Complex Networks

Στολτίδης Αλέξανδρος

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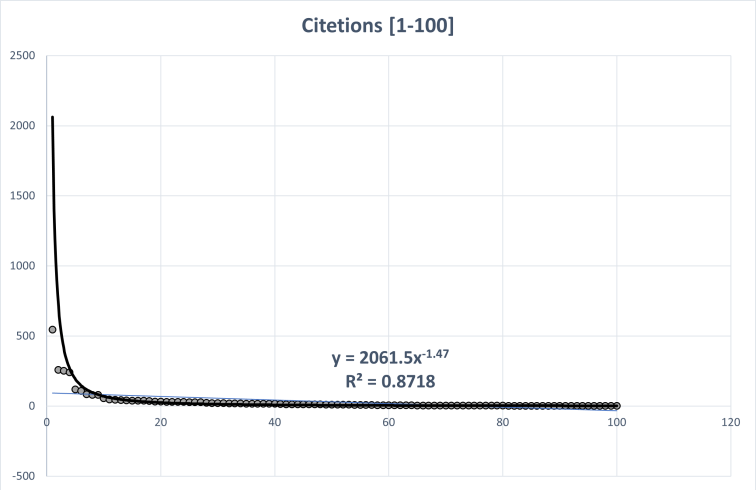
Contents

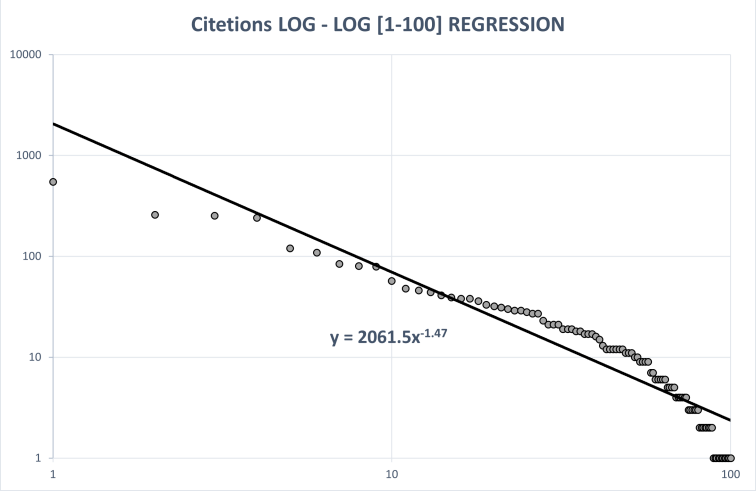
1 Exercise 1

The citation count data set can is provided Here

1.1 Power-Laws

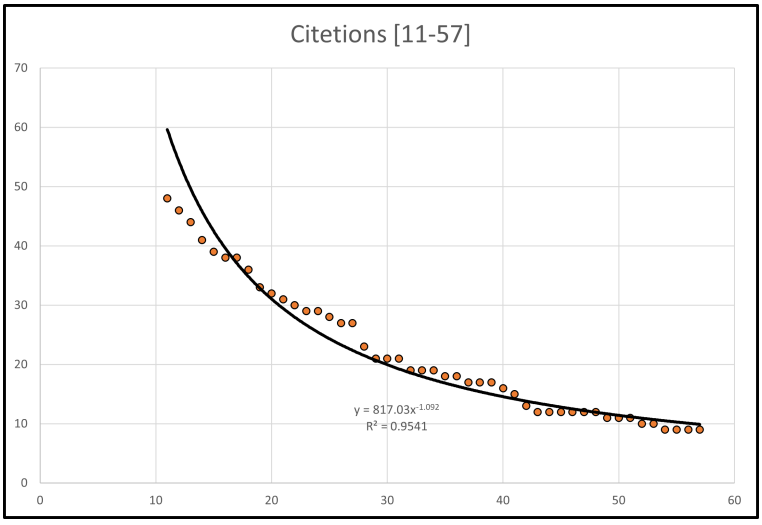
1.1.1 Power-Law Describing the Data Set

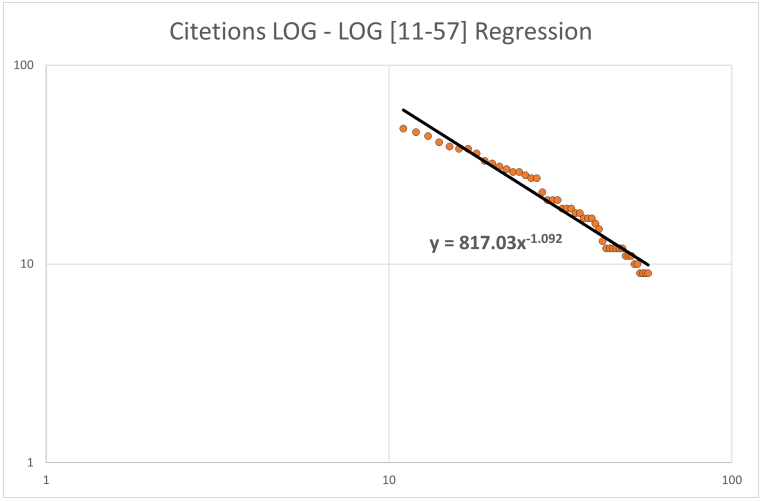




- **Exponent:** $a = 1.47$
- **Shift:** $c = 2061.5$

1.1.2 Power-Law Describing Part of the Data Set





- **Exponent:** $a = 1.092$
- **Shift:** $c = 817.03.5$

2 Exercise 2

The list of authors and co-authors is provided Here

2.1 Implementation

2.1.1 Parsing Data

The HTML Page is parsed using the BeautifulSoup4 Python's Library and all related data is exported.

2.1.2 Graph Operations

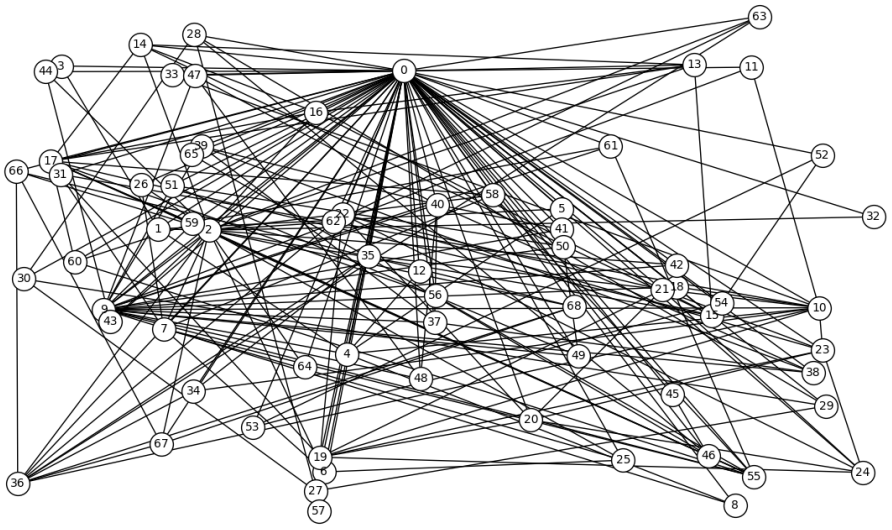
The operations required to compute the LCC (Local Clustering Coefficient), the CC (Clustering Coefficient or Network Transitivity) and the Characteristic Path Length are implemented by the NetworkX Library.

2.1.3 Export and Output Options

After the Graph is built both a .cnt file of the graph is exported and an image of the graph is displayed.

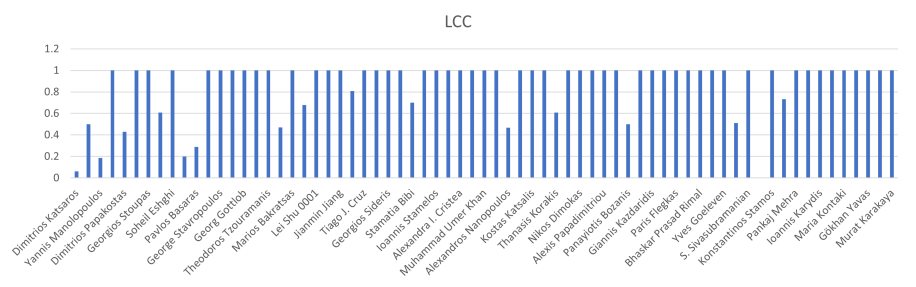
2.2 Solution

The authors and co-authors graph can be seen below.



2.3 LCC

The Local Clustering Coefficient of each professor can be seen in the image below.



2.4 CC

The Network Transitivity is equal to the the Average Local Clustering Coefficient which is equal to $CC = 0.8659$.

2.5 Characteristic Shortest Path

The **Characteristic Shortest Path** of the graph is equal to 1.91