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SUMMARIES OF ARTICLES PUBLISHED IN THIS ISSUE

(Publication of these summaries is permitted)

VÁCLAV HAVEL, Brno: *Free extensions of* (a, b)*-systems.* Czech. Math. J. *20* (*95*), (1970), 353—356. (Original paper.)

An (a, b)-system is defined as a set S_1 together with a set S_2 of some a-element subsets of S_1 such that each $(b + 1)$-element subset of S_1 is contained in at most one element of S_2 (a, b are integers, $a \geqq b + 2$). Some results about "free complete extensions" of (a, b)-systems are deduced analogously to the results from the theory of free planar extensions of partial planes or from the theory of free grupoid extensions of semigrupoids.

JOSEF NOVÁK, Praha: *On convergence groups.* Czech. Math. J. *20* (*95*), (1970), 357—374. (Original paper.)

The present paper deals with convergence groups. Convergence product of two convergence spaces and some point-properties of convergence spaces is developed and some relations between convergence topological and convergence groups are stated. A problem of E. Čech is solved concerning the existence of a convergence topological group with uncountable characters of points.

NADĚŽDA KRYLOVÁ, Praha: *Periodic solutions of hyperbolic partial differential equation with quadratic dissipative term.* Czech. Math. J. *20* (*95*), (1970), 375—405. (Original paper.)

In the paper the existence of weak solutions, which are periodic in the variable t, of a general boundary-value problem for the equation $u_{tt}(t, x) + A\,u(t, x) + u_t(t, x) + u_t(t, x)\,|u_t(t, x)| = f(t, x)$, where $A\,u(x) = \sum_{|i|,|j| \leqq k} (-1)^{|i|} D^i(a_{ij}(x)\,D^j\,u(x))$ and $x \in \Omega$, Ω is a bounded domain in E_N, is investigated. If the function $f = f(t, x)$ is T-periodic ($T > 0$) in the variable t, the existence and the unicity of the weak T-periodic solution is proved under the assumptions that A is strong elliptic, Ω is bounded domain with lipschitz boundary and $\Omega \subset E_3$, if $k = 1$, and $\Omega \subset E_5$, if $k \geqq 2$. (The dimension of Ω is limited because of the application of the imbedding theorems.) The Galerkin approximation method is used to prove the existence of a solution of the given problem. Eventually, several periodic homogeneous boundary-value problems for the wave equation in E_3 and for the biharmonic wave equation in E_2 are solved to explain the general results which were obtained.

ZDENĚK FROLÍK, Praha: *A survey of separable descriptive theory of sets and spaces.* Czech. Math. J. *20* (*95*), (1970), 406—467. (Survey paper.)

This is a survey of the theory of analytic and various Borel-like (Lusinian like) sets and spaces as developed in the last decade.

ŠTEFAN SCHWABIK, Praha: *Verallgemeinerte gewöhnliche Differentialgleichungen; Systeme mit Impulsen auf Flächen*, I. Czech. Math. J. *20* (*95*), (1970), 468—490. (Originalartikel.)

Im Artikel werden Systeme untersucht, welche Lösungen mit Unstetigkeiten haben können. Diese Unstetigkeiten geben auf gewissen Flächen einwirkende Impulse an. Für Systeme dieser Art wird die lokale Existenz, Eindeutigkeit und einige lokale Eigenschaften der Lösungen untersucht.

MILOŠ RÁB, Brno: *The Riccati differential equation with complex-valued coefficients*. Czech. Math. J. *20* (*95*), (1950), 491—503. (Original paper.)

In this paper asymptotic properties of solutions of the equation $Z' = A(t) - Z^2$ are studied, where $A(t)$ is a continuous complex-valued function defined on the semiaxis $x \geqq x_0$. Sufficient conditions are derived under which the trajectories of this equation behave like those of the equation $Z' = A - Z^2$, $A = \text{const} \neq 0$ near $t = \infty$.

PETR MANDL, Praha: *Decomposable non-negative matrices in a dynamic programming problem*. Czech. Mat. J. *20* (*95*), 1970, 504—510. (Original paper.)

Let S be a closed bounded set of non-negative $r \times r$ matrices with the property that to arbitrary non-negative vector $\mathbf{e}$ and $M, N \in S$ there exists an $O \in S$ for which $O\mathbf{e} \geqq M\mathbf{e}$, $O\mathbf{e} \geqq N\mathbf{e}$. For $M \in S$ denote by $R_{ij}(M)$ the convergence radius of $\sum_{n=0}^{\infty} m_{ij}^{(n)} z^n$ where $\|m_{ij}^{(n)}\|_{i,j=1}^{r} = M^n$. Set $R_i(M) = \inf_j R_{ij}(M)$, $\hat{R}_i = \inf_M R_i(M)$. The existence of a matrix $\hat{M} \in S$ for which $R_i(\hat{M}) = \hat{R}_i$, $i = 1, \ldots, r$, is established. It is shown that the growth rate of the powers of $\hat{M}$ cannot be surpassed by multiplying matrices from the convex closure of S.

IVAN DOBRAKOV, Bratislava: *On integration in Banach spaces*, I. Czech. Math. J. *20* (*95*), (1970), 511—536. (Original paper.)

In the first part of our paper we present the theory of so called integrable functions for our integration theory of vector valued functions with respect to an operator valued measure countably additive in the strong operator topology.