

ALGEBRA & DISCRETE MATHEMATICS SEMINAR

3:30 PM, May 31, 2012, Martin M-102

Degree Ramsey and On-line Degree Ramsey Numbers

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We say that a graph H *forces* a graph G (denoted $H \rightarrow G$) if every 2-coloring of the edges of H contains a monochromatic copy of G . For a monotone graph parameter ρ , the ρ -*Ramsey number* of G , written $R_\rho(G)$, is $\min\{\rho(H) : H \rightarrow G\}$. When $\rho(H)$ is the number of vertices in H , the ρ -Ramsey number is precisely the classical Ramsey number; taking $\rho(H)$ to be the number of edges yields the well-studied *size Ramsey number*.

In this talk we explore the *degree Ramsey number*, R_Δ , where $\Delta(G)$ denotes the maximum vertex degree in G . We also discuss an on-line variant of this parameter, in which the graph H is revealed one edge at a time, and edges must be colored as they are revealed (without knowledge of future edges). This can be modeled as a two-player game, in which one player gradually “builds” a host graph H , while the other player “paints” it; the builder’s goal is to force a monochromatic copy of the target graph G while keeping the maximum degree of H as small as possible.

We present some recent results about the behavior of these parameters on trees and cycles. We also suggest several interesting open problems.

This is joint work with Jane Butterfield, Tracy Grauman, Kevin G. Milans, Christopher Stocker, and Douglas B. West.

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