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Cap 9
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n= int(input('numero di righe '))

level= int(input('livello '))
import thinkplot
from Sand import SandPile, SandPileViewer
from thinkstats2 import Hist, Pmf
import numpy as np

pile2 = SandPile(n, level)
pile2.run()
viewer = SandPileViewer(pile2)
viewer.draw()
iters=int(input('ripetizioni '))

res = [pile2.drop_and_run() for _ in range(iters)]
T, S = np.transpose(res)
T = T[T>1]
S = S[S>0]
histT=Hist(T)
histS=Hist(S)
pmfT = Pmf(T)
pmfS = Pmf(S)

def slope(xs, ys):
    return np.diff(np.log(ys)) / np.diff(np.log(xs))

thinkplot.preplot(cols=2)

xs = [2, 600]
ys = [1.3e-1, 2.2e-4]
print(slope(xs, ys))

options = dict(color='g', alpha=0.3, linewidth=3)
thinkplot.plot(xs, ys, **options)
thinkplot.Pdf(pmfT, label='T = passi nel tempo', linewidth=1.5, color='r')
thinkplot.config(xlabel='Durata delle valanghe',
                 xlim=[1, 1000],
                 ylabel='PMF',
                 xscale='log',
                 yscale='log',
                 loc='upper right')

thinkplot.subplot(2)

xs = [1, 5000]
ys = [1.3e-1, 2.3e-5]
print(slope(xs, ys))

thinkplot.plot(xs, ys, **options)
thinkplot.Pdf(pmfS, label='S = celle cadute', linewidth=1.5, color='r')
thinkplot.config(xlabel='Dimensione delle valanghe',
                 xlim=[1, 5600],
                 ylabel='PMF',
                 xscale='log',
                 yscale='log')
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