On the r-Equitable Coloring of Graphs

Chih-Hung Yen*

Department of Applied Mathematics

National Chiayi University, Taiwan

Abstract

A graph G consists of a nonempty vertex set $V(G)$ and an edge set $E(G)$. All graphs considered in this talk are finite, loopless, and without multiple edges. Let $k \geq 1$ be an integer. A (proper) *k-coloring* of a graph G is a mapping $f : V(G) \to \{1, 2, \ldots, k\}$ such that adjacent vertices have different images. The images are called *colors* and all vertices of a fixed color constitute a *color class*. Then a k-coloring of a graph G is said to be *equitable* if the sizes of any two color classes differ by at most one. And a graph G is *equitably k-colorable* if G has an equitable k-coloring. So far, quite a few results on the equitable coloring of graphs have been obtained.

Recently, Hertz and Ries [1] generalize the notion of equitable colorability. They say that a k-coloring of a graph G is *r-equitable* if the sizes of any two color classes differ by at most r, where $r \geq 0$ is an integer. And a graph G is *r-equitably k-colorable* if there exists an r-equitable k-coloring of G. Clearly, an equitably k-colorable graph is 1-equitably k-colorable, and vice versa. Besides, the least k such that a graph G is r-equitably k-colorable is called the *r-equitable chromatic number* of G and denoted $\chi_{r=}(G)$. Also, the least n such that a graph G is r-equitably k-colorable for all $k \geq n$ is called the *r-equitable chromatic threshold* of G and denoted $\chi^*_{r=}(G)$.

In this talk, we will give a brief survey of some recent progress on the r-equitable coloring of graphs, especially for $r \neq 1$.

Keywords: Equitable coloring; r-Equitable coloring; r-Equitable chromatic number; r-Equitable chromatic threshold.

References

[1] A. Hertz, B. Ries, On r-equitable colorings of trees and forests, submitted, 2011. (http://www.gerad.ca/alainh/Ries.pdf)

*The corresponding author. E-mail address: chyen@mail.ncyu.edu.tw