Multiple Reach Distribution

$$ij - 1 = (i-1)(j-1) + j - 1 + i - 1$$

$$= 1 \sum_{ij \geq 1} (ij - 1)\, p_{ij}$$

$$\sum ij\, p_{ij} = \mathbb{E}(\quad) \quad \| \quad \sum p_{ij} = \quad = \mathbb{P}(\geq 1, \geq 1)$$

$$\sum_{i,j \geq 1} (i-1)(j-1)\, p_{ij} + \sum_{ij \geq 1} (j-1)\, p_{ij} + \sum_{ij \geq 1} (i-1)\, p_{ij}$$

$$\leq \sum_{i,j} \sum_{ij} ij(i-1)(j-1)\, p_{ij} \quad \left\{ \sum_{ij} = \sum_{ij \geq 0} ! \right)$$

$$+ \sum_{i,j} (j-1)\, p_{ij} + \sum_{i=0, j \geq 1} (j-1)\, p_{ij} + \sum_{i \geq 1, j \geq 0} (i-1)\, p_{ij}$$

$$= \mathbb{E}\left[(\mu_N')(\mu_N' - 1)\, \mu_N^2 (\mu_N^2 - 1) \right] +$$

$$\sum_{j \geq 1} p_{ij} (j-1)\, p_j + \sum_{i \geq 1} (i-1)\, p_i$$

$$\leq \mathbb{E}\left[\mu_N^2 (\mu_N^2 - 1) \right] \qquad \leq \mathbb{E}\left[\mu_N' (\mu_N' - 1) \right] !$$