Network Model

Why should I use network models?

Facebook

May 2011:
- **721 millions** users.
- Average number of friends: **190**
- A total of **68.5 billion** friendships

September 2015:
- **1.35 Billion** users

1. What are the principal underlying processes that help initiate these friendships?

2. How can these seemingly independent friendships form this complex friendship network?

3. In social media there are many networks with millions of nodes and billions of edges.
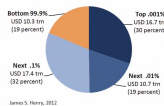   - **They are complex and it is difficult to analyze them**

- สร้างแล้ว ปมเงิน ว่าเหมือนของจริงขนาดไหน
  └ Degree distribution

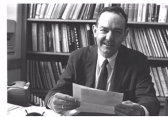## Distributions

Wealth Distribution:
- Most individuals have average capitals,
- Few are considered wealthy.
- Exponentially more individuals with average capital than the wealthier ones.

City Population:
- A few metropolitan areas are densely populated
- Most cities have an average population size.

Global Distribution of Wealth

Bottom 99.9% USD 10.3 tn (19 percent)

Top .001% USD 16.7 tn (30 percent)

Next .1% USD 17.4 tn (32 percent)

Next .01% USD 10.7 tn (19 percent)

James S. Henry, 2012

Herbert A Simon,
On a Class of Skew Distribution Functions, 1955

The **Pareto principle**
(80–20 rule): 80% of the effects come from 20% of the causes

Pareto Principle เช่น

80 % ของกลุ่มน้อยสามารถทำ
งาน แบบเกินมา 80 %

ไม่ได้ใช้ Normal Distribution

Power-Law Degree Distribution

- When the frequency of an event changes as a power of an attribute
    - The frequency follows a **power-law**

Power-law intercept

The power-law exponent and its value is typically in the range of **[2, 3]**

$$p_d = ad^{-b}$$

Fraction of users with degree d

Node degree

ถ้า t ใน colab คือ a, b

📗 Clustering Coefficients.ipynb ☆

ไฟล์ แก้ไข มุมมอง แทรก รันไทม์ เครื่องมือ ความช่วยเหลือ บันทึกการเปลี่ยนแปลงทั้งหมดแล้ว
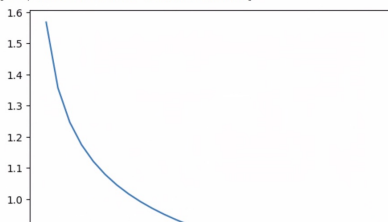
โค้ด + ข้อความ

```
1 t
```

```
array([1.5679539 , 0.2087552 ])
```

```
[70]  1 def f(x,a,b):
      2   return a*x**-b
      3 a=2;b=2.5
      4 plt.plot(x,f(x,t[0],t[1]))
      5 #plt.plot(x,y)
```

```
<ipython-input-70-14820b15fd52>:2: RuntimeWarning: divide by zero encountered in power
  return a*x**-b
[<matplotlib.lines.Line2D at 0x7d3bf294a8c0>]
```


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