Identifying coloring of a graph

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(joint work with Ting-Pang Chang)

Let G be a graph, u be a vertex of G, and $B(u)$(or $B_G(u)$) be the set of u with all its neighbors in G. A set S of vertices is called an *identifying set* of G if there exists a function f from $V(G)$ to the set of all nonempty subsets of S such that (i) for each vertex u of G, $f(u) \subseteq B(u)$, and (ii) for every pair of distinct vertices u and v, $f(u)$ and $f(v)$ are distinct. f is called an *identifying coloring* of G with respect to S. The *identifying chromatic number* $\iota_c(G)$ is the cardinality of a minimum identifying set of G. In this paper, we study the identifying sets in graphs, give a polynomial-time algorithm to find a minimum identifying set of a tree, and determine the identifying chromatic numbers of complete bipartite graphs.

References

[1] S. Gravier, J. Moncel, A. Semri, Identifying codes of cycles, European J. Combin. 27 (2006), 767–776.

[2] M.G. Karpovsky, K. Chakrabarty, L.B. Levitin, On a new class of codes for identifying vertices in graphs, IEEE Trans. Inform. Theory 44:2 (1998), 599–611.

[3] M.G. Karpovsky, K. Chakrabarty, L.B. Levitin, D.R. Avreky, On the covering of vertices for fault diagnosis in hypercubes, Inform. Process. Lett. 69 (1999), 99–103.

[4] A. Raspaud, L.-D. Tong, Minimum identifying code graphs, Discrete Appl. Math. 160:9 (2012), 1385–1389.

[5] M. Xu, K. Thulasiramanb, X. Hu, Identifying codes of cycles with odd orders, European J. Combin. 29 (2008), 1717–1720.