
Zbl 645.10045**Erdős, Paul; Nathanson, Melvyn B.***Partitions of bases into disjoint unions of bases.* (In English)**J. Number Theory 29, No.1, 1-9 (1988). [0022-314X]**

Two Ramsey-like combinatorial results on partitions are proved using probabilistic methods and the Borel-Cantelli lemma. The authors deduce that if A is an asymptotic basis of order h and if every large integer has sufficiently many representations as a sum of h elements of A , then A is a union of a finite or infinite number of pairwise disjoint asymptotic bases of order h .

Waring's problem is extended to showing that for each $k \geq 2$ and for all $s > s_0(k)$, the set $A = \langle n^k : n = 1, 2, \dots \rangle$ has a partition $A = \cup_{j=1}^{\infty} A_j$ such that each A_j is an asymptotic basis of order s . In the other direction, they show that the squares cannot be partitioned into disjoint sets which are asymptotic bases of order 4; for numbers not divisible by 4 there is a positive result. Some open problems are also included. For another combinatorial result which also has applications to additive number theory, see *P. Erdős* and *R. Rado* [Intersection theorems for system of sets, *J. Lond. Math. Soc.* 35, 85-90 (1960; Zbl 103.27901)] and the reviewer [Homogeneous additive congruences, *Philos. Trans. R. Soc. Lond., Ser. A* 261, 163-210 (1967; Zbl 139.27102)].

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Classification:

11B13 Additive bases

11B75 Combinatorial number theory

11P05 Waring's problem and variants

05C55 Generalized Ramsey theory

05A05 Combinatorial choice problems

11P81 Elementary theory of partitions

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asymptotic basis of order h ; Waring's problem; partition