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Gabriele Ricci

SAMENESS BETWEEN BASED UNIVERSAL ALGEBRAS

Abstract. This is the continuation of the paper “Transformations between Menger systems”. To define when two universal algebras with bases “are the same”, here we propose a universal notion of transformation that comes from a triple characterization concerning three representation facets: the determinations of the *Menger system*, *analytic monoid* and *endomorphism representation* corresponding to a basis. Hence, this notion consists of three equivalent definitions. It characterizes another technical variant and also the universal version of the very semi-linear transformations *that were coordinate-free*. Universal transformations allow us to check the *actual* invariance of general algebraic constructions, contrary to the seeming invariance of representation-free thinking. They propose a new interpretation of free algebras as superpositions of “analytic spaces” and deny that our algebras differ from vector spaces at fundamental stages. Contrary to present beliefs, even the foundation of abstract Linear Algebra turns out to be incomplete.

D. Doan, B. Kivunge, J. J. Poole, J. D. H Smith,
T. Sykes, M. Teplitskiy

PARTIAL SEMIGROUPS AND PRIMALITY INDICATORS IN THE FRACTAL GENERATION OF BINOMIAL COEFFICIENTS TO A PRIME SQUARE MODULUS

Abstract. This paper, resulting from two summer programs of Research Experience for Undergraduates, examines the congruence classes of binomial coefficients to a prime square modulus as given by a fractal generation process for lattice path counts. The process depends on the isomorphism of partial semigroup structures associated with each iteration. We also consider integrality properties of certain critical coefficients that arise in the generation process. Generalizing the application of these coefficients to arbitrary arguments, instead of just to the prime arguments appearing in their original function, it transpires that integrality of the coefficients is indicative of the primality of the argument.

Waldemar Sieg

MAXIMAL CLASSES FOR THE FAMILY OF QUASI-CONTINUOUS FUNCTIONS WITH CLOSED GRAPH

Abstract. In this paper we consider classes of functions $f : \mathbb{R} \rightarrow \mathbb{R}$. The maximal *additive* class for the family QU of quasi-continuous functions with closed graph is equal to the class of all continuous functions. We also show that the maximal *multiplicative* class for QU is equal to a class of continuous functions, which fulfil an extra condition.

Ewa Strońska

ON \mathcal{E} -CONTINUITY AND \mathcal{E} -MINIMALITY OF MULTIFUNCTIONS OF TWO VARIABLES

Abstract. In this article we formulate and prove some sufficient conditions for the $l - \mathcal{E}_{X \times Y}$ -continuity and the $\mathcal{E}_{X \times Y}$ -minimality of multifunctions of two variables.

Jianhua Shen, Jing Dong

EXISTENCE OF POSITIVE SOLUTIONS TO BVPS OF HIGHER ORDER DELAY DIFFERENTIAL EQUATIONS

Abstract. The paper is concerned with the existence of positive solutions for the nonlinear eigenvalue problem with singularity and the superlinear semipositone problem of higher order delay differential equations. The main results are obtained by using Guo-Krasnoselskii's fixed point theorem in cones. These results extend some of the existing literature.

Stanisław Domachowski

**LOCAL BOUNDS AND EXISTENCE OF SOLUTIONS TO
NON-CONVEX DIFFERENTIAL INCLUSIONS**

Abstract. Using a global bifurcation theorem for convex-valued completely continuous mapping we prove an existence theorem for differential inclusions of the form $u'' \in F(t, u, u')$, where F admits a convex-valued, weakly completely continuous selector and u satisfies some nonlinear boundary conditions.

Marek Galewski

**EXISTENCE OF BOUNDED SOLUTIONS FOR
FOURTH ORDER DIRICHLET PROBLEMS WITH
CONVEX-CONCAVE NONLINEARITY**

Abstract. We consider the Dirichlet boundary value problem for higher order O.D.E. with nonlinearity being the sum of a derivative of a convex and of a concave function in case when no growth condition is imposed on the concave part.

P. Nath, D. K. Singh

**ON A SUM FORM FUNCTIONAL EQUATION RELATED TO
ENTROPIES AND SOME MOMENTS OF A
DISCRETE RANDOM VARIABLE**

Abstract. The general solutions of a sum form functional equation have been obtained. The importance of its solutions in relation to the entropies and some moments of a discrete random variable has been discussed.

Ovidiu T. Pop, Mircea D. Fărcaș

**ABOUT THE BIVARIATE OPERATORS OF
DURRMEYER-TYPE**

Abstract. The aim of this paper is to study the convergence and approximation properties of the bivariate operators and GBS operators of Durrmeyer-type.

Ali Aral, Vijay Gupta

ON q -BASKAKOV TYPE OPERATORS

Abstract. In the present paper we introduce two q -analogous of the well known Baskakov operators. For the first operator we obtain convergence property on bounded interval. Then we give the monotony on the sequence of q -Baskakov operators for n when the function f is convex. For second operator, we obtain direct approximation property on unbounded interval and estimate the rate of convergence. One can say that, depending on the selection of q , these operators are more flexible than the classical Baskakov operators while retaining their approximation properties.

Marek Żołądek

ON THE MAZUR-ULAM THEOREM IN METRIC GROUPS

Abstract. Let X, Y be abelian uniquely 2-divisible groups with metrics d_X, d_Y respectively, invariant with respect to the translations and let there exist a constant $c > 1$ such that $d_Y(2y, 0) \geq cd_Y(y, 0)$ for $y \in Y$. We prove that each surjective isometry $U : X \rightarrow Y$ has a form $U(x) = a(x) + U(0)$ for $x \in X$, where $a : X \rightarrow Y$ is a homomorphism.

Poom Kumam, Somyot Plubtieng

**SOME RANDOM FIXED POINT THEOREMS FOR
RANDOM ASYMPTOTICALLY REGULAR OPERATORS**

Abstract. Let (Ω, Σ) be a measurable space, X a Banach space, C a weakly compact convex subset of X and $T : \Omega \times C \rightarrow C$ a random operator. Let $WCS(X)$ be the weakly convergent sequence coefficient of X and $\kappa_\omega(X)$ its Lifschitz characteristic. If T is asymptotically regular and assume that there exists $\omega \in \Omega$ and constant c such that

$$\sigma(T(\omega, \cdot)) \leq c < \frac{1 + \sqrt{1 + 4WCS(X)(\kappa_\omega(X) - 1)}}{2},$$

we prove that T has a random fixed point. Our results also give stochastic version generalization of some results of Domínguez [*Fixed point theorems for uniformly Lipschitziane mappings and asymptotically regular mappings*, Nonlinear Anal. 32 No. 1 (1998), 15–27].

H. K. Pathak, Rosana Rodríguez-López

**SOME RESULTS ON COMMON FIXED POINTS FOR
WEAKLY COMPATIBLE MAPPINGS SATISFYING
ALTMAN INTEGRAL TYPE CONTRACTION**

Abstract. In this paper, a common fixed point theorem for two pairs of weakly compatible mappings satisfying Altman integral type contraction in a metric space is proved. Our result extends and improves several known results.

Pratulananda Das, Lakshmi Kanta Dey

**POROSITY OF CERTAIN CLASSES OF OPERATORS
IN GENERALIZED METRIC SPACES**

Abstract. We study the porosity behavior of non-contractive mappings in a generalized metric space, a concept recently introduced in [1]. We also investigate partially the porosity position of a certain class of operators whose condition arises from [8].

Seyit Temir, Goknur Aykanat

**CONVERGENCE OF IMPLICIT ITERATIVE PROCESS FOR
A FINITE FAMILY OF I -NONEXPANSIVE MAPPINGS**

Abstract. We prove that an implicit iterative process converges weakly and strongly to a common fixed point of a finite family of I -nonexpansive mappings in a Banach space. The results presented in this paper extend and improve the corresponding results of [1, 3, 11, 12]

Nilgün Sönmez

DIVISION POINT IN THE POINCARÉ UPPER HALF PLANE

Abstract. In this work, it is shown that the coordinates of the division point can be determined by the formula in the Poincaré upper half plane.

Takashi Noiri, Ahmad Al-Omari, Mohd. Salmi Md. Noorani

**WEAK FORMS OF OPEN AND CLOSED FUNCTIONS
VIA b - θ -OPEN SETS**

Abstract. In this paper, we introduce and study two new classes of functions called weakly b - θ -open functions and weakly b - θ -closed functions by using the notions of b - θ -open sets and b - θ -closure operator. The connections between these functions and other related functions are investigated.

Marian Przemski

**CLUSTER SETS AND RELATED PROPERTIES
OF MULTIFUNCTIONS**

Abstract. In this paper we present some types of cluster sets of multifunction. Using these concepts we relate properties of cluster sets to some generalized continuity properties, minimality of multifunctions and closedness of its graphs.

J. K. Kohli, D. Singh

δ -PERFECTLY CONTINUOUS FUNCTIONS

Abstract. A new class of functions called ‘ δ -perfectly continuous functions’ is introduced and their basic properties are studied. Their place in the hierarchy of other variants of continuity that already exist in the literature is elaborated. Further, it is shown that if X is sum connected (e.g. connected or locally connected) and Y is Hausdorff, then the function space $P_{\Delta}(X, Y)$ of all δ -perfectly continuous functions from X into Y is closed in Y^X in the topology of pointwise convergence.

W. M. Mikulski

**RIEMANNIAN VECTOR BUNDLES
HAVE NO CANONICAL LINEAR CONNECTIONS**

Abstract. We prove that Riemannian vector bundles have no canonical linear connections.