Summaries of articles published in this issue

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(Publication of these summaries is permitted)

H. E. Scheiblich, Columbia, S. C.: *Concerning congruences on symmetric inverse semigroups.* Czech. Math. J. *23 (98),* (1973), 1—10. (Original paper.)

The lattice of congruences on a symmetric inverse semigroup $\mathscr{I}_X$ has been determined by A. E. Liber, using techniques very similar to those of A. I. Malcev for characterizing the congruences on a full transformation semi-group $\mathscr{T}_X$. The purpose of this note is to derive and extend these results using more recent theorems on any inverse semigroup. In the course of events, it is shown that $\mathscr{I}_X$ is embedded in $\mathscr{T}_{X^\circ}$, the congruences on $\mathscr{I}_X$ are not just those induced by congruences on $\mathscr{T}_{X^\circ}$, but $\Lambda(\mathscr{I}_X) \cong \Lambda(\mathscr{T}_X)$.

Ivan Singer, Bucarest: *On minimal sequences of type l_+ and bounded biorthogonal systems in Banach spaces.* Czech. Math. J. *23 (98),* (1973), 11—14. (Original paper.)

In the author's previous paper the question was raised whether a minimal sequence $\{x_n\}$ of type l_+ exists in every Banach space. In the present Note it is proved that the answer to this problem is affirmative and that for a wide class of separable Banach spaces (including all spaces having a finite dimensional decomposition) $\{x_n\}$ can be chosen to be also complete in E.

Darrell C. Kent, Pullman and Gary D. Richardson, Greenville: *Open and proper maps between convergence spaces.* Czech. Math. J. *23 (98),* (1973), 15—23. (Original paper.)

This paper is to some extent a continuation of the previous paper by D. C. Kent (Fund. Math. *65* (1969), 197—205). In this study of open and proper maps between convergence spaces, the authors are interested primarily in results pertaining to the theory of convergence spaces rather than in general-izations of well-known topological theorems. The authors show, for example, that open maps extend from a convergence space to its decomposition series whereas proper maps do not; furthermore, open maps preserve the property of pretopological coherence of pairs of spaces. Alternate characterizations are given for both types of maps. In the last section the authors study the behavior of the extension map from a convergence space to its Stone-Čech compactification.

Jaroslav Janda, Praha: *Über die Kategorie der Menge stetiger Funktionen, welche Differentialgleichungen ohne Eindeutigkeit bestimmen.* Czech. Math. J. *23 (98),* (1973), 30—33. (Originalartikel.)

In der Arbeit wird bewiesen, dass die stetige Funktionen $f: R^2 \to R$ ($f \in C(R^2)$), für welche die Differentialgleichung $y' = f(x, y)$ zumindest einen Uneindeutigkeitspunkt hat, in $C(R^2)$ bei der Topologie der lokal gleichmässigen Konvergenz eine Menge erster Kategorie bilden.

NEAL J. ROTHMAN, Urbana: *Duality and algebraically irreducible semi-groups*. Czech. Math. J. *23* (*98*), (1973), 24—29. (Original paper.)

In this paper, the concept of duality of semigroups is used to find sufficient conditions that if *S* is a compact abelian semigroup with zero element and identity element which is algebraically irreducible both about the zero element and the maximal group containing the identity element, there exists a standard thread in *S* from zero element to the identity element. The dual semigroup is taken as a subsemigroup of the measurable semicharacters satisfying an involutional equation, which the second dual of necessity satisfies. The condition has an interpretation in terms of the continuity of a "natural" involution on the semigroup *S*. In particular, for the semigroups discussed, there is a continuous "natural" involution if and only if there is no essential winding in the semigroup.

IVAN KOLÁŘ, Brno: *On manifolds with connection*. Czech. Math. J. *23* (*98*), (1973), 34—44. (Original paper.)

This paper presents an exact justification of the so-called invariant method of investigation (by É. Cartan and G. F. Laptěv) for manifolds with connection.

L. S. HUSCH, Knoxwille: *Equicontinuous commutative semigroups of onto functions*. Czech. Math. J. *23* (*98*), (1973), 45—49. (Original paper.)

In this note the author investigates equicontinuous commutative semigroups *G* of functions of a space *X* into itself. The author defines a product on orbit closures which makes each orbit closure a commutative semigroup. If *X* is compact Hausdorff and each $g \in G$ is onto, then each $g \in G$ is a homeomorphism and each orbit closure is a topological group. Finally it is shown that if *X* is compact Hasudorff then the closure of *G* in the space of continuous maps of *X* into itself with the compact-open topology is a topological group and each orbit closure is the continuous homomorphic image of *G*.

BOHDAN ZELINKA, Liberec: *Meromorphisms of graphs*. Czech. Math. J. *23* (*98*) (1973), 50—56. (Original paper.)

A meromorphism of a graph is an isomorphic mapping of a graph into itself. In this paper the semigroup of a graph and its interrelations with the group of automorphisms are studied.

JACQUES TROUÉ, Montreal: *On a theorem on the change of base point in a path connected space*. Czech. Math. J. *23* (*98*), (1973), 123—124. (Original paper.)

In the paper a new simpler proof of a well known theorem is given.

JÁN JAKUBÍK, Košice: *Center of a complete lattice*. Czech. Math. J. *23* (*98*), (1973), 125—138. (Original paper.)

In this paper necessary and sufficient conditions under which the center of a complete lattice *L* is a closed sublattice of *L* are found. Further, relative centers of a conditionally complete lattice are investigated.

STANISLAV ŠMAKAL, Praha: *Vertices of space curves.* Czech. Math. J. *23 (98)*, (1973), 74—85. (Original paper.)

The paper deals with the extremes of curvatures on closed curves in Euclidean spaces E_n ($n \geqq 3$). Only curves with curvatures everywhere positive are studied. A special attention is given to curves with centrally symmetrical spherical image of tangent vectors. Further, extremes of curvares of curves with constant ratios of curvatures k_{2i}/k_{2i+1} ($i = 1, \ldots, \frac{1}{2}(n-2)$) are studied in spaces of even dimension. The proofs are analogous to those due to W. Blaschke, G. Herglotz and W. Süss which are known in the plane case.

STANISLAV ŠMAKAL, Praha: *Curves of constant breadth.* Czech. Math. J. *23 (98)*, (1973), 86—94. (Original paper.)

Z. Nádeník studied closed curves whose spherical image of last normals is a hypercircle Γ, in Euclidean spaces of even dimensions. In case of a centrally symmetrical hypercircle Γ, Z. Nádeník defined opposite points of the curve and its breadth as the distance B of the hyperosculating hyperplanes at the opposite points. It is possible to introduce the breadth B of a curve $\mathscr{C}$ in the same way provided that the curve $\mathscr{C}$ in a space E_n of even dimension with curvatures everywhere positive has a centrally symmetrical spherical image $\mathscr{C}^*$ of tangent vectors. The first part of the paper deals with the general case of curves with constant breadth B, while the second part investigates special Bertrand's curves of constant curvatures B with constant ratios of curvatures k_{2i}/k_{2i+1} ($i = 1, \ldots, \frac{1}{2}(n-2)$).

FRANTIŠEK ŠIK, Brno: *Closed and open sets in topologies induced by lattice ordered vector groups.* Czech. Math. J. *23 (98)*, (1973), 139—150. (Original paper.)

An *l*-group G is called a realization and denoted by (G, M) if it is a subdirect sum of linear ordered groups $\{G_x : x \in M\}$. Let us define two mappings $Z : 2^G \to 2^M$ and $\Psi : 2^M \to 2^G$ by declaring $Z(P) = \{x \in M : f(x) = 0, f \in P\}$ and $\Psi(A) = \{f \in G : f(x) = 0, \ x \in A\}$ respectively. The family $\{Z(f) : f \in G\}$ is a base of closed sets of a topology on M. In the paper, we investigate the structure of the Ψ-image of the family $\mathcal{C}(M)$ of all closed and open sets of the space M and the structure of the lattice being the Z-image of the lattice $\Delta(G)$ of all direct factors of G. A representation theorem for Boolean algebras is given: any Boolean algebra can be represented by the algebra $\Delta(G)$ of a suitable *l*-group.

ŠTEFAN SCHWARZ, Bratislava: *The semigroup of fully indecomposable relations and Hall relations.* Czech. Math. J. *23 (98)*, (1973), 151—163. (Original paper.)

Two semigroups of binary relations are studied which have applications in combinatorics and the theory of non-negative matrices.

JÁN JAKUBÍK, Košice: *On σ-complete lattice ordered groups.* Czech. Math. J. *23 (98)*, (1973), 164—174. (Original paper.)

Let G be an *l*-group that is σ-complete and conditionally orthogonally complete. In this paper it is proved that if G is singular then it is complete. Further it is shown that if G is (α, 2)-distributive for some infinite cardinal α, then G is (α, α)-distributive.