

# 1 Dataset

## 1.1 Properties

### 1.1.1 Degree Distribution

$$P_k = \frac{N_k}{N} = \frac{1}{N} \sum_i \delta(k_i - k)$$

### 1.1.2 Clustering Coefficient

$$C_i = \frac{\# \text{ edges among neigs}}{\max \# \text{ edges among neigs}} = \frac{e_i}{k_i(k_i - 1)/2}$$

$$\langle C \rangle = \frac{1}{N} \sum_i C_i$$

### 1.1.3 Average Path Length

$$\langle L \rangle = \frac{1}{N(N-1)} \sum_{ik} L_{ik}$$

# 2 Random Graph

## 2.1 Properties

### 2.1.1 Degree Distribution

$$P(k) = \binom{N-1}{k} p^k (1-p)^{N-1-k}$$

### 2.1.2 Clustering Coefficient

$$C_i = \frac{e_i}{k_i(k_i - 1)/2} = p \frac{k_i(k_i - 1)/2}{k_i(k_i - 1)/2} = p = \frac{\langle k \rangle}{N}$$

### 2.1.3 Average Path Length

$$APL = \langle L \rangle \simeq \frac{\ln N}{\ln k}$$