$L(4,3,2,1)$-labeling of certain trees

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An $L(4,3,2,1)$-labeling is a simplified model for the channel assignment problem. It is a natural generalization of the widely studied $L(2,1)$-labeling.
An $L(4,3,2,1)$-labeling of a graph G is a function f from the vertex set of the graph to the set of nonnegative integers such that for any two vertices x, y, $d(x,y) + |f(x) - f(y)| \geq 5$. I.e., if $d(x,y) = 1$, then $|f(x)-f(y)| \geq 4$; if $d(x,y) = 2$, then $|f(x)-f(y)| \geq 3$; if $d(x,y) = 3$, then $|f(x) - f(y)| \geq 2$ and if $d(x,y) = 4$, then $|f(x) - f(y)| \geq 1$. The $L(4,3,2,1)$-labeling number, $k_4(G)$, of G is the smallest positive integer k such that G has an $L(4,3,2,1)$-labeling with k as the maximum label. In this paper we determine the $L(4,3,2,1)$-labeling number for trees of small width, and for subdivisions of stars.

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