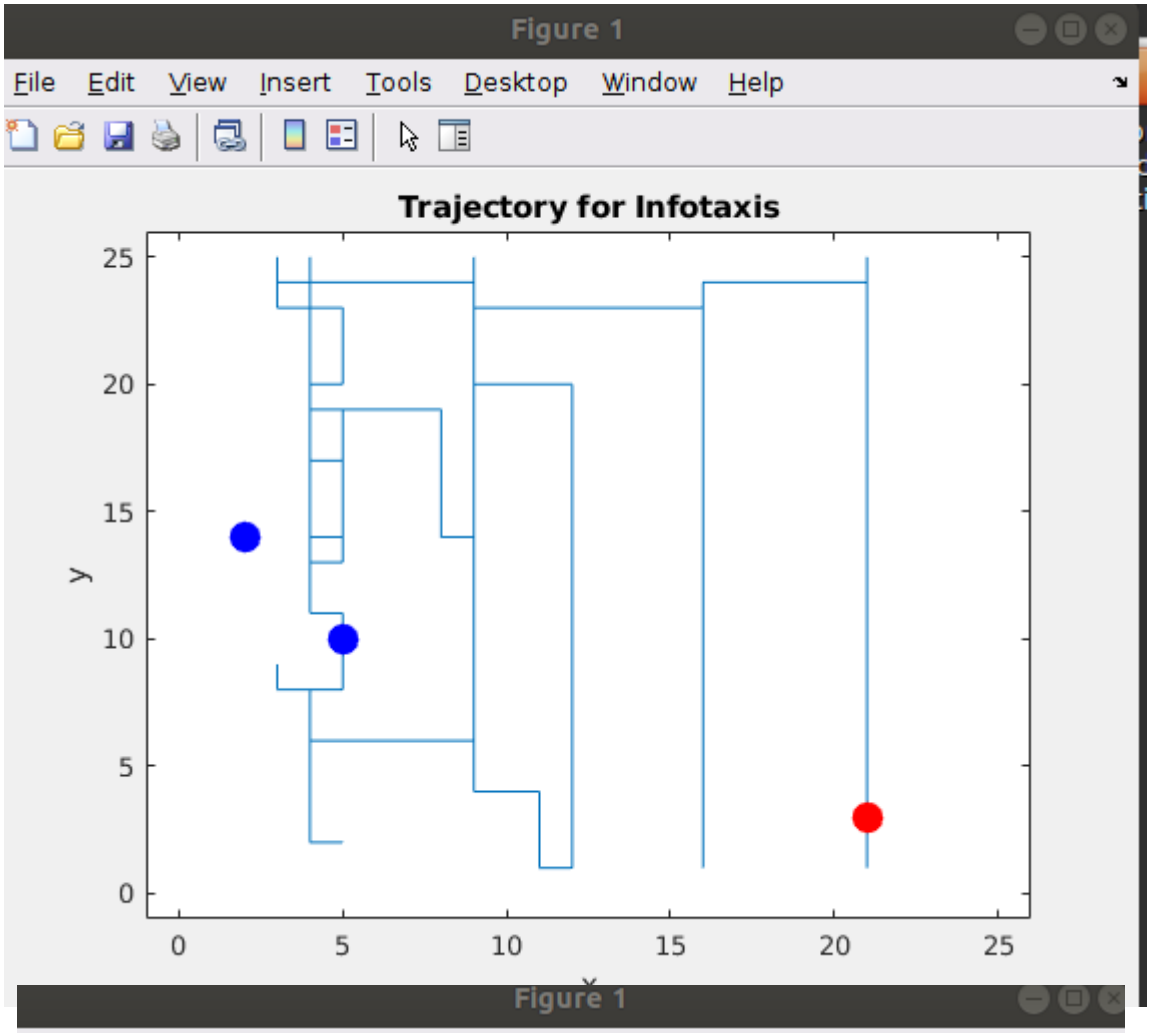
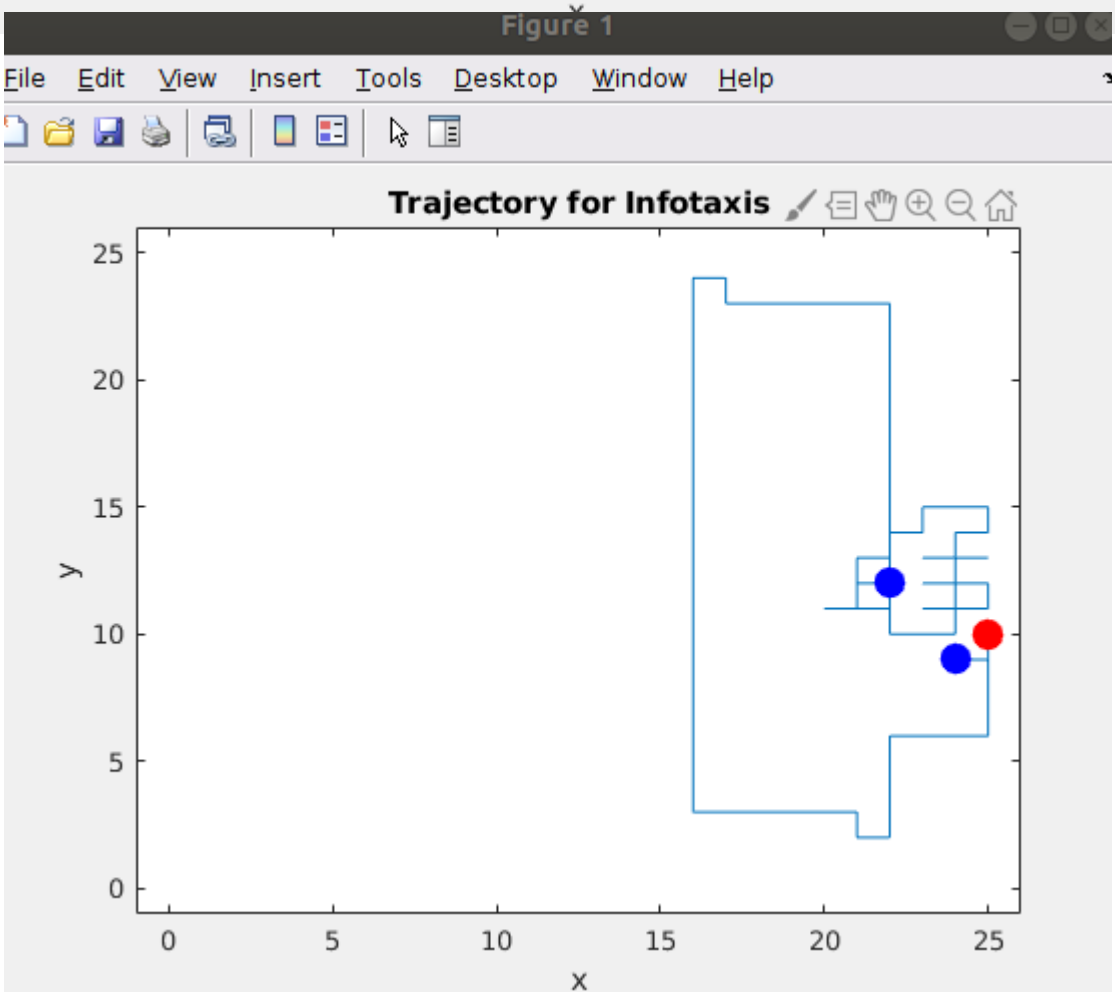


Figure 1
File Edit View Insert Tools Desktop Window Help
Trajectory for Infotaxis
25
20
15
10
5
0
y
0 5 10 15 20 25
x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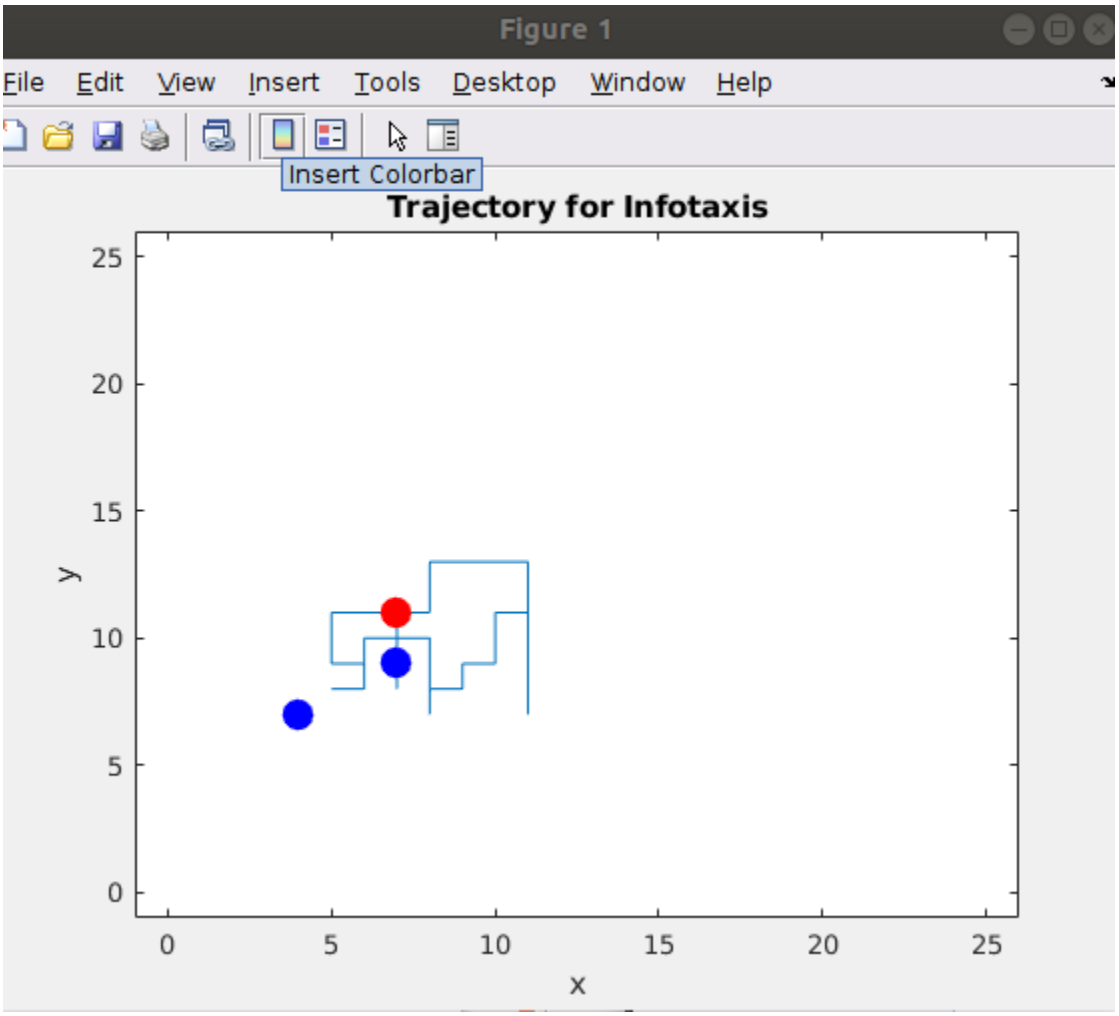

The above three examples are from infotaxis. The two blue dots represent doors, and the red dot is the initial measurement location. Sometimes both doors are reached, but more often than not, only one was explored and reached. Then, there was not much exploration beyond the door.