DOCTORAL THESIS

Distance two labeling of some products of graphs

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Distance Two Labeling of Some Products of Graphs

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Abstract

Let j, k and m be positive numbers, an *$L(j,k)$-labeling* f of G is an assignment of numbers to vertices of G such that $|f(u)-f(v)| \geq j$ if $d(u,v)=1$, and $|f(u)-f(v)| \geq k$ if $d(u,v)=2$. Then the *span* of f is the difference between the maximum and the minimum numbers assigned by f. The *$L(j,k)$-number* of G, denoted by $\lambda_{j,k}(G)$, is the minimum span over all $L(j,k)$-labelings of G.

A *circular m-$L(j,k)$-labeling* of a graph G is a function $f : V(G) \to [0,m)$ such that $|f(u)-f(v)|_m \geq j$ if u and v are adjacent, and $|f(u)-f(v)|_m \geq k$ if u and v are at distance two, where $|a-b|_m = \min\{|a-b|, m-|a-b|\}$. The minimum m such that there exist a circular m-$L(j,k)$-labeling of G is called the *circular-$L(j,k)$-number* of G and is denoted by $\sigma_{j,k}(G)$.

In this thesis, for any two positive numbers j and k with $2j \leq k$, we determine the $L(j,k)$-numbers and circular $L(j,k)$-numbers of the direct product of a path and a cycle. Moreover, we also investigate the $L(j,k)$-numbers of the Cartesian product of a path and a cycle.

Keywords: Graph, $L(j,k)$-labeling, circular-$L(j,k)$-labeling, $L(j,k)$-number, circular-$L(j,k)$-number, direct product, Cartesian product.

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