Temple CST 2100   Modeling & Simulation in Science and Technology   Spring 2016

Problem Set 3

(Out Thu 02/04/2016, Due Thu 02/11/2016)

Problem 3

(a) Combine the two Matlab files `temple_abm_butterfly_animation.m`
and `temple_abm_bacteria_run_and_tumble_and_eat.m` from the course website
`http://math.temple.edu/~seibold/teaching/2016_2100/`
to obtain a the following agent-based model. Butterflies conduct hill-topping, one after another, as in the example butterfly code. Moreover, each butterfly continuously lowers the ground below its position (similarly to the example bacteria code). Choose the magnitude of the ground reduction so large that each butterfly carves a visible, but not too deep, channel. Now let many butterflies conduct hill-topping (one after another, with the landscape constantly being modified). Let their paths end when they reached a hill top (as in the code `temple_abm_butterfly_corridor_width.m`). Submit (i.e., email to the course instructor and TA) your program under the filename `yourfamilyname_problem3a.m`

(b) Run your code from part (a) with 500 butterflies, and plot their paths and end points of their paths. Then remove (i.e., set to zero) the lowering of the ground, and re-run your code. Again, plot the paths and end points. Describe and explain the differences between the two cases.