Reminder XII

- $G(n,p)$ - model : n vertices, probability $p \in [0,1]$ to have an edge between any 2 vertices.

$\mathbb{P}(\|G\| = m) = \binom{\binom{n}{2}}{m} p^m (1-p)^{\binom{n}{2} - m}$ binomial distribution $B(\binom{n}{2}, p)$

$\mathbb{E}(\deg(x)) =: c = (n-1)p$ ↯ too big!

$\lim_{\substack{n \to \infty \\ p = \frac{c}{n-1}}} \mathbb{E}(\deg(x) = k) = e^{-c} \frac{c^k}{k!}$ Poisson distribution $P(c)$

← we impose it

- Giant component : $|\Lambda^n| \geq \varepsilon |G_n|$ with $|G_n| = n \to \infty$

indep. of n

↑ connected

↑ it exists for $c > 1$, with solution $s = 1 - e^{-cs}$ to belong to it.

- Study of small components (trees, precise distribution)

- Clustering coefficient $c, c_x \approx \frac{\# \triangle}{\# \wedge}$, local or global

For $G(n,p)$, $C = C_x = p = \frac{c}{n-1}$ if we choose this becomes too small

- <u>Weaknesses</u> : 1) Clustering coef. too small

2) degree distribution decreasing too fast

Prefer power law : $\mathbb{P}(\deg(x) = k) \approx \frac{1}{k^\alpha}$, $\alpha > 0$