1096-05-2456 **Jobby Jacob*** (jxjsma@rit.edu) and **Christopher Wood**. *On $L(2,1)$ labeling of trees.*

An $L(2,1)$ coloring of a graph G is an integer labeling of the vertices where adjacent vertices differ in label by at least two, and vertices that are at distance two from each other differ in label by at least one. That is, an $L(2,1)$ *coloring* of G is a vertex labelling $f : V(G) \longrightarrow \{0\} \cup \mathbb{Z}^+$ such that

1. $|f(u) - f(v)| \geq 2$ for all $uv \in E(G)$,
2. $|f(u) - f(v)| \geq 1$ if $d(u,v) = 2$.

The *span of an $L(2,1)$ coloring f* on a graph G is the $\max f(u)$ for all $u \in V(G)$. The *span of a graph G*, denoted by $\lambda(G)$, is the minimum span of all $L(2,1)$ colorings on G. Griggs and Yeh showed that $\lambda(T) \in \{\Delta(T)+1, \Delta(T)+2\}$ for all trees T, however, no complete characterization of trees has been established.

We present a complete characterization of trees up to twenty vertices based on their $L(2,1)$-span. We will also show that finding a forbidden subtree characterization for higher order trees is extremely difficult. (Received September 17, 2013)