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"""
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Cap 8

"""
from __future__ import print_function, division
#%matplotlib inline
import numpy as np
import matplotlib.pyplot as plt

import thinkplot
from matplotlib import rc
rc('animation', html='jshtml')
import warnings
import matplotlib.cbook
warnings.filterwarnings("ignore",category=matplotlib.cbook.mplDeprecation)
from thinkstats2 import RandomSeed
RandomSeed(17)

from Cell2D import Cell2D, Cell2DViewer
from scipy.signal import correlate2d

class Diffusion(Cell2D):
    """Automa cellulare di diffusione."""
    kernel = np.array([[0, 1, 0],
                       [1,-4, 1],
                       [0, 1, 0]])

    def __init__(self, n, r=0.1):
        """Initializza gli attributi.

        n: numerodi righe
        r: costante della velocità di diffusione
        """
        self.r = r
        self.array = np.zeros((n, n), np.float)

    def step(self):
        """Esegue un passo nel tempo."""
        c = correlate2d(self.array, self.kernel, mode='same')
        self.array += self.r * c
class DiffusionViewer(Cell2DViewer):
    cmap = plt.get_cmap('Blues')
diff = Diffusion(n=9, r=0.1)

diff.add_cells(3, 3, '111', '111', '111')
viewer = DiffusionViewer(diff)
anim = viewer.animate()
anim
thinkplot.preplot(cols=3)
viewer.draw()
thinkplot.subplot(2)
viewer.step(5)
viewer.draw()
thinkplot.subplot(3)
viewer.step(10)
viewer.draw()
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