

DPCN (Quiz 2)

Set1

1a. Assume the degree distribution of a network (symmetric and binary) follows a power law $p_k = Ck^{-\gamma}$, Calculate the normalization constant C . Find out the condition such that you can obtain the finite C . (Marks 3)

1b. Assume the degree distribution of network (symmetric and binary) follows a power law $p_k = Ck^{-\gamma}$. Find out the first moment ($\langle k \rangle$), and the second moment ($\langle k^2 \rangle$). Explain in which cases these moments will diverge. (Marks 4)

2. Prove that, in Erdos-Renyi Graph, GCC will pop-up if mean degree ($\langle k \rangle$) is greater than 1.

(Marks 5)

3. If $x_{n+1} = f(x_n)$; Find the condition (show the derivation) where the system will show a stable fixed point

$$(x_{n+1} = f(x_n) = x^*).$$

(i) $f(x_n) = x_n^2$; (ii) $f(x_n) = \cos x_n$; Find the fixed points and find the stability conditions.

(Marks 2+3=5)