Czechoslovak Mathematical Journal

Summaries of articles published in this issue

Czechoslovak Mathematical Journal, Vol. 22 (1972), No. 4, (692),(693)–(694)

Persistent URL: http://dml.cz/dmlcz/101135

SUMMARIES OF ARTICLES PUBLISHED IN THIS ISSUE

(Publication of these summaries is permitted)

M. SATYANARAYANA, Bowling Green: *Commutative primary semigroups.* Czech. Math. J. *22* (*97*), (1972), 509—516. (Original paper.)

A commutative semigroup is said to be primary if every ideal in the semigroup is primary. In this paper the author studies the structure of primary semigroups, which differs from the structure of commutative primary rings.

S. MRÓWKA and H. P. TAN, Buffalo: *Sequences of disjoint open sets.* Czech. Math. J. *22* (*97*), (1972), 517—521. (Original paper.)

The purpose of this paper is to discuss the validity of the statement: (S) Given an infinite subset A of a space X, there exists an infinite sequence $G_1, G_2, \ldots$ of mutually disjoint open subsets of X each of which intersects A. It is known that (S) holds in arbitrary regular T_1-space. It also holds whenever X is Hausdorff and A has at least one accumulation point. On the other hand, (S), in its full generality, fails for Hausdorff spaces; an example can be found in one paper by Z. Frolík. In this paper the authors give an example similar to Frolík's, but simpler (authors' example is countable and second countable). The authors also indicate examples showing that a space satisfying (S) need not be Urysohn; the question if every Urysohn space satisfies (S) remains open.

BEDŘICH PONDĚLÍČEK, Poděbrady: *A characterization of semilattices of left or right groups.* Czech. Math. J. *22* (*97*), (1972), 522—524. (Original paper.)

In this note the author gives a characterization of right regular or periodic semigroups, which are semilattices of left groups.

JORGE MARTINEZ, Gainesville: *Free products in varieties of lattice-ordered groups.* Czech. Math. J. *22* (*97*), (1972), 535—553. (Original paper.)

It is well known in group theory that the free product of two non-trivial groups is non-Abelian even if the factors themselves are Abelian. More generally, does the free product of two objects in a variety of universal algebras always fail to be in a proper subvariety? This phenomenon is exhibited for various varieties of l-groups, no counter examples are known in the theoery of l-groups. A new variety of l-groups is discussed: an l-group G is weakly Abelian if $2x \geqq x^g = -g + x + g$ for all $0 < x \in G$, $g \in G$. Weakly Abelian l-groups are characterized as follows: they are the l-groups satisfying $x + N = x^g + N$ for each $0 < x < G$, $g \in G$ and each value N of x. Some interesting corollaries are presented. A short discussion of projective Abelian l-groups is given. Projectives are subdirect products of integers having no uncountable sets of pairwise disjoint elements. A cardinal sum of two finitely generated projectives is projective. This characterizes the projectives with finitely many disjoint elements as the finite cardinal sums of copies of the integers.

DIETMAR DORNINGER, Wien: *Über Eulersche und paare Hamiltonsche Graphen.* Czech. Math. J. *22* (*97*), (1972), 600—611. (Originalartikel.)

Wir bezeichnen einen endlichen, ungerichteten n-regulären Graphen als Hamiltonschen Graphen, wenn er derart in n Linearfaktoren zerfällt, dass die Vereinigung von je zwei Linearfaktoren einen Hamiltonschen Kreis des Graphen ergibt. In der Arbeit soll die Klasse der paaren Hamiltonschen Graphen vom Grad n, insbesondere für $n < 6$ untersucht werden. Dazu betrachten wir eine Teilklasse der gerichteten, k-valenten Eulerschen Graphen, welche die kantendisjunkte Vereinigung von $k/2$ kontinuierlich gerichteten Kreisen sind, und zeigen, dass man mittels einer einfachen Transformation aus der betrachteten Teilklasse alle paaren Hamiltonschen Graphen gewinnt. Dann wird die Existenz und Transformation von k-valenten Eulerschen Graphen — insbesondere für $k < 10$ — untersucht und die gefundenen Resultate werden auf paare Hamiltonsche Graphen angewandt.

KAREL SEGETH, Praha: *Universal approximation by hill functions.* Czech. Math. J. *22* (*97*), (1972), 612—640. (Original paper.)

The introductory part of the paper concerns mainly the sufficient conditions for a sequence of hill functions given by a convolution formula to have a function of exponential type as its limit. The basic result of the paper is a theorem on the approximation by an infinitely smooth rapidly decreasing function. This approximation is shown to be universal, i.e., best possible with respect to the smoothness of the function approximated. Computational aspects of the approximation of this kind are also considered.

JAROLÍM BUREŠ, Praha: *Deformation and equivalence G-structures. Part* I. $\{e\}$*-structures.* Czech. Math. J. *22* (*97*), (1972), 641—652. (Original paper.)

The paper treats necessary and sufficient conditions for a given diffeomorphism f of a manifold M_1 onto a manifold M_2 to be an equivalence (a local equivalence) of G-structures B_1 on M_1 and B_2 on M_2 for the case of trivial group $G = \{e\}$. The notion "f is a deformation of order k" of G-structures B_1 on M_1 and B_2 on M_2 is introduced and the following problem is solved: for which k a deformation of $\{e\}$-structures of order k is already an equivalence? In general case the problem is practically completely solved.

ANTON DEKRÉT, Žilina: *On canonical forms on non-holonomic and semi-holonomic prolongations of principal fibre bundles.* Czech. Math. J. *22* (*97*), (1972), 653—662. (Original paper.)

In this paper the author finds the structure equations of canonical forms on non-holonomic and semi-holonomic prolongations of principal fibre bundles as well as the Maurer-Cartan equations of the structure groups of these bundles.

LADISLAV BICAN, Praha: *Notes on purities.* Czech. Math. J. *22* (*97*), (1972), 525—534. (Original paper.)

The first paragraph of this note is devoted to the general theory of projectively closed purities. A sufficient condition for a projectively closed purity to be projective is given. Further, it is shown that the intersection of any set of projective purities is projective. The second paragraph deals with injectively closed purities and dualizes some results concerning projectively closed purities. It is a well-known fact in the Abelian groups theory that a group D is divisible if and only if it contains no maximal proper subgroups. The third paragraph generalizes this fact to a class of $\mathscr{E}$-purities.

IVAN NETUKA, Praha: *The third boundary value problem in potential theory.* Czech. Math. J. *22* (*97*), (1972), 554—580. (Original paper.)

The paper continues the author's previous investigations of a certain operator $\mathscr{T}$ which is closely connected with the third boundary value problem for the Laplace equation (see Czech. Math. J. *22* (1972), 312—324, 462—489). The null-space of $\mathscr{T}$ is studied and the results together with the Riesz-Schauder theory are applied to solving the third boundary value problem for non-regular domains by means of Newtonian potentials.

WILLIBALD DÖRFLER, Wien: *Automorphismen von X-Summen von Graphen.* Czech. Math. J. *22* (*97*), (1972), 581—589. (Originalartikel.)

Das lexikographische Produkt von Graphen und Mengensystemen und seine Verallgemeinerung, die X-Summe, wurden bereits von verschiedenen Autoren untersucht. Die Fragestellung war, unter welchen Bedingungen das Produkt nur natürliche Automorphismen besitzt. In der vorliegenden Arbeit wird die Automorphismengruppe des lexikographischen Produktes und der X-Summe auf Kommutativität, Transitivität, Regularität und Primitivität untersucht.

MILOŠ RÁB, Brno: *Second order differential equations with complex-valued coefficients.* Czech. Math. J. *22* (*97*), (1972), 590—599. (Original paper.)

The paper is devoted to the study of oscillatory and asymptotic properties of solutions of the equation (1) $(P(x)\,y')' + Q(x)\,y = 0$ where $P(x) = p(x)\,e^{i\varphi(x)}$, $Q(x) = q(x)\,e^{i\psi(x)}$ and p, q, φ, ψ are real functions $p > 0$, $q, \psi \in C^0$, $\varphi \in C^1$ on an interval (a, b) which can be bounded or unbounded. The main result guarantees that every solution of (1) is of the form $y = r(x)\,e^{i\Theta(x)}$ where r, Θ are suitable real functions. Since $|y(x)| = |r(x)|$ and the functions $y(x)$ and $r(x)$ have exactly the same zeros, the function $r(x)$ reflects both the growth properties and the distribution of the zeros of solutions of (1); some estimates for the number of zeros of any solution on (a, b) and conditions for disconjugacy are given.

JOSEF KRÁL and JAROSLAV LUKEŠ, Praha: *Integrals of the Cauchy type.* Czech. Math. J. *22* (*97*), (1972), 663—682. (Original paper.)

Necessary and sufficient geometric conditions on the rectifiable curve $K \subset R^2$ are established guaranteeing the existence of regular limits at $\eta \in K$ of the integrals $\int_K F(\zeta)\,d\zeta/(\zeta - z)$, $\operatorname{Im} \int_K F(\zeta)\,d\zeta/(\zeta - z)$ for any continuous real-valued function F satisfying $F(\zeta) - F(\eta) = o(Q(\zeta))$ as $\zeta \to \eta$, where $Q \geqq 0$ is a fixed bounded lower-semicontinuous function.