statistics under random multigraph models

quantified defined using the distribution of edge multiplicities



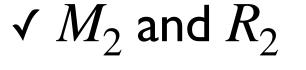
$oxed{arphi}$ complexity sequence $\mathbf{R}=(R_0,R_1,\ldots,R_k)$ where

$$R_k = \sum_{i < j} \sum_{i < j} I(M_{ij} = k)$$
 for $k = 0, 1, ..., m$

is the frequencies of edge multiplicities

✓ M_1 and M_2

- tendency for within and between vertex category edges (homophily/heterophily)



- simplicity statistics
- single ties within vertex category (isolation)

 $\checkmark R_0$ and R_1

- R_0 : tendency for isolated vertices (network diffusion)
- R_1 : simple occupancy of edges



- tendency for strengthening ties (multiplexity)

 $\checkmark M_1$ and R_1

- single ties within vertex category (isolation)

 \checkmark interval estimates for R_k

- if overlapping for multiple edge types \Rightarrow multiplexity

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- $oxed{arphi}$ number of loops M_1 and number of non-loops M_2
- \square complexity sequence $\mathbf{R} = (R_0, R_1, ..., R_k)$ where

$$R_k = \sum_{i < j} \sum_{i < j} I(M_{ij} = k)$$
 for $k = 0, 1, ..., m$

is the frequencies of edge multiplicities

- $\checkmark M_1$ and M_2
 - tendency for within and between vertex category edges (homophily/heterophily)
- $\checkmark R_0$ and R_1
 - R_0 : tendency for isolated vertices (network diffusion)
 - R_1 : simple occupancy of edges
- $\checkmark M_1$ and R_1
- single ties within vertex category (isolation)

- √ M₂ and R₂
- simplicity statistics
- single ties within vertex category (isolation)
- $\checkmark R_0 + R_1$ compared to $R_3 + \cdots + R_k$
- tendency for strengthening ties (multiplexity)
- ✓ interval estimates for R_k
- if overlapping for multiple edge types ⇒ multiplexity

random multigraph models