

1113-05-263

Guantao Chen* (gchen@gsu.edu), Department of Mathematics and Statistics, Georgia State University, Atlanta, GA 30303, and **Yuping Gao** and **Songling Shan**. *Chromatic index determined by fractional chromatics index*. Preliminary report.

Given a graph G , denote by χ' the *chromatic index* of G , χ'_f the *fractional chromatic index*, Δ the maximum degree and μ the multiplicity of G . It is known that $\Delta \leq \chi'_f \leq \chi' \leq \Delta + \mu$, where the upper bound is a classic result of Vizing. While deciding exact value of χ' is a classic NP-complete problem, the computing χ'_f is polynomial time. In fact, it is shown that if $\chi'_f > \Delta$ then $\chi'_f = \max \frac{|E(H)|}{\lfloor |V(H)|/2 \rfloor}$, where the maximality is over all induced subgraphs H of G . Goldberg (1973), Anderson (1977), and Seymour (1979) conjectured that $\chi' = \lceil \chi'_f(G) \rceil$ if $\chi'(G) \geq \Delta + 2$. We show that if $\chi' \geq \Delta + \sqrt[3]{\Delta/2}$ then $\chi' = \lceil \chi'_f(G) \rceil$. It has been shown that the Goldberg conjecture is equivalent to the following conjecture of Jakobsen: *For any positive integer m with $m \geq 3$, every graph G with $\chi' > \frac{m}{m-1}\Delta + \frac{m-3}{m-1}$ satisfies $\chi' = \lceil \chi'_f(G) \rceil$.* The Jakobsen conjecture has been verified for $m \leq 15$ by a series of papers since 1973. We show that it is true for $m \leq 19$. (Received August 24, 2015)