Networks with small excess

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The *degree/geodecity problem* is an analogue for directed and mixed graphs of the classical degree/girth problem [1]. It asks for the smallest networks with fixed out-degree (as well as undirected degree for mixed graphs) such that for any two vertices u, v there is at most one (non-backtracking) walk from u to v with length at most k. The directed/mixed Moore bound is a lower bound for the problem. We present new results on the structure of networks with order close to the Moore bound, including their regularity properties, and a new lower bound for mixed graphs for $k = 2$.

References

[1] J. Tuite, G. Erskine, On networks with order close to the Moore bound, *Graphs Comb.* 38 (5) (2022) 143.