UNIVERSITY OF DELAWARE
DEPARTMENT OF MATHEMATICAL SCIENCES
DISCRETE MATHEMATICS SEMINAR

Friday May 14, 2004, 2:30pm, Room 436 Ewing Hall

Explicit Constructions in Graph Ramsey Theory

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After briefly surveying the major problems of Ramsey theory for graphs, I will present several explicit constructions of edge-colorings of graphs. One of these provides an edge-coloring of the complete graph on n vertices such that every copy of K_4 receives at least four colors on its six edges. The number of colors used is $n^{1/2+o(1)}$, thereby improving upon the probabilistic construction of Erdős and Gyarfas. This construction is closely related to the determination of the multicolor Ramsey number for four-cycles, which is one of the only cases where we understand the behaviour of a multicolor graph Ramsey number. The tools used for the construction are a combination of hypergraph methods, and equations over finite fields.