Connectivity thresholds for superpositions of Bernoulli random graphs

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Let $G_1, \ldots, G_m$ be independent identically distributed Bernoulli random subgraphs of the complete graph $\mathcal{K}_n$. For $k = 1, 2, \ldots$, we show the k-connectivity threshold as $n, m \to +\infty$ for the union graph $\cup_{i=1}^m G_i$ defined on the vertex set of $\mathcal{K}_n$. For $k = 2, 3, \ldots$ we observe two different threshold behaviors: one for the unions of cliques and the other one for the (remaining) case where each G_i has a vertex of degree 1 with positive probability. Results for the case $k = 1$ have been reported in [1, 2].

References

[1] D.Ardickas, M.Bloznelis, Connectivity threshold for superpositions of Bernoulli random graphs, *Discrete Math.* 2025, 348, 114684.

[2] M.Bloznelis, D. Marma. R. Vaicekauskas, Connectivity threshold for superpositions of Bernoulli random graphs.II, *Acta Math. Hung.* 2025, 175, 352 - 375.