John Villalpando* (jvillalp@callutheran.edu), California Lutheran University, 60 West Olsen Road, Thousand Oaks, CA 91360, and Vesta Coufal, Kathie Yerion and Rob Ray. The Existence of Trees for Given Values of $\lambda$, $\bar{\kappa}$, and $\kappa$ for $L(2,1)$-Colorings and Irreducible $L(2,1)$-Colorings.

An $L(2,1)$-coloring of a graph is a labeling of the vertices using non negative integers such that adjacent vertices differ in label by at least 2 and distance two vertices differ in label. A well studied invariant of $L(2,1)$-colorings, the span denoted by $\lambda$, is the smallest integer $k$ for a given graph such that there exists an $L(2,1)$-coloring of the graph using only integers less than or equal to $k$. The invariant $\bar{\kappa}$ is the least number of color classes required to create an $L(2,1)$-coloring on a given graph. An $L(2,1)$-coloring of a graph is irreducible if reducing the label on any vertex violates an $L(2,1)$-coloring condition. The invariant $\kappa$ is the least number of color classes required to create an irreducible $L(2,1)$-coloring on a given graph. For any tree $T$ it is known that $\Delta + 1 \leq \bar{\kappa} \leq \kappa \leq \lambda + 1$ and $\lambda \in \{\Delta + 1, \Delta + 2\}$ where $\Delta$ is the maximum degree of the tree. We study the 18 possible cases of the values $\bar{\kappa}, \kappa$, and $\lambda$ on trees providing examples, families of examples or when necessary proving no such tree exists. (Received September 09, 2014)