

Zbl 301.05123

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Extremal problems on graphs and hypergraphs. (In English)**Proc. 1st Working Sem. Hypergraphs, Columbus 1972, Lecture Notes Math. 411, 75-84 (1974).**

[For the entire collection see Zbl 282.00007.]

This survey paper continues the line of questioning of the author's earlier papers, for example in *Theory Graphs Appl.*, Proc. Sympos. Smolenice 1963, 29-36 (1964; Zbl 161.20501), and, in Chapter II, generalizes some of the questions from graphs to hypergraphs. If \underline{G} is a finite family of r -graphs (i.e. r -uniform hypergraphs), then $f(n; \underline{G})$ is defined to be the smallest integer m such that every r -graph with n vertices and at least m r -edges contains a sub- r -graph isomorphic to a member of \underline{G} . When \underline{G} is a family of ordinary graphs, it is known from the theorems of *P. Erdős* and *A. H. Stone* [*Bull. Amer. math. Soc.* 52, 1087-1091 (1946; Zbl 063.01277)] und *P. Erdős* and *M. Simonovits* [*Stud. Sci. Math. Hung.* 1, 51-57 (1966; Zbl 178.27301)] that

$$f(n; \underline{G}) = \left(1 - \frac{1}{k-1}\right) \frac{n^2}{2} + o(n^2) \text{ as } n \rightarrow \infty$$

where k is the minimum of the chromatic numbers of the members of \underline{G} . Thus the case when \underline{G} consists solely of bipartite graphs is of particular interest, and Chapter I is devoted to a discussion of some results in this direction.

Chapter II is devoted to analogous problems for hypergraphs, in particular, for sets \underline{G} consisting of (for fixed integers s and t) r -graphs having exactly s vertices and exactly t r -edges. Several problems which arise in the author's recent papers with *V. T. Sós* and the reviewer [*W. G. Brown*, *P. Erdős*, and *V. T. Sós*, *New Direct. Theory Graphs*, Proc. third Ann. Arbor Conf., Univ. Michigan 1971, 53-63 (1973; Zbl 258.05132); *V. T. Sós*, *P. Erdős*, and *W. G. Brown*, *Periodica Math. Hungar.* 3, 221-228 (1973; Zbl 269.05111)] are discussed. Caveat lector! A number of the formulas contain typographical errors.

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Classification:

05C35 Extremal problems (graph theory)

05C99 Graph theory

05C15 Chromatic theory of graphs and maps