Sequences of radius \( k \) for complete bipartite graphs.

Summary: A \( k \)-radius sequence for a graph \( G \) is a sequence of vertices of \( G \) (typically with repetitions) such that for every edge \( uv \) of \( G \) vertices \( u \) and \( v \) appear at least once within distance \( k \) in the sequence. The length of a shortest \( k \)-radius sequence for \( G \) is denoted by \( f_k(G) \). We give an asymptotically tight estimation on \( f_k(G) \) for complete bipartite graphs which matches a lower bound, valid for all bipartite graphs. We also show that determining \( f_k(G) \) for an arbitrary graph \( G \) is NP-hard for every constant \( k > 1 \).

MSC: 05C12 Distance in graphs

Keywords: \( k \)-radius sequences; bipartite graphs; maximum cut

Full Text: DOI arXiv

References:

[1] Alon, N.; Spencer, J., The probabilistic method, (2008), Wiley Hoboken
[2] Bertossi, A. A., The edge Hamiltonian path problem is NP-complete, Inf. Proc. Lett., 13, 157-159, (1981) - Zbl 0495.68058
[3] Blackburn, S. R., The existence of \$k\$-radius sequences, J. Combin. Theory Ser. A, 119, 212-217, (2012) - Zbl 1238.05182
[4] Blackburn, S. R.; McKee, J. F., Constructing \$k\$-radius sequences, Math. Comput., 81, 2439-2459, (2012) - Zbl 1290.05151
[5] Bondy, J. A.; P.; Z.; Rzążewski, Lonc, Constructing optimal \$k\$-radius sequences, SIAM J. Discrete Math., 30, 452-464, (2016) - Zbl 1338.68226
[6] Chee, Y. M.; Ling, S.; Tan, Y.; Zhang, X., Universal cycles for minimum coverings of pairs by triples, with applications to 2-radius sequences, Math. Comput., 81, 585-603, (2012) - Zbl 1236.05020
[7] Chinn, P.; Chvátalová, J.; Dewdney, A.; Gibbs, N., The bandwidth problem for graphs and matrices-a survey, J. Graph Theory, 6, 223-254, (1982) - Zbl 0494.05057
[8] Dębski, M.; Lonc, Z., Sequences of large radius, European J. Combin., 41, 197-204, (2014) - Zbl 1314.68249
[9] Dębski, M.; Lonc, Z.; Rzążewski, P., Sequences of radius \$k\$ for complete bipartite graphs, (WG 2016 Proc., LNCS, vol. 9941, (2016)), 1-12 - Zbl 1417.05047
[10] Dębski, M.; Lonc, Z.; Rzążewski, P., Achromatic and harmonious colorings of circulant graphs, J. Graph Theory, (2017), (in press, available online) - Zbl 1369.05072
[11] Frankl, P.; Rödl, V., Near perfect coverings in graphs and hypergraphs, European J. Combin., 6, 317-326, (1985) - Zbl 0624.05058
[12] Garey, M. R.; Graham, R. L.; Johnson, D. S.; Knuth, D. E., Complexity results for bandwidth minimization, SIAM J. Appl. Math., 34, 477-495, (1978) - Zbl 0385.05048
[13] Garey, M. R.; Johnson, D. S., Computers and intractability. A guide to the theory of NP-completeness, (1979), Freeman New York - Zbl 0411.68039
[14] Jaromczyk, J.; Lonc, Z., Sequences of radius \$k\$-radius: how to fetch many huge objects into small memory for pairwise computations, (15th International Symposium, ISAAC 2004, Hong Kong, LNCS, vol. 3341, (2004)), 594-605 - Zbl 1116.68039
[15] Jaromczyk, J.; Lonc, Z.; Truszczyński, M., Constructions of asymptotically shortest \$k\$-radius sequences, J. Combin. Theory Ser. A, 119, 731-746, (2012) - Zbl 1242.05138
[16] Newman, A., MAX-cut, (Encyclopedia of Algorithms, Vol. 1, (2008)), 489-492
[17] Poljak, S.; Tuza, Z., (Maximum Cuts and Large Bipartite Subgraphs, DIMACS Series in Discrete Mathematics and Theoretical Computer Science, vol. 20, (1995)), 181-244 - Zbl 0834.05001

This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.