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University, MS 38677. *Some Properties of  $k$ -trees.*

Let  $k \geq 2$  be an integer. We investigate hamiltonian properties for a  $k$ -tree  $G$ , a special chordal graph. Instead of studying the toughness condition motivated by a conjecture of Chvátal, we introduce a new parameter, the branch number of  $G$ , denoted by  $\beta(G)$ . Some results on the relationships between  $\beta(G)$  and other graph parameters will be presented. A path system of  $G$  is a subgraph whose components are paths with length at least 1. One of our main results shows that if  $\beta(G) < k$  and  $T$  is any path system with at most  $k - (\beta(G) + 1)$  edges, then for any  $x$  and  $x'$  not in the same path in  $T$  with  $d_T(x) \leq 1$  and  $d_T(x') \leq 1$ , we can find a hamiltonian  $(x, x')$ -path passing through  $T$ . Using this result, we show that if  $\beta(G) \leq k$ , then  $G$  is hamiltonian. This generalizes a recent result of Broersma et al. which says that any  $\frac{k+1}{3}$ -tough  $k$ -tree is hamiltonian. (Received August 22, 2007)