1003-X1-257 **L A Szekely**, **H Wang\*** (`hwang0@math.sc.edu`) and **Y Zhang**. *Some non-existence results on Leech trees.*

More than 25 years ago John Leech posed the following beautiful problem: find, whenever possible, trees on $n$ vertices with positive weights on the edges, such that the $\binom{n}{2}$ weighted distances among the $n$ vertices are exactly the numbers $1, 2, 3, ..., \binom{n}{2}$.

Herbert Taylor gave a proof restricting the number of vertices on which Leech trees can exist to $n^2$ and $n^2 + 2$. We prove two theorems, giving restrictions on the longest path and maximum degree in Leech trees. We also prove a computer search showing that there is no Leech tree for $n = 9, 11$. (Received September 03, 2004)