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#!/usr/bin/env python
# -*- coding: utf-8 -*-

import networkx as nx
import numpy as np
import matplotlib.pyplot as plt

l_average_list = []
c_average_list = []
l_avg_list = []
c_avg_list = []

l_average_max = nx.average_shortest_path_length(
    nx.watts_strogatz_graph(1000, 10, 0))
c_average_max = nx.average_clustering(
    nx.watts_strogatz_graph(1000, 10, 0))

p = [0,
      0.0001,
      0.00016,
      0.000256000000000000000004,
      0.000409600000000000000014,
      0.0006553600000000000003,
      0.001048576000000000007,
      0.001677721600000000016,
      0.002684354560000000033,
      0.0042949672960000007,
      0.0068719476736000014,
      0.010995116277760028,
      0.017592186044416053,
      0.0281474976710657,
      0.045035996273705144,
      0.07205759403792826,
      0.11529215046068526,
      0.1844674407370965,
      0.2951479051793545,
      0.47223664828696743,
      0.7555786372591482,
      1]

for i in range(len(p)):
    for j in range(20):
        l_average = nx.average_shortest_path_length(
            nx.watts_strogatz_graph(1000, 10, p[i])) / l_average_max
        c_average = nx.average_clustering(
            nx.watts_strogatz_graph(1000, 10, p[i])) / c_average_max
        l_avg_list.append(l_average)
        c_avg_list.append(c_average)
    l_average_list.append(float(sum(l_avg_list) / len(l_avg_list)))
    c_average_list.append(float(sum(c_avg_list) / len(c_avg_list)))

print l_average_list
print c_average_list

```



```
plt.xlabel(r"$p$")
plt.semilogx(p, c_average_list, label=r"$C(p) / C(0)$",
             color="red", linewidth=0, marker='o')
plt.semilogx(p, l_average_list, label=r"$L(p) / L(0)$",
             color="blue", linewidth=0, marker='o')
plt.legend() # make legend
plt.savefig("lc.png")
plt.show()
```

