Discrete Mathematics 87 (1991) 219–220
North-Holland

Forthcoming papers

The following papers will be published in future issues:

Martin J. Sharry and Anne Penfold Street, Partitioning sets of quadruples into designs III

It is shown that the collection of all $\binom{11}{4}$ quadruples chosen from a set of eleven points can be partitioned into eleven mutually disjoint 3-(10, 4, 1) designs in precisely 21 non-isomorphic ways.

R.J. Simpson, Disjoint covering systems of rational Beatty sequences

A rational Beatty sequence is a sequence $\{[\alpha n + \beta]\}$, where α is rational, n runs through the integers and square brackets denote integer part. In 1973 A.S. Fraenkel conjectured that if $\{\{[\alpha_i n + \beta_i]\}$: $i = 1, \ldots, t\}$ is a collection of rational Beatty sequences which partition the integers then α_i/α_j is an integer for some pair of distinct indices i and j. We show that the conjecture is true if $\alpha_i \leqslant 2$ for some i.

D.R. Stinson, A survey of Kirkman triple systems and related designs

The purpose of this paper is to survey results on Kirkman triple systems and generalizations. These generalizations include nearly Kirkman triple systems and resolvable group-divisible designs with block size three, Kirkman frames, Kirkman triple systems containing Kirkman and/or Steiner triple systems as subsystems, non-isomorphic Kirkman systems, and orthogonal resolutions of Kirkman systems.

Marta Sved, The geometry of the binomial array modulo p^2 and p^3

A geometrical approach to divisibility properties of binomial coefficients has been applied recently by several authors. Computer outputs throw light on the structure of Pascal's array modulo primes and prime powers. The geometrical picture gives new meaning to relations known before and reveals new properties. In previous work the author treated arrays modulo primes and arrays of binomials *divisible* by higher power of primes. The aim of the present work is to characterise the structure of Pascal's array modulo p^2 and p^3, (where p is some prime), especially considering binomials *not divisible* by p.

W.D. Wallis and J. Wu, Clique partitions of split graphs

Split graphs are graphs formed by taking a complete graph and an empty graph disjoint from it and some or all of the possible edges joining the two. We prove that the problem of deciding the clique partition number is NP-complete, even when restricted to the class of split graphs.

H.C. Williams, Some formulas concerning the fundamental unit of a real quadratic field

Let ε be the fundamental unit of a real quadratic field of discriminant d and let integers V_n and U_n be defined by $(V_n + U_n\sqrt{d})/2 = \varepsilon^n$. It is well known that if p is any odd prime, then $p \mid U_m$, where $m = p - \chi$ and χ is the value of the Legendre symbol (d/p). In this paper several formulas are derived for the value of $U_m/p \pmod{p}$ for the case in which $p \nmid d$.

B.J. Wilson, Minimax arcs

In PG$(2, q)$ with q odd it is possible to construct two classes of complete (k, n)-arcs for which $k = (n-1)q + 1$ by making use of the partitioning of PG$(2, q)\setminus C$ into interior points and exterior points with respect to an irreducible conic C. The points of the arcs of both classes have the property that the number of n-secants through each is either a maximum or a minimum. We show that this property, together with the condition that $n \geqslant (q+3)/2$ characterises one of the classes and that, together with the conditions that $n = (q+1)/2$ and the arc only has one maximum point, it characterises the other.

Hans-Jürgen Bandelt and Henry Martyn Mulder, Pseudo-median graphs: decomposition via amalgamation and Cartesian multiplication

A graph is pseudo-median if for every triple u, v, w of vertices there exists either a unique vertex between each pair of them, if their mutual distances sum up to an even number, or a unique triangle whose edges lie between the three pairs of u, v, w, respectively, if the distance sum is odd. We show that every finite pseudo-median graph can be built up by successive amalgamations of smaller pieces. The building stones themselves are certain Cartesian products of wheels, snakes (i.e., path-like 2-trees), and complete graphs minus matchings.

Stephan Foldes, Ivan Rival and Jorge Urrutia, Light sources, obstructions and spherical orders

Ordered sets are used as a computational model for motion planning in which figures on the plane may be moved along a ray emanating from a light source. The resulting obstructions give rise to ordered sets which, in turn, are precisely (truncated) spherical orders. We show too, that there is a linear-time algorithm to recognize such ordered sets.

H. Galeana-Sánchez and V. Neumann-Lara, Extending kernel-perfect digraphs to kernel perfect critical digraphs

In this paper we prove that any R-digraph is an induced subdigraph of an infinite set of R^--digraphs.

The method employed in the proof can be used as a powerful tool in the construction of a large class of R^--digraphs.

G.M. Hamilton and D.G. Rogers, Further results on irregular, critical perfect systems of difference sets

An $(m, n; u, v; c)$-system is a collection of components, m of valency $u-1$ and n of valency $v-1$, whose difference sets form a perfect system with threshold c. If there is an $(m, n; 3, 6; c)$-system, then $m \geqslant 2c-1$; and if there is a $(2c-1, n; 3, 6; c)$-system, then $2c-1 \geqslant n$. For all sufficiently large c, there are $(2c-1, n; 3, 6; c)$-systems at least when $n = 1$ or 2 and, in particular, $(2c-1, 1; 3, 6; c)$-systems which have a certain splitting property enabling them to be pulled apart nicely.

We show here that if, for some c and n, there is a $(2c-1, n; 3, 6; c)$-system which splits at $3c + 6n - 1$, then, in the first place, $c - 1 \geqslant n$, and, secondly, there is a $(2c^* - 1, n; 3, 6; c^*)$-system with a split at $3c^* + 6n - 1$ for all sufficiently large c^* depending on c and n. We then confirm the existence of such split systems at least when $n = 1, 5, 6$ and 7, finding also that they do not exist for $n = 2, 3$ or 4.

We discuss the bearing of these results on the study of critical perfect systems and on the multiplication theorem for these systems. Another approach to $(2c-1, n; 3, 6; c)$-systems, including the cases $n = 2$, 3 and 4, is considered in the sequel.