Two-edge connected reliability of complete and complete bipartite graphs

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(joint work with Peter Tittmann)

Reliability measures of networks have been considered by many authors. In this talk, results of the two-edge connected reliability as defined in [1] will be presented. Let $G = (V, E)$ be an undirected graph with vertex set V and edge set E. The edges $e \in E$ are assumed to fail independently with known probabilities $q_e = 1 - p_e$. The two-edge connected reliability of G is the probability for the realization of a two-edge connected graph.

We present a new approach for the computation of this reliability measure of complete and complete bipartite graphs. In the case of complete graphs a recursion is derived using set partitions. With this, one can also compute the number of two-edge connected simple graphs of given order. Furthermore, for complete bipartite graphs of the form $K_{s,t}$ with $s \leq 4$ and $t \geq s$ a direct formula is given using combinatorial arguments.

References

[1] C. Lucet, J.-F. Manouvrier, J. Carlier, Evaluating network reliability and 2-edge-connected reliability in linear time for bounded pathwidth graphs, Algorithmica, 27 (2000), 316–336.