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I. Chajda, H. Länger

Modifications of MV-algebras corresponding to strong ortholattices

Pages: 1-6

Abstract

It is well-known that principal filters of MV-algebras are de Morgan algebras with involutory complementation. A modification of the notion of an MV-algebra is presented having the property that all principal filters are ortholattices. It turns out that the commutativity of these modified MV-algebras is equivalent to the distributivity of the corresponding ortholattices.

C. J. Chikunji

A classification of cube radical zero completely primary finite rings

Pages: 7-20

Abstract

In this paper, we consider the isomorphism problem of a class of completely primary finite rings R such that if \mathcal{M} is the Jacobson radical of R , then $\mathcal{M}^3 = (0)$ and $\mathcal{M}^2 \neq (0)$, in the general case (not necessarily the case where the maximal Galois subrings lie in the center). We further obtain the number of non-isomorphic classes in a special case of these rings.

T. Hatziafratis

A residue type process for smooth functions involving the derivatives of the Newtonian potential in \mathbf{R}^2

Pages: 21-30

Abstract

For a smooth function $f(x, y)$, of the real variables x and y , we compute the limit

$$\lim_{ve \rightarrow 0} \oint_{x^2+y^2=ve^2} f(x, y) \frac{\partial^{k+l}}{\partial x^k \partial y^l} \left(\frac{-ydx + xdy}{x^2 + y^2} \right)$$

in terms of the derivatives of f at $(0, 0)$ and we study related questions.

A. Najdecki, J. Tabor

Characterization of continuous functions by class C^∞ curves

Pages: 31-34

Abstract

Let $f : X \rightarrow Y$, where X is a Banach space and Y is a Hausdorff topological space. We prove that if $f \circ \gamma$ is continuous for every curve $\gamma : [0, 1] \rightarrow X$ of class C^∞ , then f is continuous.

L. Trojnar-Spelina

Characterizations of subclasses of univalent functions

Pages: 35-41

Abstract

We investigate the family of functions $f(z) = z + \sum_{n=2}^{\infty} a_n z^n$ that are analytic in the unit disk with the property that the domain of values $f'(z) + \frac{1+e^{i\alpha}}{2} z f''(z)$, ($\alpha \in (-\pi, \pi]$) is the parabolic region $(\operatorname{Im} w)^2 < 2\operatorname{Re} w - 1$. Integral representation and convolution characterization are found and some coefficients bounds are given.

H. Hamada

Univalence criterion for certain integral operators

Pages: 43-46

Abstract

Pescar investigated the univalence of certain integral operators. We will show that the results are obtained by the Schwarz lemma. We will also give some generalizations.

M. Dorff, J. Szynal

Linear invariance and integral operators of univalent functions

Pages: 47-57

Abstract

Different methods have been used in studying the univalence of the integral

$$J_{\alpha,\beta}(f)(z) = \int_0^1 z(f'(t))^{\alpha} \left(\frac{f(t)}{t}\right)^{\beta} dt, \quad \alpha, \beta \in \mathbf{R}, \quad (1)$$

where f belongs to one of the known families of holomorphic and univalent functions $f(z) = z + a_2z^2 + \dots$ in the unit disk $\mathbf{D} = \{z : |z| < 1\}$ (see [?]).

In this paper, we study a larger set than (1), namely the set of the minimal invariant family which contains (1), where f belongs to the linear invariant family, and thereby we obtain information about the univalence of (1). In particular, we determine the order of this minimal invariant family in the cases of univalent and convex univalent functions in \mathbf{D} . As a result, we find the radius of close-to-convexity and the lower bound for the radius of univalence for the minimal invariant family in the case of convex univalent functions. This allows us to determine the exact region for (α, β) where the corresponding minimal invariant family is univalent and close-to-convex. These results are sharp and generalize those which were obtained in [?].

J. Bater, Y. Min

The oscillation criteria for nonlinear neutral differential equations

Pages: 69-78

Abstract

The problem of oscillation of a class of nonlinear neutral type integro-differential equations with distributed delay is discussed. The necessary and sufficient condition and another sufficient criterion for oscillation have been given.

T. Rzeżuchowski

A note on measures on time scales

Pages: 79-84

Abstract

A connection between the measures used on time scales and usual Lebesgue measure is established and applied to simple justifications of some recently published results on Vitali covering theorem and Δ -differentiability of monotone functions defined on time scales.

S. A. Shkarin

On solvability of linear differential equations in \mathbf{R}^N

Pages: 85-99

Abstract

We construct $x^0 \in \mathbf{R}^N$ and a row-finite matrix $T = \{T_{i,j}(t)\}_{i,j \in \mathbf{N}}$ of polynomials of one real variable t such that the Cauchy problem $\dot{x}(t) = T_t x(t)$, $x(0) = x^0$ in the Fréchet space \mathbf{R}^N has no solutions. We also construct a row-finite matrix $A = \{A_{i,j}(t)\}_{i,j \in \mathbf{N}}$ of $C^\infty(\mathbf{R})$ functions such that the Cauchy problem $\dot{x}(t) = A_t x(t)$, $x(0) = x^0$ in \mathbf{R}^N has no solutions for any $x^0 \in \mathbf{R}^N \setminus \{0\}$. We provide some sufficient condition of solvability and unique solvability for linear ordinary differential equations $\dot{x}(t) = T_t x(t)$ with matrix elements $T_{i,j}(t)$ analytically dependent on t .

R. Ciarski

Stability of difference equations generated by parabolic differential functional equations

Pages: 101-117

Abstract

The aim of this paper is to present a numerical approximation for the initial boundary value problem for quasilinear parabolic differential functional equations. The convergence result is proved for the difference scheme with the property that the difference operators approximating mixed derivatives depend on local properties of coefficients of the differential equation. A numerical example is given.

E. G. Kir'ytzkii

On a functional equation related to an automorphism of a unit circle

Pages: 119-134

Abstract

In this article the complete description of the decisions of a functional equation $f(w(z)) = f(w(0))f(z)$ is given, where $w(z)$ —automorphism of a unit circle E and the decisions are searched among analytical in E functions. It is established, that research of a given functional equation is closely connected to property of stationary points of automorphism $w(z)$.

L. Bartłomiejczyk

Irregular solutions of the Feigenbaum functional

equation

Pages: 135-141

Abstract

We describe the structure of orbits generated by two commuting bijections and using this description we construct irregular solutions of the Feigenbaum functional equation:

$$\varphi(\varphi(\lambda x)) = \lambda\varphi(x) = 0$$

and its generalizations:

$$\varphi^2(x) = g(\varphi(f(x))).$$

The graph of such a solution almost cover the plane in the sense of measure and topology.

E. Wachnicki

On generalized Mazhar–Totik operators

Pages: 143-151

Abstract

In this paper we consider the continuous version of the operator investigated by Mazhar and Totik ([?]). Some applications for the limit problem are indicated.

J. Musielak

Sequences of bounded φ -variation and weighted unconditional convergence of series

Pages: 153-162

Abstract

There are investigated spaces $v_{0,\varphi}$ of sequences of bounded φ -variation. Spaces $v_{0,\varphi}$ are applied to the problem of weighted unconditional convergence of series. It is shown that $(v_{0,\varphi}, l^{\varphi^*})$, where l^{φ^*} means the Orlicz sequence space generated by the N -function φ^* , is a pair of weighted unconditional convergence. There are also considered nonlinear convolution – type operators in $v_{0,\varphi}$.

S. Mecheri

Generalized finite operators

Pages: 163-167

Abstract

Let $B(H)$ be the algebra of all bounded linear operators on an infinite dimensional complex and separable Hilbert space H . $A \in B(H)$ is called finite if

$$\|AX - XA - I\| \geq 1, \quad \forall X \in B(H).$$

In this paper we extend the class of finite operators to a more general class of pairs of operators called generalized finite operators defined by

$$\{(A, B) \in B(H) \times B(H) : \|AX - XB - I\| \geq 1, \forall X \in B(H)\}$$

and we present some pairs of generalized finite operators.

B. K. Lahiri, P. Das

Well-posedness and porosity of a certain class of operators

Pages: 169-176

Abstract

We prove that several fixed point problems are well-posed and study the porosity behaviour of a certain class of operators.

V. Berinde

A convergence theorem for some mean value fixed point iteration procedures
Pages: 177-184

Abstract

A general convergence theorem for the Ishikawa fixed point iteration procedure in a large class of quasi-contractive type operators is given. As particular cases, it contains convergence theorems for Picard, Krasnoselskij and Mann iterations, theorems which extend and generalize several results in the literature.

T. Sasahara

Quasi-minimal Lagrangian surfaces whose mean curvature vectors are
eigenvectors
Pages: 185-196

Abstract

We investigate quasi-minimal Lagrangian surfaces whose mean curvature vectors are eigenvectors of the Laplace operator.

A. Djoudi

General fixed point theorems for weakly compatible maps
Pages: 197-205

Abstract

The purpose of this note is to use general expansive conditions and minimal type commutativity without continuity requirements to prove some fixed point theorems. The theorems extend known results from the class of compatible continuous expansive maps to a wider class of mappings.

P. P. Ntumba

Sikorski and Frölicher CW-complexes compared

Pages: 207-221

Abstract

In this paper we analyze the underlying topological space of a Sikorski CW-complex and the close relationship between Sikorski CW-complexes and Frölicher CW-complexes. Sikorski and Frölicher CW-complexes are analogues of CW-complexes in the categories of differential spaces (à la Sikorski) and Frölicher spaces relatively.

T. Noiri, V. Popa

Some properties of upper and lower θ -quasicontinuous multifunctions

Pages: 223-234

Abstract

In this paper we obtain new characterizations of upper and lower θ -quasicontinuous multifunctions and investigate several properties of such multifunctions.

W. M. Mikulski

On naturality of the formal Euler operator

Pages: 235-238

Abstract

That all natural operators of the type of formal Euler operator from the variational calculus are the constant multiples of the formal Euler operator is deduced.

W. Czernous

Numerical method of lines for first order partial differential equations with deviated variables

Pages: 239-254

Abstract

Classical solutions of nonlinear initial boundary value problems are approximated in the paper by solutions of suitable quasilinear differential difference systems. The proof of the stability of the method of lines is based on a comparison technique with nonlinear estimates of the Perron type. Numerical examples are given.

A. Smoktunowicz, I. Wrobel

Numerical stability of the Richardson second order method

Pages: 255-263

Abstract

In this paper we study numerical properties of the Richardson second order method (RS) for solving a linear system $Ax = b$, where $A \in \mathbb{R}^{n \times n}$ is symmetric and positive definite. We consider the standard model of floating point arithmetic (cf. [?], [?], [?]). We prove that the RS-algorithm is numerically stable. This means that the algorithm computes approximations \tilde{x}_k to the exact solution $x^* = A^{-1}b$ such that the error $\overline{\lim}_k \varphi \tilde{x}_k - x^* \varphi_2 / \varphi x^* \varphi_2$ is of order $\epsilon \text{cond}(A)$, where ϵ is the machine precision and $\text{cond}(A) = \varphi A \varphi_2 \varphi A^{-1} \varphi_2$ denotes the condition number of the matrix A .