

CSDS 455: Applied Graph Theory

Homework 13

Due Wednesday, October 7 at the start of class

Homework rules: You are welcome to work with others to solve these problems. If you do get help from someone else (or from some other resource), please indicate that on your homework.

Problem 1: In *edge coloring*, we assign colors to the edges of G so that all the edges incident to a vertex receive different colors. $\chi'(G)$ is the minimum number of colors required to edge color G .

Assume $\chi'(G) > \Delta(G) + 1$ but for any edge xy , $\chi'(G - xy) = \Delta + 1$. Prove that in every proper edge coloring of $G - xy$ there exists a path from x to y in which the edges alternate between two colors.

(We can use this fact to prove Vizing's Theorem: $\chi'(G) \leq \Delta(G) + 1$ by induction.)

Problem 2: Assume G is a Δ -regular multigraph, and assume Δ is even. Prove that $\chi'(G) \leq \frac{3}{2}\Delta(G)$.