On Graphs of Ramsey Type

S.A. Burr AT&T Long Lines
P. Erdos Hungarian Academy of Science
L. Lovasz Eotvos L. University

If F, G, and H are graphs, write $F \rightarrow (G, H)$ to signify that if the edges of F are colored red and blue in any fashion, either the red subgraph of F contains a copy of G or the blue subgraph contains a copy of H. Various properties of such graphs F are studied. For instance, for given G and H, the minimum chromatic number χ of any graph F for which $F \rightarrow (G, H)$ can be determined, at least in principle. In particular, if $F \rightarrow (K_m, K_n)$, $\chi(F) \geq r(m, n)$, where $r(m, n)$ denotes the ordinary Ramsey number. Thus $\Delta(F) \geq r(m, n)-1$, where $\Delta(F)$ denotes the maximum degree of F. On the other hand if F is a minimal graph for which $F \rightarrow (K_m, K_n)$, then $\delta(F) \geq mn$, where $\delta(F)$ denotes the minimum degree of F. Each of the above results is sharp.

OPTIMAL REARRANGEABLE GRAPHS

F.R.K. Chung
Bell Laboratories

Let G be a finite graph with vertex set $V = M \cup N$. We say that G is rearrangeable if for all choices of distinct vertices $i_1, i_2, \ldots, i_t$ in M and $j_1, j_2, \ldots, j_t$ in N, there exist vertex disjoint paths between i_k and j_k for all k. For example, a complete bipartite graph with the vertex sets M and N is rearrangeable. However, this graph will usually have many more edges than is necessary for rearrangeability.

We determine the minimal number of edges any rearrangeable graph may have for all choices of M and N. We also discuss generalizations in which V is strictly greater than $M \cup N$ and/or t is bounded by a predetermined value.

The Characterization of Certain Sets of Graphs Using a Generalized Closure Operation

WILLIAM H.E. DAY, Southern Methodist University

Jardine and Sibson[1] investigated flat cluster methods and characterized them in terms of certain sets of graphs called indicator families. In this paper I characterize indicator families in terms of certain closure operations defined on a set of graphs. This is a special case of a more general result in which I characterize certain subsets of lattice elements in terms of closure operations defined on a complete lattice.

[1]Nicholas Jardine and Robin Sibson, Mathematical Taxonomy, John Wiley & Sons Ltd. (1971).