

## Graph Cordiality – Extremes and Preservers

LeRoy B. Beasley, Utah State University

An undirected graph is said to be cordial if there is a friendly  $(0,1)$ -labeling of the vertices that induces a friendly  $(0,1)$ -labeling of the edges. An undirected graph  $G$  is said to be  $(2,3)$ -orientable if there exists a friendly  $(0,1)$ -labeling of the vertices of  $G$  such that about one third of the edges are incident to vertices labeled the same. That is, there is some digraph that is an orientation of  $G$  that is  $(2,3)$ -cordial. Examples of the smallest (edgewise) cordial and  $(2,3)$ -orientable graphs are given and bounds on the largest size of the edge set of a cordial graphs are proven. It is also shown that if  $T$  is a linear operator on the set of all undirected graphs on  $n$  vertices that strongly preserves the set of cordial graphs or the set of  $(2,3)$ -orientable graphs then  $T$  is a vertex permutation..

Keywords: linear operator, linear preserver, vertex permutation, friendly labeling, cordial graph,  $(2,3)$ -cordial digraph,  $(2,3)$ -orientable graph.