

Zeitschrift: L'Enseignement Mathématique
Herausgeber: Commission Internationale de l'Enseignement Mathématique
Band: 25 (1979)
Heft: 1-2: L'ENSEIGNEMENT MATHÉMATIQUE

Artikel: OLD AND NEW PROBLEMS AND RESULTS IN COMBINATORIAL NUMBER THEORY: van der WAERDEN'S THEOREM AND RELATED TOPICS
Autor: Erdős, P. / Graham, R. L.

Bibliographie
DOI: <https://doi.org/10.5169/seals-50387>

Nutzungsbedingungen

Die ETH-Bibliothek ist die Anbieterin der digitalisierten Zeitschriften auf E-Periodica. Sie besitzt keine Urheberrechte an den Zeitschriften und ist nicht verantwortlich für deren Inhalte. Die Rechte liegen in der Regel bei den Herausgebern beziehungsweise den externen Rechteinhabern. Das Veröffentlichen von Bildern in Print- und Online-Publikationen sowie auf Social Media-Kanälen oder Webseiten ist nur mit vorheriger Genehmigung der Rechteinhaber erlaubt. [Mehr erfahren](#)

Conditions d'utilisation

L'ETH Library est le fournisseur des revues numérisées. Elle ne détient aucun droit d'auteur sur les revues et n'est pas responsable de leur contenu. En règle générale, les droits sont détenus par les éditeurs ou les détenteurs de droits externes. La reproduction d'images dans des publications imprimées ou en ligne ainsi que sur des canaux de médias sociaux ou des sites web n'est autorisée qu'avec l'accord préalable des détenteurs des droits. [En savoir plus](#)

Terms of use

The ETH Library is the provider of the digitised journals. It does not own any copyrights to the journals and is not responsible for their content. The rights usually lie with the publishers or the external rights holders. Publishing images in print and online publications, as well as on social media channels or websites, is only permitted with the prior consent of the rights holders. [Find out more](#)

Download PDF: 18.04.2026

ETH-Bibliothek Zürich, E-Periodica, <https://www.e-periodica.ch>

REFERENCES

- [Ab (75)] ABBOTT, H. L. On a conjecture of Erdős and Straus on non-averaging sets of integers. *Proc. 5th Br. Comb. Conf., Aberdeen 1975* (1976), 1-4.
- [Ab-Ha (72)] ABBOTT, H. L. and D. HANSON. Lower bounds for certain types of van der Waerden numbers. *J. Comb. Th (A)* 12 (1972), 143-146.
- [Ab-Li-Ri (74)] ABBOTT, H. L., A. C. LIU and J. RIDDELL. On sets of integers not containing arithmetic progressions of prescribed length. *J. Australian Math. Soc.* 18 (1974), 188-193.
- [Aj-Sz (74)] AJTAI, M. and E. SZEMERÉDI. Sets of lattice points that form no squares. *Studia Sci. Math. Hungar.* 9 (1974), 9-11.
- [Bab (76)] BABAI, L. (personal communication).
- [Bau (74)] BAUMGARTNER, J. A short proof of Hindman's theorem. *J. Comb. Theory (A)* 17 (1974), 384-386.
- [Bau (75)] ——— Partitioning vector spaces. *J. Comb. Th (A)*. 18 (1975), 231-233.
- [Bea (26)] BEATTY, Samuel. Problem 3173. *Amer. Math. Monthly* 33 (1926), p. 159.
- [Bec (xx)]
- [Beh (46)] BEHREND, F. On sets of integers which contain no three terms in arithmetical progression. *Proc. Nat. Acad. Sci. U.S.A.* 32 (1946), 331-332.
- [Ber (68)] BERLEKAMP, E. R. A construction for partitions which avoid long arithmetic progressions. *Canad. Math. Bull.* 11 (1968), 409-414.
- [Bra (28)] BRAUER, A. Über Sequenzen von Potenzresten. *S.-B. Preuss. Akad. Wiss. Phys. Math. Kl.* (1928), 9-16.
- [Bro (71)] BROWN, T. C. Is there a sequence of four symbols in which no two adjacent segments are permutations of one another? *Amer. Math. Monthly* 78 (1971), 886-888.
- [Bro (75)] ——— Behrend's theorem for sequences containing no k -element arithmetic progression of a certain type. *J. Comb. Th (A)*. 18 (1975), 352-356.
- [Chv (69)] CHVÁTAL, V. Some unknown van der Waerden numbers. In *Combinatorial Structures and their Applications*, Gordon and Breach, New York, 1969, 31-33.
- [Chv (72)] ——— Remarks on a problem of Moser. *Canad. Math. Bull.* 15 (1972), 19-21.
- [Dav+3 (77)] DAVIS, J. A., R. C. ENTRINGER, R. L. GRAHAM and G. J. SIMMONS. On permutations containing no long arithmetic progressions. *Acta. Arith.* 34 (1977), 81-90.
- [Dek (79)] DEKKING, F. M. Strongly non-repetitive sequences and progression-free sets. *J. Comb. Th.* 27 (1979), 181-185.
- [Er (50)] ERDÖS, P. On integers of the form $2^n + p$ and some related problems. *Summa Brasil Math.* 11 (1950), 1-11.
- [Er (66)] ——— Extremal problems in number theory II (in Hungarian). *Math. Lapok* 17 (1966), 135-155.

- [Er (73) b] ERDÖS P. Problems and results on combinatorial number theory. J. N. Srivastava et al., eds., in *A Survey of Combinatorial Theory*, 117-138, North Holland, Amsterdam, 1973.
- [Er (76) c] — Problems and results on combinatorial number theory II. *Jour. Indian Math. Soc.* 40 (1976), 1-14.
- [Er+5 (73)] ERDÖS, P., R. L. GRAHAM, P. MONTGOMERY, B. L. ROTHSCHILD, J. SPENCER and E. G. STRAUS. Euclidean Ramsey Theorems I. *J. Comb. Th. (A)* 14 (1973), 341-363.
- [Er+5 (75)] — Euclidean Ramsey Theorems II, III. *Colloq. Math. Soc. János Bolyai, Vol. 10*, 529-557, 558-595 (Infinite and Finite Sets). North Holland, Amsterdam, 1975.
- [Er-Sp (74)] ERDÖS, P. and J. H. SPENCER. *Probabilistic Methods in Combinatorics*. Acad. Press, New York, 1974, p. 39.
- [Er-Str (70)] ERDÖS, P. and E. G. STRAUS. Nonaveraging sets, II. *Colloq. Math. Soc. János Bolyai* 4 (1970), 405-411.
- [Er-Tu (36)] ERDÖS, P. and P. TURÁN. On some sequences of integers. *J. London Math. Soc.* 11 (1936), 261-264.
- [Frae (69)] FRANKEL, A. S. The bracket function and complementary sets of integers. *Canad. J. Math.* 21 (1969), 6-27.
- [Frae (73)] — Complementary and exactly covering sequences. *J. Comb. Th (A)*. 14 (1973), 8-20.
- [Frae-Le-Sh (72)] FRAENKEL, A. S., J. LEVITT and M. SHIMSHONI. Characterization of the set of values of $[n\alpha]$, $n = 1, 2, \dots$. *Dis. Math.* 2 (1972), 335-345.
- [Fu (77)] FURSTENBERG, H. Ergodic behavior of diagonal measures and a theorem of Szemerédi on arithmetic progressions. *J. Analyse Math.* 31 (1977), 204-256.
- [Fu-Ka (78)] FURSTENBERG, H. and Y. KATZNELSON. An ergodic theorem for commuting transformations. *J. Analyse Math.* 34 (1978), 275-291.
- [Gar (∞)] GARSIA, A. (*Unpublished*).
- [Ge (77)] GERVER, J. L. The sum of the reciprocals of a set of integers with no arithmetic progression of k terms. *Proc. Amer. Math. Soc.* 62 (1977), 211-214.
- [Ge-Ra (xx)] GERVER, Joseph L. and L. Thomas RAMSEY. On certain sequences of lattice points (*to appear*).
- [Gl (xx)] GLAZER, S. Ultrafilters and semigroup combinatorics. *J. Comb. Theory (A)*. (*to appear*).
- [Gr (63)] GRAHAM, R. L. On a theorem of Uspensky. *Amer. Math. Monthly* 70, (1963), 407-409.
- [Gr (xx)] — On partitions of E^n (*to appear*).
- [Gr-Li-Li (78)] GRAHAM, R. L., C. S. LIN and S. LIN. A note on the spectra of numbers. *Math. Mag.* 51 (1978), 174-176.
- [Gr-Ro (71)] GRAHAM, R. L. and B. L. ROTHSCHILD. A survey of finite Ramsey theorems. *Proc. Second Louisiana Conf. on Combinatorics, Graph Theory and Computing*, 21-40, 1971.
- [Gr-Ro (74)] A short proof of van der Waerden's theorem on arithmetic progressions. *Proc. Amer. Math. Soc.* 42 (1974), 385-386.
- [Gr-Si-Só (xx)] GRAHAM, R. L., M. SIMONOVITS and V. T. SÓS. A note on the intersection properties of subsets of integers (*to appear*).
- [Gr-Só (xx)] GRAHAM, R. L. and V. T. SÓS (*To appear*).

- [Gr-Sp (79)] GRAHAM R. L. and J. H. SPENCER. A general Ramsey product theorem. *Proc. Amer. Math. Soc.* 73 (1979), 137-139.
- [Gr-Sp-Wi (77)] GRAHAM, R. L., J. H. SPENCER and H. S. WITSENHAUSEN. On extremal density theorems for linear forms. In *Number Theory and Algebra*, 103-109, ed. by H. Zassenhaus, Acad. Press, New York, 1977.
- [Hale-Je (63)] HALES A. W. and R. I. JEWETT. Regularity and positional games. *Trans. Amer. Math. Soc.* 106 (1963), 222-229.
- [Hi (74)] HINDMAN N., Finite sums from sequences within cells of a partition of \mathbb{N} . *J. Comb. Theory (A)* 17 (1974), 1-11.
- [Hi (79)] — Ultrafilters and combinatorial number theory. *Number theory*, Carbondale 1979, ed. M. B. Nathanson, Lecture Notes in Math. No. 751, Springer, Berlin, 1979, 119-184.
- [Hi (xx) a] — Partitions and sums and products of integers. *Trans. Amer. Math. Soc.* (to appear).
- [Hi (xx) b] — Partitions and sums and products — two counterexamples. *J. Comb. Theory (A)* (to appear).
- [Hoff (76)] HOFFMAN, D. G. *Sets of integers closed under affine operators*. Ph. D. dissertation, Dept. of Comb. and Opt., Univ. of Waterloo, 1976.
- [Hoff-Kl (xx)] HOFFMAN, D. G. and D. A. KLARNER. Sets of integers closed under affine operators — The closure of finite sets; the finite basis theorems. (To appear).
- [Ju (79)] JUHÁSZ, Rozália. Ramsey type theorems in the plane. *J. Comb. Th. (A)* 27 (1979), 152-160.
- [Kak-Mo (30)] KAKEYA, S. and S. MORIMOTO. On a theorem of M. Baudet and van der Waerden. *Jap. J. Math.* 7 (1930), 163-165.
- [Kl-Ra (73)] KLARNER, D. A. and R. RADO. Linear combinations of sets of consecutive integers. *Amer. Math. Monthly* 80 (1973), 985-989.
- [Kl-Ra (74)] — Arithmetic properties of certain recursively defined sets. *Pac. J. Math.* 53 (1974), 445-463.
- [Kom-Su-Sz (75)] KOMLÓS, J., M. SÜLYÖK and E. SZEMERÉDI. Linear problems in combinatorial number theory. *Acta Math. Acad. Sci. Hungar.* 26 (1975), 113-121.
- [Mo (53)] MOSER, L. On non-averaging sets of integers. *Canad. J. Math.* 5 (1953), 245-252.
- [Mo (70)] — Problem 170. *Canad. Math. Bull.* 13 (1970), p. 268.
- [Na (77)] NATHANSON, M. B. Permutations, periodicity and chaos. *J. Comb. Th. (A)* 22 (1977), 61-68.
- [Nes-Röd (∞)] NESETRIL J. and V. RÖDL. (*Unpublished*).
- [Ni (63)] NIVEN, Ivan. *Diophantine Approximations*. John Wiley and Sons, New York, 1963.
- [Odd (75)] ODDA, Tom. Solution to Problem E2440. *Amer. Math. Monthly* 82 (1975), p. 74.
- [Odl-Sta (78)] ODLYZKÓ A., M. and R. P. STANLEY. *Some curious sequences constructed with the greedy algorithm*. Bell Laboratories internal memorandum (1978).
- [Par-Har (77)] PARIS, Jeff and Leo HARRINGTON. A mathematical incompleteness in Peano arithmetic. In *Handbook of Mathematical Logic*, ed. Jon Barwise, 1133-1142, North Holland, Amsterdam, 1977.

- [Pe-Sz (∞)] PETRUSKA G. and E. SZEMERÉDI. (*Unpublished*).
- [Ple (70)] PLEASANTS, P. A. B., Non-repetitive sequences. *Proc. Comb. Philos. Soc.* 68 (1970), 267-274.
- [Poll (xx)] POLLINGTON, A. On generalized arithmetic and geometric progressions. (*To appear*).
- [Pom (79)] POMERANCE, C. The prime number graph. *Math. Comp.* 33 (1979), 399-408.
- [Pom (xx)] ——— Collinear subsets of lattice point sequences — an analogue of Szemerédi's theorem. (*To appear*).
- [Rad (33) a] RADO, R. Verallgemeinerung eines Satzes von van der Waerden mit Anwendungen auf ein Problem der Zahlentheorie. *Sitzungsber. preuss. Akad. Berlin* 27 (1933), 3-10.
- [Rad (33) b] ——— Studien zur Kombinatorik. *Math. Zeit.* 36 (1933), 424-480.
- [Rad (70)] ——— Some partition theorems. *Colloq. Math. Soc. János Bolyai* 4, Combinatorial Theory and its Applications, vol. III, North Holland, Amsterdam 1970, 929-936.
- [Ramsey (30)] RAMSEY, F. P. On a problem of formal logic. *Proc. London Math. Soc.*, 2nd ser, 30 (1930), 264-286.
- [Ran (60)] RANKIN, R. A. Sets of integers containing not more than a given number of terms in arithmetical progression. *Proc. Roy. Soc. Edinburgh Sect. A* 65 (1960/61), 332-344.
- [Roth (53)] ROTH, K. F. On certain sets of integers. *J. London Math. Soc.* 28 (1953), 104-109.
- [Roth (64)] ——— Remark concerning integer sequences. *Acta Arith.* 9 (1964), 257-260.
- [San (68)] SANDERS, J. *A generalization of Schur's theorem*. Dissertation, Yale Univ., 1968.
- [Schur (16)] SCHUR, I. Über die Kongruenz $x^m + y^m \equiv z^m \pmod{p}$. *Jahresbericht der Deutschen Mathematiker Vereinigung* 25 (1916), 114-117.
- [Shad (76)] SHADER, Leslie E. All right triangles are Ramsey in \mathbb{E}^2 ! *J. Comb. Th. (A)* 20 (1976), 385-389.
- [Sim-Sös (xx)] SIMONOVITS, M. and V. T. Sös. (*To appear*).
- [Spen (72)] SPENCER, J. H. A remark on coloring integers. *Canad. Math. Bull.* 15 (1972), 43-44.
- [Spen (73)] ——— Solution to Problem P. 185. *Canad. Math. Bull.* 16 (1973), p. 464.
- [Spen (75)] ——— Restricted Ramsey configurations. *J. Comb. Th. (A)* 19 (1975), 278-286.
- [Sper (28)] SPERNER, E. Ein Satz über Untermengen einer endlichen Menge. *Math. Zeit.* 27 (1928), 544-548.
- [St-Sh (78)] STEVENS, R. S. and R. SHANTURAM. Computergenerated van der Waerden partitions. *Math. Comp.* 17 (1978), 635-636.
- [Stol (76)] STOLARSKY, K. B. Beatty sequences, continued fractions, and certain shift operators. *Canad. Math. Bull.* 19 (1976), 473-482.
- [Sz (69)] SZEMERÉDI, E. On sets of integers containing no four elements in arithmetic progression. *Acta Math. Acad. Sci. Hungar.* 20 (1969) 89-104.
- [Sz (75)] ——— On sets of integers containing no k elements in arithmetic progression. *Acta. Arith.* (1975), 199-245.
- [Sz (∞)] ——— (*Unpublished*).

- [Tho (78)] THOUVENOT, J.-P. La démonstration de Furstenberg du théorème de Szemerédi sur les progressions arithmétiques. *Séminaire Bourbaki*, 30^e année, 1977/78, n^o 518, 11 pp.
- [U (27)] USPENSKY, J. V. On a problem arising out of the theory of a certain game. *Amer. Math. Monthly* 34 (1927), 516-521.
- [Wa (27)] Van der WAERDEN, B. L. Beweis einer Baudetschen Vermutung. *Nieuw Arch. Wisk.* 15 (1927), 212-216.
- [Wa (71)] — How the proof of Baudet's conjecture was found. *Studies in Pure Mathematics*, L. Mirsky, ed., Academic Press, New York (1971), 251-260.
- [Weint (77)] WEINTRAUB, S. Seventeen primes in arithmetic progression. *Math. Comp.* 31 (1977), p. 1030.
- [Wit (52)] WITT, E. Ein kombinatorischer Satz der Elementargeometrie. *Math. Nachr.* 6 (1952), 261-262.

(Reçu le 3 juillet 1979)

P. ERDÖS

Mathematical Institute of the Hungarian Academy of Sciences
Budapest, Hungary.

R.L. GRAHAM

Bell Laboratories
Murray Hill, New Jersey, USA.

vide-leer-empty

vide-leer-empty