statistics under random multigraph models

quantified defined using the distribution of edge multiplicities

☑ number of loops M_1 and number of non-loops M_2

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

$$R_k = \sum_{i \le j} \sum I(M_{ij} = k) \quad \text{for } k = 0,1,\ldots,m$$

is the frequencies of edge multiplicities

✓ M_1 and M_2

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

✓ R_0 and R_1

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

✓ M_1 and R_1

- single ties within vertex category (isolation)

✓ M_2 and R_2

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

✓ $R_0 + R_1$ compared to $R_3 + \cdots + R_k$

- tendency for strengthening ties (multiplexity)

✓ interval estimates for R_k

- if overlapping for multiple edge types ⇒ multiplexity

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