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Mona Khare, Soni Gupta

VALUATION AND METRIC
ON A LATTICE EFFECT ALGEBRA

Abstract. In the present paper we have derived some properties of the pseudo-metric introduced by Riečanová on a lattice effect algebra $E$ corresponding to a valuation $\omega$ on $E$, which turns out to be a metric if $\omega$ happens to be faithful. Using these properties we have been able to prove that this metric is complete. Also it is observed that the resulting metric space is convex if and only if $\omega$ is non-atomic if and only if $E$ is atomless.

Chang Bum Kim, Hee Sik Kim

ANOTHER AXIOMATIZATION OF $B$-ALGEBRAS

Abstract. In this paper we introduce the notion of a $BA$-algebra, and show that the class of $BA$-algebras is equivalent to the class of $B$-algebras.

Jerzy Plonka

SUBDIRECT PRODUCT REPRESENTATIONS
OF SOME UNARY EXTENSIONS OF SEMILATTICES

Abstract. An algebra $\mathfrak{A}$ represents the sequence $s_0 = (0, 3, 1, 1, \ldots)$ if there are no constants in $\mathfrak{A}$, there are exactly 3 distinct essentially unary polynomials in $\mathfrak{A}$ and exactly 1 essentially $n$-ary polynomial in $\mathfrak{A}$ for every $n > 1$. It was proved by Marczak and Plonka that an algebra $\mathfrak{A}$ represents the sequence $s_0$ if and only if it is clone equivalent to a generic of one of three varieties $\mathcal{V}_1$, $\mathcal{V}_2$, $\mathcal{V}_3$. Moreover, some representations of algebras from these varieties by means of semilattice ordered systems of algebras were given there. In this paper we give another, by subdirect products, representation of algebras from $\mathcal{V}_1$, $\mathcal{V}_2$, $\mathcal{V}_3$. Moreover, we describe all subdirectly irreducible algebras from these varieties and we show that if an algebra $\mathfrak{A}$ represents the sequence $s_0$, then it must be of cardinality at least 4.

Piotr Multarzyński

ON DIVIDED DIFFERENCE OPERATORS
IN FUNCTION ALGEBRAS

Abstract. In this paper we study divided difference operators of any order acting in function algebras. In the definition of difference quotient operators we use a tension structure defined on the set of points on which depend the functions of the algebras considered. In the paper we mention the opportunity for partial difference quotient operators as well as for some purely algebraic definition of divided difference operators in terms of the suitable Leibniz product rules.

Czesław Stępniak

THROUGH A GENERALIZED INVERSE

Abstract. Traditionally, the existence of a generalized inverse of a matrix $A$ is derived in an indirect way from the matrix equation $AXA = A$. We reach this result in a direct and constructive manner, based on spectral decomposition. Moreover, some new results on its characterization and on representation of the entire set of generalized inverses are given. Usefulness of these results is demonstrated in examples.

Feng Wei, Zhankui Xiao
PAIRS OF DERIVATIONS ON RINGS AND BANACH ALGEBRAS

Abstract. We give a generalization of Vulkan’s theorem concerning a pair of derivations on rings. Then applying this purely algebraic result we obtain several range inclusion results of pair of derivations on Banach algebras.

Ýbrahim Çanak

STRUCTURE OF TAYLOR COEFFICIENTS BY EQUIVALENCE OF TAUBERIAN CONDITIONS

Abstract. From the equivalent statement of a sequence \((u_n)\) whose general control modulo of the oscillatory behavior of integer order \(m\) is \((C,1)\) slowly oscillating, we obtain some conclusions regarding the structure of the general control modulo of the oscillatory behavior of integer order \(k\), \(k \leq m\), of \((u_n)\) and investigate subsequential convergence of some sequences related to \((u_n)\).

Wenjun Liu, Jianwei Dong

ON NEW OSTROWSKI TYPE INEQUALITIES

Abstract. In this short note, some new inequalities of Ostrowski type involving two functions and their derivatives for mapping whose derivations belong to \(L^p[a,b]\), \(p \geq 1\) are established.

K.-L. Tseng, G.-S. Yang, S. S. Dragomir

ON QUASI CONVEX FUNCTIONS AND HADAMARD’S INEQUALITY

Abstract. In this paper we establish some inequalities of Hadamard’s type involving Godunova-Levin functions, \(P\)-functions, quasi-convex functions, \(J\)-quasi-convex functions, Wright-convex functions and Wright-quasi-convex functions.

Grzegorz Bartuzel, Andrzej Fryszkowski

FILIPPOV LEMMA FOR CERTAIN DIFFERENTIAL INCLUSION OF THIRD ORDER

Abstract. We propose a version of the Filippov Lemma for differential inclusions of the type

\[ y'' + k^2 y' \in F(x,y) \]

defined on \([-1,1]\) with boundary conditions

\[ y(-1) = y(1) = y'(1) = 0. \]

M. K. Aouf, A. O. Mostafa

SOME PROPERTIES OF A SUBCLASS OF UNIFORMLY CONVEX FUNCTIONS WITH NEGATIVE COEFFICIENTS

Abstract. The aim of this paper is to obtain coefficient estimates, distortion theorem, extreme points and radii of close - to - convexity, starlikeness and convexity for functions belonging to the subclass \(TS_n(a,\alpha,\beta)\) of uniformly convex functions with negative coefficients. We also derive many results for the modified Hadamard products of functions belonging to

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the class $T_{S_{\lambda}}(n, \alpha, \beta)$, and obtain several interesting distortion theorems for certain fractional operators of functions in this class. Finally, we consider integral operators associated with functions in this class.

A. Y. Lashin

ON CERTAIN SUBCLASSES OF MEROMORPHICALLY $p$-VALENT FUNCTIONS

Abstract. In this paper we introduce the class $\sum_{\alpha}^\beta (A, B)$ of meromorphically $p$-valent functions and investigate some inclusion properties, coefficient estimates, distortion theorems. Also we investigate some results concerning the partial sums and neighbourhoods of such functions.

M. K. Aouf, H. Silverman

GENERALIZATIONS OF HADAMARD PRODUCTS OF CERTAIN MEROMORPHIC UNIVALENT FUNCTIONS WITH POSITIVE COEFFICIENTS

Abstract. The authors establish certain results concerning the generalized Hadamard products of certain meromorphic univalent functions with positive coefficients analogous to the results due to Choi et al. (J. Math. Anal. Appl. 199(1996), 495–501).

Piotr Majcher

THE NONLOCAL DARBOUX PROBLEM ON THE UNBOUNDED REGION IN BANACH SPACES

Abstract. In this paper we study existence theorems of solutions for the hyperbolic Darboux problem of the form

$$\frac{\partial^2 u}{\partial x \partial y}(x, y) = f\left((x, y), u(x, y), \frac{\partial u}{\partial x}(x, y), \frac{\partial u}{\partial y}(x, y)\right)$$

with nonlocal boundary conditions $u(x, 0) + h_1(u) = g_1(x), u(0, y) + h_2(u) = g_2(y)$, on the unbounded region. The functions defining nonlocal conditions satisfy the Lipschitz condition with respect to a measure of noncompactness.

Jakub Jan Ludew

ON NEMYTSKIJ OPERATOR OF SUBSTITUTION IN THE $C^1$ SPACE OF SET-VALUED FUNCTIONS

Abstract. We consider the Nemytskij operator, i.e., the operator of substitution, defined by $(N\phi)(x) := G(x, \phi(x))$, where $G$ is a given multifunction. It is shown that $N$ maps $C^1(I, C)$, the space of all continuously differentiable functions on the interval $I$ with values in a cone $C$ in a Banach space, into $C^1(I, cc(Z))$, the space of all continuously differentiable set-functions on $I$ with compact and convex values in a Banach space $Z$ and $N$ fulfills the Lipschitz condition if and only if the generator $G$ is of the form

$$G(x, y) = A(x, y) + B(x),$$

where $A(x, \cdot)$ is continuous, linear function, $A(\cdot, y)$ and $B$ are continuously differentiable and the function $x \mapsto A(x, \cdot)$ is Lipschitzian.

Vinod K. Bhardwaj, Indu Bala

ON LACUNARY GENERALIZED DIFFERENCE SEQUENCE SPACES DEFINED BY ORLICZ FUNCTIONS IN A
SEMINORMED SPACE AND $\Delta_m^\alpha$-LACUNARY STATISTICAL CONVERGENCE

Abstract. The main purpose of this paper is to introduce a new concept of $\Delta_m^\alpha$-lacunary statistical convergence. It is shown that if a sequence is $\Delta_m^\alpha$-lacunary strongly summable with index $p$ with respect to an Orlicz function $M$ then it is $\Delta_q^\alpha$-lacunary statistically convergent and that the concepts of $\Delta_m^\alpha$-lacunary strong summability with index $p$ with respect to an Orlicz function $M$ and $\Delta_q^\alpha$-lacunary statistical convergence are equivalent on $\Delta_q^\alpha$-bounded sequences. The composite space $N_0[\Delta_m^\alpha, M^\alpha, p, q]$ using composite Orlicz function $M^\alpha$ has also been introduced. It is also shown that if $q$ is total, then every $N_0[\Delta_m^\alpha, M, q]$ method is consistent with the $W(\Delta_m^\alpha, M, q)$ method. Our results generalize and unify the corresponding earlier results of Freedman et al. [5], Tripathy et al. [17, 18, 19] and, Bhardwaj and Singh [1].

Ismail Aydin, Birsen Sağır

ON FUNCTIONS WITH FOURIER TRANSFORMS IN $A_p^{lip}(G)$

Abstract. Let $G$ be a metrizable locally compact Abelian group with dual group $\hat{G}$. For $1 \leq p < \infty$, $A_p(G)$ denotes the vector space of all complex-valued functions in $L^1(G)$ whose Fourier transforms $\hat{f}$ belong to $L^p(\hat{G})$. Research on the spaces $A_p(G)$ was initiated by Warner in [14] and Larsen, Liu and Wang in [7], Martin and Yap in [8]. Let $\text{Lip}(\alpha, p)$ and $\text{lip}(\alpha, p)$ denote the Lipschitz spaces defined on $G$. In the present paper, the space $A_p^{lip}(G)$ consisting of all complex-valued functions $f \in \text{lip}(\alpha, 1)$ whose Fourier transforms $\hat{f}$ belong to $L^p(\hat{G})$ is investigated. In the first section invariant properties and asymptotic estimates for the translation and modulation operators are given. Furthermore it is shown that space $A_p^{lip}(G)$ is homogeneous Banach space. At the end of this work, it is proved that the space of all multipliers from $L^1(G)$ to $A_p^{lip}(G)$ is the space $A_p^{lip}(G)$.

Shaban Sedghi, Nabi Shobe

COMMON FIXED POINT THEOREMS IN COMPLETE FUZZY METRIC SPACES

Abstract. In this paper, common fixed point theorems for fuzzy maps in fuzzy metric spaces are proved. These theorems are fuzzy version of some known results in ordinary metric spaces.

Janusz Januszewski

TRANSLATIVE COVERING OF A SQUARE BY A SEQUENCE OF ARBITRARY-ORIENTED SQUARES: PART II

Abstract. Given a collection of squares of arbitrary side lengths whose total area is at least 3. Then the unit square can be covered by translates of these squares.

Wiesław Sasin, Piotr Lipiński

QUOTIENT STRUCTURED SPACES

Abstract. In this paper we investigate some properties of quotient structured spaces. The notion of a structured space was originally considered by Mostow [2]. Some foundations of structured spaces with applications to relativistic physics are presented in [1]. In the beginning we present some basic notions and definitions from structured space theory. Then we discuss some properties of quotient structured spaces. In the third part we present a space-time as a quotient space. At the end of this paper we consider F-quasiregular
equivalence relation and the structured space with malicious singularity.

Tomasz Maszczyk, Grzegorz Świrszcz

SOME REMARKS ON ORIGAMI AND ITS LIMITATIONS

Abstract. From a mathematical point of view the Japanese art of Origami is an art of finding isometric injections of subsets of $\mathbb{R}^2$ into $\mathbb{R}^3$. Objects obtained in this manner are developable surfaces and they are considered to be fully understood. Nevertheless, until now it was not known whether or not the local shape of the Origami model determines the maximum size and shape of the sheet of paper it can be made of. In the present paper we show that it does. We construct a set $\Omega \subset \mathbb{R}^2$ containing the point $(0, \frac{1}{2})$ and an isometry $F : \Omega \to \mathbb{R}^3$ such that for every neighborhood $\omega \subseteq \Omega$ of the point $(0, \frac{1}{2})$ and for every $\varepsilon > 0$ and $\delta > 0$, $F$ restricted to $\omega$ cannot be extended to an isometry of the set $\{-\varepsilon < x < \varepsilon, -\delta < y < 1 + \delta\}$ into $\mathbb{R}^3$. We also prove that all the singularities of an Origami model are of the same type – there can appear only cones.

Włodzimierz M. Mikulski

LIFTING VECTOR FIELDS AND PROLONGATION OF CONNECTIONS TO HIGHER ORDER FIBRED FRAME BUNDLES

Abstract. We construct some extension $\overline{\mathcal{L}}_{fib}^r : T \to TL_{fib}^r$ of the flow operator $\mathcal{L}_{fib}^r : T_{proj} \to TL_{fib}^r$ where $L_{fib}^r : \mathcal{F}M_{m,n} \to \mathcal{F}M$ is the $r$-th order fibred frame bundle functor. Next using operator $\overline{\mathcal{L}}_{fib}^r : T \to TL_{fib}^r$ we present some construction of general connections $\mathcal{L}_{fib}^r(\nabla)$ on $L_{fib}^r Y \to Y$ depending on classical (not necessarily projectable) linear connections $\nabla$ on $Y$. 