KRZYSZTOF SOKÓŁ-SZOŁTYSEK
PROGRAM 5
GRUPA PONIEDZIAŁKOWA

WYNIKI - WIELKOŚĆ ZDIAGONALIZOWANEJ MACIERZY N X N W PODANYM CZASIE

1s - 790

runfile('/home/dm/.config/spyder-py3/temp.py',
wdir='/home/dm/anacondaws')
0.9955379962921143
mean logarithm:
8.8288032204
790

runfile('/home/dm/.config/spyder-py3/temp.py',
wdir='/home/dm/anacondaws')
0.9991536140441895
mean logarithm:
7.93400344747
790

4 s - 1120

runfile('/home/dm/.config/spyder-py3/temp.py',
wdir='/home/dm/anacondaws')
3.9286580085754395
mean logarithm:
8.54269641676

runfile('/home/dm/.config/spyder-py3/temp.py',
wdir='/home/dm/anacondaws')
4.036144256591797
mean logarithm:
8.69316849413

runfile('/home/dm/.config/spyder-py3/temp.py',
wdir='/home/dm/anacondaws')

3.9712326526641846
mean logarithm:
8.46199662306

16 s  - 1730

runfile('/home/dm/.config/spyder-py3/temp.py',
wdir='/home/dm/anacondaws')
16.195514917373657
mean logarithm:
8.91284366772

runfile('/home/dm/.config/spyder-py3/temp.py',
wdir='/home/dm/anacondaws')
15.910765171051025
mean logarithm:
9.15997849888

runfile('/home/dm/.config/spyder-py3/temp.py',
wdir='/home/dm/anacondaws')
15.904202699661255
mean logarithm:
8.6220791043

1m  - 2700

runfile('/home/dm/.config/spyder-py3/temp.py',
wdir='/home/dm/anacondaws')
59.648277044296265
mean logarithm:
9.69527633084
2700

4min - 4300

runfile('/home/dm/.config/spyder-py3/temp.py',
wdir='/home/dm/anacondaws')
216.47883319854736
mean logarithm:
9.85188082381
4158

runfile('/home/dm/.config/spyder-py3/temp.py',
wdir='/home/dm/anacondaws')
216.95545315742493
mean logarithm:
9.38572013421
4180

runfile('/home/dm/.config/spyder-py3/temp.py',
wdir='/home/dm/anacondaws')
218.02181601524353
mean logarithm:
9.7767840864
4200

runfile('/home/dm/.config/spyder-py3/temp.py',
wdir='/home/dm/anacondaws')
235.17094373703003
mean logarithm:
10.009770892
4300

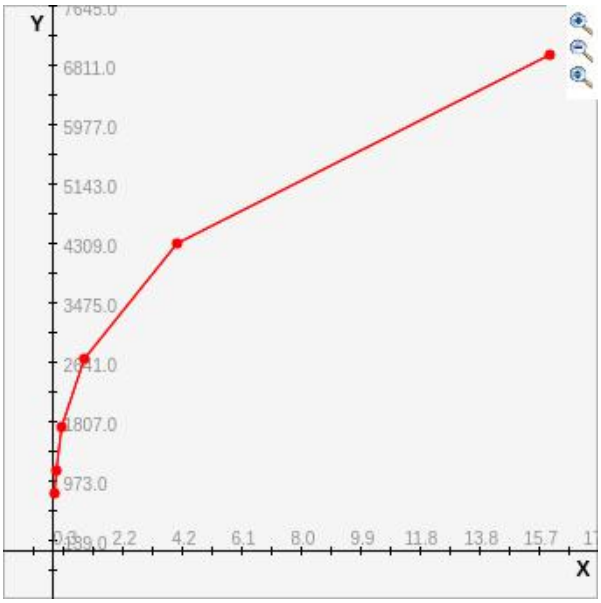
16min - 6950

In [55]: runfile('/home/dm/.config/spyder-py3/temp.py',
wdir='/home/dm/anacondaws')
914.6113700866699
mean logarithm:
10.4157964982
6850

In [56]: runfile('/home/dm/.config/spyder-py3/temp.py',

wdir='/home/dm/anacondaws')
950.6974024772644
mean logarithm:
11.0867514838
6950

WYKRES CZASU DO WIELKOSCI MACIERZY



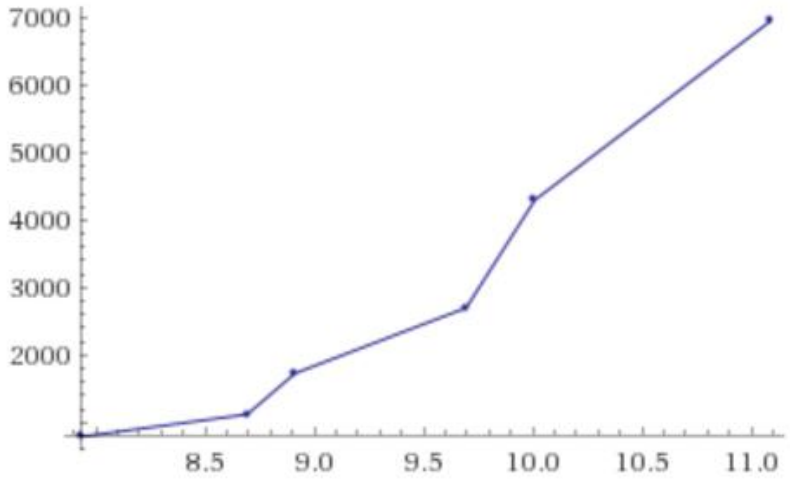

Jak widać, wzrost jest logarytmiczny - nie uzyskujemy od pewnego momentu dużego przyrostu N zwiększając czas na obliczenia

WYKRES L DO WIELKOŚCI MACIERZY

Input interpretation:

| | |
|---|---|
| plot | {{7.93400344747, 790}, {8.69316849413, 1120}, {8.91284366772, 1730}, {9.69527633084, 2700}, {10.009770892, 4300}, {11.0867514838, 6950}} |

Plot:




Średni logarytmiczny współczynnik uwarunkowania zmienia się nieznacznie z lekka tendencją wzrostową względem wielkości N

LISTING

```
# -*- coding: utf-8 -*-
"""
Spyder Editor

This is a temporary script file.
"""
# Problem V

import numpy as np
import time
```

```
n = 790
Matricescount = 10

G = [np.matrix(np.sqrt(1/n) * np.random.randn(n, n)) for i in
range(Matricescount)]

time1 = time.time()
SV = [np.linalg.svd(g, compute_uv = False) for g in G]
time2 = time.time()

print(time2-time1)

K = [sv[0] / sv[n-1] for sv in SV]
print("mean logarithm:")
print(np.mean(np.log(K)))
print(n)
```