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SUMMARIES OF ARTICLES PUBLISHED IN THIS ISSUE

(Publication of these summaries is permitted)

KRIPASINDHU SIKDAR, Calcutta: *Decompositions of the state space, homomorphisms and product of semigroup acts.* Czech. Math. J. *24* (*99*), (1974), 511—521. (Original paper.)

Let S be a topological semigroup and X a nonvoid Hausdorff space. Then an act is a continuous function $X \times S \to X$ such that, denoting the value of the function at (x, s) by xs, $x(s_1 s_2) = (xs_1)\, s_2$ holds for all $s_1, s_2 \in S$ and all $x \in X$. An orbit (a point-inverse set) is a set of the form $xS = \{xs : s \in S\}$ ($xS^{(-1)} = \{y \in X : yS \cap \{x\} \neq 0\}$), where $x \in X$. An orbit (a point-inverse set) is maximal if it is not properly contained in an orbit (a point-inverse set). A decomposition of X is a partition $\{X_t\}$ where each X_t is closed. Acts for which maximal orbits (point-inverse sets) or orbits form a decomposition of X are studied and a set of results towards the characterization of such acts are proved. Some results are proved showing how a homomorphism from an act onto another maps a maximal (minimal) orbit (or a point-inverse set) onto a maximal (minimal) orbit (or a point-inverse set) and when a homomorphism maps an act whose maximal orbits (point inverse sets) or orbits form a decomposition onto an act of the same type. Finally, some observations are made regarding how a product of acts inherits some particular property as mentioned above from the component acts.

IVAN STRAŠKRABA and OTTO VEJVODA, Praha: *Periodic solutions to a singular abstract differential equation.* Czech. Math. J. *24* (*99*), (1974), 528—540. (Original paper.)

In the paper the convergence in the graph norm of $A^{1/2}$ of ω-periodic solution to the equations $\varepsilon\, u''(t) + u'(t) + A\, u(t) = f(t)$, $\varepsilon \in R^+ = \langle 0, \infty)$, $t \in R = (-\infty, \infty)$ and $\varepsilon\, u''(t) + u'(t) + A\, u(t) = \mu F(\varepsilon)\, (u)\, (t)$, $\varepsilon, \mu \in R^+$, $t \in R$ for $\varepsilon \to 0^+$ is established, where A is a closed linear operator in a Hilbert space H with the spectrum $\sigma(A) \geqq m > 0$.

JIŘÍ RACHŮNEK, Olomouc: *Prime subgroups of ordered groups.* Czech. Math. J. *24* (*99*), (1974), 541—551. (Original paper.)

In this paper some concepts known for lattice-ordered groups (l-groups) are generalized to ordered groups (henceforth po-groups) and their properties are investigated. In the first section prime subgroups of G are studied. The second section concerns properties of δ-polars in G. In the concluding section the notion of an o-filter and that of an o-antifilter in a po-set is introduced and the connection between the prime subgroups of a 2-isolated Riesz group G and the o-filters of G^+ is described, as well as a property of o-antifilters of the po-set of all the dual principal polars in G.

DALIBOR KLUCKÝ, Olomouc: *Ternary rings with zero associated to desarguesian and pappian planes.* Czech. Math. J. *24* (*99*), (1974), 607—613. (Original paper.)

In this paper, the necessary and sufficient conditions that a planar ternary ring with zero coordinatizes a desarguesian plane and a pappian plane are deduced.

C. S. Hoo, Edmonton and K. P. Shum, Hong Kong: *On compact N-semigroups*. Czech. Math. J. *24* (*99*), (1974), 552—562. (Original paper.)

In this paper the authors study the properties of the set N of all nilpotent elements of a semigroup S in terms of Tod e where e is a non-zero idempotent of S and Tod e is the set of all topological zero divisors of e. The authors prove that in fact N is the intersection of all such Tod e. The authors also show that if e is a non-zero primitive idempotent of a compact N-semigroup S (S is called a compact N-semigroup if S is a compact space and N is an open subset of S), then Tod e is an open prime ideal of S. Finally the authors show that in a compact N-semigroup, under some conditions, a nil ideal is nilpotent, thus transporting the well known Hopkins-Levitzki theorem from ring theory to compact N-semigroups, with the chain conditions being replaced by compactness.

Dietmar Kahnert, Stuttgart: *Addition linearer Cantormengen*. Czech. Math. J. *24* (*99*), (1974), 563—572. (Originalartikel.)

Ist C eine Cantormenge, C^* die von C erzeugte additive Untergruppe der reelen Zahlen $\mathbf{R}$ und L das Lebesgue-Maß, so wird untersucht, welche Bedingungen an C gestellt werden müssen, damit $L(C^*) = 0$ oder $L(C^*) > 0$ ist. Ferner wird gezeigt, daß es zu jeder Cantormenge C eine Cantormenge B mit $L(B) = 0$ gibt, so daß $B + C = \{b + c : b \in B,\ c \in C\}$ ein Intervall enthält.

R. H. Johnson, Berkeley: *A new class of enumeration problems*. Czech. Math. J. *24* (*99*), (1974), 573—583. (Original paper.)

Realizations of certain graphical sequences are enumerated using ordinary generating functions. These results are then used to answer some questions concerning bounds on the number of realizations of sequences of a given length. Finally "Nat Turner's Problem" raised by Senior is discussed.

H. M. Riedl, Konstanz and G. F. Webb, Nashville: *Relative boundedness conditions and the perturbation of a nonlinear operator*. Czech. Math. J. *24* (*99*), (1974), 584—597. (Original paper.)

This paper investigates the perturbation of nonlinear operators with respect to such properties as closedness, Lipschitz invertibility, resolvent, and spectrum. The results are primarily nonlinear analogues to the linear case for unbounded operators. As a criteria for the "size" of the perturbing operator a nonlinear analogue to the linear notion of relative boundedness is used.

Štefan Porubský, Bratislava: *Natural exactly covering systems of congruences*. Czech. Math. J. *24* (*99*), (1974), 598—606. (Original paper.)

The purpose of this paper is to characterize natural exactly covering systems of residual classes containing exactly m residual classes with respect to one modulus while their other classes have distinct moduli. This characterization is established in certain connection with diophantine equation.

LADISLAV SKULA, Brno: *Quasi-reflections and limits.* Czech. Math. J. *24* (*99*), (1974), 522—527. (Original paper.)

In this paper the concept of quasi-reflection is introduced, which generalizes the concept of the reflection. Three Theorems of the theory of reflection concerning the preserving of limits and colimits hold also in the theory of quasi-reflection if only the so-called λ-, λ_l- and λ_c-diagrams are considered. It is shown that further weakening of the supposition for these diagrams is not in a certain sense possible.

JIŘÍ SOUČEK, VLADIMÍR SOUČEK, Praha: *On the spectrum of a nonlinear operator.* Czech. Math. J. *24* (*99*), (1974), 614—663. (Original paper.)

In this paper the structure of the set of all eigenvalues of a nonlinear operator A on Hilbert space H is investigated. First, finite-dimensional case is examined and under the assumptions that A is potential and real-analytic it is shown that the set $\Lambda_r = \{\lambda \in R \mid$ there exists $x \in H$, $\|x\| = r$ such that $\lambda x = Ax\}$ is finite for all but a discrete set of $r > 0$. The main tool in proofs is the theory of functions of several complex variables, a generalization of the Morse theorem for holomorphic functions on an analytic set is proved here. Then the results are transferred to infinite dimensional case and under additional assumptions that A is strongly continuous it is proved that the set Λ_r is a sequence converging to zero (or a finite set) for all but a countable set of $r > 0$.

VÁCLAV HAVEL, Brno: *A general coordinatization principle for projective planes with comparison of Hall and Hughes frames and with examples of generalized oval frames.* Czech. Math. J. *24* (*99*), (1974), 664—673. (Original paper.)

A general principle of coordinatization of projective planes is presented. The resulting coordinatizing algebraic systems include planar ternary rings. The Hall and Hughes frames are described in detail. As a further important special case the so called generalized oval frames are investigated. Finally some examples of "proper" generalized oval frames are given.