

1143-05-427

Hemanshu Kaul*, Department of Applied Math, Illinois Institute of Technology, Chicago, IL 60616. *Proportional Choosability: A New List Analogue of Equitable Coloring.*

The study of equitable coloring began with a conjecture of Erdos in 1964, and a formal introduction by Meyer in 1973. An equitable k -coloring of a graph G is a proper k -coloring of G such that the sizes of the color classes differ by at most 1. In 2003 Kostochka, Pelsmajer, and West introduced a list analogue of equitable coloring, called equitable choosability, in which the size of the color classes is required only to be appropriately bounded from above.

Here we introduce proportional choosability, a new list analogue of equitable coloring s.t. the number of times a color is used must be proportional to the number of lists in which the color appears. Proportional k -choosability implies both equitable k -choosability and equitable k -colorability. We show that if a graph G is proportionally k -choosable, then every subgraph of G is also proportionally k -choosable and also G is proportionally $(k + 1)$ -choosable, unlike equitable choosability for which analogous claims would be false. We will discuss proportional choosability of graphs with small order, completely characterize proportionally 2-choosable graphs, and illustrate some of the techniques we have used here. This is joint work with Jeffrey Mudrock, Michael Pelsmajer, and Benjamin Reiniger. (Received August 20, 2018)