Addressing problem and the distance matrix of a graph

鄭硯仁
National Taiwan Normal University

Let G be a graph. An addressing of G of length k is a mapping $f : V(G) \to \{0, 1, *\}^k$ such that for all $u, v \in V(G)$, $d_G(u, v)$ is equal to the number of places in $f(u)$ and $f(v)$ where one has a 0 and the other has a 1. Let $N(G)$ be the least length of an addressing of G. In 1971, Graham and Pollak proved that $N(G) = n - 1$ if G is a tree of order n. In their proof, they showed that the determinant of the distance matrix of a tree of order n does not depend on the structure of the tree. In 1977, Graham, Hoffman and Hosoya gave a generalization by showing that the determinant of the distance matrix of a graph G only depends on its blocks. We give new classes of graphs such that the determinant of the distance matrix is constant among each class. In addition, we also find $N(G)$ for these new graphs. This is a joint work with Jephian C.-H. Lin.