

Kyrchei I. I.

**REPRESENTATION OF GENERALIZED INVERSE MOORE–PENROSE MATRIX
BY ANALOG OF CLASSICAL ADJOINT MATRIX**

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The Moore–Penrose generalized inverse of arbitrary matrix of completed or incomplete rank is analytically represented by a matrix, which is the generalization of a classical adjoint one.

Andriychuk V. I., Zdomska L. M.

ON THE SELMER GROUP OF ELLIPTIC CURVE

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Let E be an elliptic curve defined over an algebraic function field in one variable over quasifinite constant field k . Let n be a positive integer, $(n, \text{char } k) = 1$. Then the Selmer group $S^n(E/K)$ is finite.

Mazurenko N. I.

ABSORBING SYSTEMS IN THE HILBERT CUBE RELATED TO HAUSDORF AND COVERING DIMENSION

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The topology of the system $(D_{\geq k}^{>\gamma_n}(\mathbb{Q}))_{k \in \mathbb{N} \cup \{0\}, \gamma_n \in \Gamma, \gamma_{n+1} \geq k}$, where $D_{\geq k}^{>\gamma_n}(\mathbb{Q}) = \{A \in \exp(\mathbb{Q}) \mid \dim_H(A) > \gamma_n, \dim(A) \geq k\}$ and $\Gamma = \{\gamma_i\}_{i=1}^{\infty}$ is a countable ordered set with $0 < \gamma_1 < \gamma_2 < \dots < \infty$, is described.

Antonova T. N., Hladun V. R.

**SOME SUFFICIENT CONDITIONS OF CONVERGENCE AND STABILITY
OF BRANCHED CONTINUED FRACTIONS WITH ALTERNATING PARTIAL NUMERATORS**

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Sufficient conditions for positiveness for tails of branched continued fractions with alternating partial numerators are established. Criteria of convergence and stability for such class of branched continued fractions are proved.

Vozna S. M.

**NEWTON–THIELE-TYPE INTERPOLATIONAL FORMULA IN THE FORM OF TWO-DIMENSIONAL CONTINUED FRACTION
WITH NON-EQUIVALENT VARIABLES**

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Interpolational two-dimensional continued fraction with non-equivalent variables has been constructed for the function of two variables by use of partial inverse and divided differences of special type. The remainder of this interpolational fraction is also established.

Kushnirchuk Yo. F.

SOLVABILITY OF NON-HOMOGENEOUS GENERALIZED HYPERGEOMETRIC EQUATION

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Conditions of solvability of non-homogeneous generalized hypergeometric third-order equation in the space of entire functions are obtained.

Kalenyuk P. I., Nytrebych Z. M., Drygaś P.

**METHOD OF SOLVING THE CAUCHY PROBLEM FOR EVOLUTIONARY
EQUATION IN BANACH SPACE**

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We propose a method for solving the Cauchy problem for evolutionary equation with infinite order abstract operator in the Banach space. For the right-hand side of initial condition, from a special subspace of the Banach space, in which vectors are represented as Stieltjes integrals over a certain measure, the solution of the problem is represented as certain Stieltjes integral over the same measure. We give examples of applying the method to solving the Cauchy problem for partial differential equations in the class of entire analytical functions of certain orders.

Solomko A. V., Sharyn S. V.

FUNCTIONAL CALCULUS OVER BANACH SPACES IN CONE \mathbf{R}_+^n

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The construction of functional calculus for (C_0) -semi-groups of operators in Banach spaces for positive n -dimension angle is considered. The theorems about isomorphisms of convolution algebra to commutants of (C_0) -semi-groups of operators are proved.

Antoniouk A. Vict.

REGULAR PROPERTIES OF SEMIGROUPS, GENERATED BY NONLINEAR FLOWS ON MANIFOLDS

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At the investigation of regular properties of semigroups, generated by second order parabolic equations with unbounded coefficients on noncompact manifold the methods of strongly continuous semigroups theory become inapplicable in the spaces of continuously differentiable functions. In this case one can use the relation of semigroup theory with the theory of stochastic differential equations. We study how the regular properties of solutions of parabolic equations are related with the differentiability of solutions to the nonlinear stochastic differential equations with respect to the initial data and random parameters. It is shown how one can prove the result about the raise of smoothness under the action of semigroup in spaces of continuously differentiable functions. The arising conditions relate the nonlinearity of coefficient with the geometry of manifold.

Antoniouk A. Val.

NONLINEAR ESTIMATES ON REGULARITY OF DIFFERENTIAL FLOWS ON MANIFOLDS

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During the study of differential flows on noncompact manifolds the essential role is played by conditions on the behaviour of coefficients on the infinity. We consider the first order differential equation with globally non-Lipschitz coefficients on manifold that could also contain random terms. It is demonstrated that the correct investigation of variations of nonlinear equations on manifolds with respect to the initial conditions and parameters requires the generalization of the Riemannian covariant derivative. For corresponding variational equations we find a family of nonlinear estimates on regularity, based on the nonlinear symmetries of variations. The influence of curvature of manifold on the regular properties is studied.

Vityuk A. N.

EXISTENCE OF SOLUTIONS OF DIFFERENTIAL INCLUSIONS OF FRACTIONAL ORDER IN THE SPACE OF SUMMABLE FUNCTIONS

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Differential inclusions of fractional order $\alpha \in (0,1)$, containing the Riemann – Liouville fractional derivative, are considered in the space of summable functions. The existence of their solutions is proved.

Borodin V. A., Samoylenko V. Hr.

ASYMPTOTIC PROPERTIES OF SOLUTIONS TO THE n -TH ORDER DIFFERENTIAL EQUATION WITH IMPULSES

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We study the problem on existence of such impulse values, that for given (fixed) solution $x^(t)$ to the n -th order linear differential equation and fixed moments of impulses $t = t_k$, $k \in \mathbf{N}$, the original linear differential equation with impulses at the fixed moment*

of time $t = t_k$, $k \in \mathbb{N}$, has a periodic solution, the initial values of which at the initial moment $t_0 < t_1$ coincide with values of solution $x^*(t)$ at $t = t_0$.

Evtukhov V. M., Stehun A. A.

ASYMPTOTIC REPRESENTATIONS OF UNBOUNDED SOLUTIONS FOR NON-LINEAR DIFFERENTIAL EQUATIONS OF THE THIRD ORDER

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The asymptotic representations for unbounded solutions of the third order differential equations, close to the Emden–Fowler equations type, are established.

Makhney O. V.

EXPANSION OF SINGULAR DIFFERENTIAL OPERATOR BY EIGEN-FUNCTIONS

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The asymptotic formulas for large values of parameter of the solutions to the singular differential equation allow one to value Green's function of the boundary-value problem. With the help of this estimation the expansion of the singular differential operator by eigen-functions in the case of simple eigen-values is constructed.

Balabushenko T. M., Ivasyshyn L.M.

FUNDAMENTAL MATRICES OF SOLUTIONS OF POLYNOMIAL SHEAF OF ELLIPTIC SYSTEMS, GENERATED BY PARABOLIC SYSTEM

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The fundamental matrices are constructed for the solutions of E^u sheaf of $\vec{2b}$ -elliptic systems, generated by the stationary $\vec{2b}$ -parabolic system of any order, which satisfies special $\Lambda_\delta^{1,r}$ -condition. Estimations of the fundamental matrix of solutions E^u are established.

Vlasij O.D., Goy T. P., Ptashnyk B. Yo.

PROBLEM WITH NON-LOCAL CONDITIONS FOR WEAK-NONLINEAR EQUATIONS WITH VARIABLE COEFFICIENTS IN MAIN PART OF OPERATOR

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Correctness of the problem with non-local boundary conditions for high-order weakly nonlinear partial differential equations with variable coefficients in the linear part of operator in the cylindrical domain is investigated. Conditions of classical solvability of the problem are established for almost all (concerning Lebesgue's measure) parameters of the problem.

Ivasyshen S. D., Medynsky I. P.

LOCAL SOLVABILITY OF CAUCHY PROBLEM FOR QUASI-LINEAR $\vec{2b}$ -PARABOLIC SYSTEMS WITH WEAK DEGENERATION ON INITIAL HYPERPLANE

ISSN 0130-9420. *Mathematical methods and physico-mechanical fields.* – 2004. – 47, No. 4. – P. 110-114. – Ref.: 8 names. – Ukr.

The theorem on solvability of correct Cauchy problem for linear system is proved. The conditions of local solvability for a quasi-linear $\vec{2b}$ -parabolic system with weak degeneration on initial hyperplane are determined.

Ilkiv V. S.

NON-LOCAL BOUNDARY-VALUE PROBLEMS FOR PARTIAL DIFFERENTIAL SYSTEMS IN SOBOLEV SPACES OF INFINITE ORDER

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In the paper the boundary-value problem with non-local conditions for partial differential systems of infinite order is considered. We construct some special spaces (the Sobolev spaces of infinite order) and investigate their properties. Conditions of existence and uniqueness of solution to the non-local problem in the Sobolev spaces of infinite order have been obtained.

Kohut I. V.

**SOLVING A NON-LOCAL BOUNDARY-VALUE PROBLEM
FOR HOMOGENEOUS SYSTEM OF PARTIAL DIFFERENTIAL EQUATIONS
BY MEANS OF DIFFERENTIAL-SYMBOL METHOD**

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By means of differential-symbol method, we investigate the non-local boundary-value problem for a homogeneous system of partial differential equations of the first order in time and, in general, of infinite order in spatial variables. We construct the solution to this problem in the class of vector-functions, whose components, for fixed t , are quasi-polynomials of a special form. We propose the method for constructing a partial solution to the problem in the class of its non-uniqueness.

Lopushanska H. P., Chmyr O. Uu.

**ON SOLVABILITY OF THE FIRST BOUNDARY-VALUE PROBLEM FOR EQUATION $u_t = \Delta u + |u|^{\beta+1}$ IN THE CLASS OF
GENERALIZED FUNCTIONS**

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Sufficient conditions of solvability of the boundary-value for semi-linear heat conduction equation have been established (when the functions, which are set on the boundary of domain, are generalized).

Malytska A. P.

**ON FUNDAMENTAL SOLUTION OF CAUCHY PROBLEM
FOR DEGENERATED ACCORDING TO ARBITRARY NUMBER OF GROUPS OF VARIABLES OF PARABOLIC KOLMOGOROW-
TYPE EQUATION OF ANY ORDER**

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We constructed and researched the fundamental solution of Cauchy problem Kolmogorow's type parabolic equation of any order with degeneration by any number of groups of variables.

Pasichnyk H. S.

ON THE CAUCHY PROBLEM FOR DISSIPATIVE $\overline{2b}$ -PARABOLIC SYSTEMS

ISSN 0130-9420. *Mathematical methods and physico-mechanical fields.* – 2004. – 47, No. 4. – P. 138-143. – Ref.: 7 names. – Ukr.

The results on fundamental matrix for solutions to the Cauchy problem and solvability of the Cauchy problem for dissipative $\overline{2b}$ -parabolic systems are stated.

Pukalsky I. D.

CAUCHY PROBLEM FOR PARABOLIC EQUATIONS WITH POWER DEGENERATION

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The existence and uniqueness of Cauchy problem for irregular parabolic equations without limitation on the power order of the coefficient degeneration have been proved in the spaces of classical functions with the power weight. Estimation of the solution to the problem in the corresponding spaces has been found.

Pukach P. Ya.

MIXED PROBLEM IN UNBOUNDED DOMAIN FOR WEAKLY NONLINEAR HYPERBOLIC EQUATION WITH GROWING COEFFICIENTS

ISSN 0130-9420. Mathematical methods and physico-mechanical fields. – 2004. – 47, No. 4. – P. 149-154. – Ref.: 12 names. – Ukr.

The paper is devoted to investigation of the first mixed problem for weakly nonlinear hyperbolic equation of the second-order in the domain $Q = \Omega \times (0, T)$, where $\Omega \subset \mathbf{R}_z^n$ is the unbounded domain. We study the case of growth of elliptic operator coefficients. Conditions of existence and uniqueness of the generalized solution in the Sobolev spaces of local integrable functions with arbitrary behavior at infinity have been obtained.

Symotiuk M. M., Medvid O. M.

PROBLEM WITH DISTRIBUTED DATA FOR LINEAR PARTIAL DIFFERENTIAL EQUATIONS

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The correctness of the problem with distributed data for linear partial differential equations with constant complex coefficients is investigated. The conditions of existence and uniqueness of solution to the problem are established. The metric theorems on estimations of small denominators of the problem are proved.

Perun G. M.

DIRICHLET PROBLEM FOR LINEAR STOCHASTIC EQUATION OF PARABOLIC TYPE WITH CONTINUOUS PERTURBATIONS

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With the help of Green's function the existence of solution to the non-homogeneous Dirichlet problem for the linear second-order parabolic type equation with continuous perturbations is established.

Vasiunyk Z. I., Datsko B. Yo.

CLASSIFICATION OF SPATIALLY-INHOMOGENEOUS SOLUTIONS IN THE SYSTEM OF REACTION-DIFFUSION TYPE BASED ON SELF-ORGANIZING ALGORITHM

ISSN 0130-9420. Mathematical methods and physico-mechanical fields. – 2004. – 47, No. 4. – P. 166-171. – Ref.: 7 names. – Ukr.

New original method for estimation of auto-oscillation character in the systems of reaction-diffusion, based on the Kohonen self-organizing algorithm, is proposed. A concrete model system is considered by this method.

Popovych V. S., Tokovyy Yu. M.

CONSTRUCTION OF SOLUTION TO THE PLANE THERMOELASTICITY PROBLEM FOR A THERMOSENSITIVE STRIP

ISSN 0130-9420. Mathematical methods and physico-mechanical fields. – 2004. – 47, No. 4. – P. 172-179. – Ref.: 17 names. – Ukr.

The solution to the plane thermoelasticity problem for a thermosensitive strip is constructed. Thus the technique of the analytical-numerical solving of a nonlinear heat conductivity problem for the specified domain is advanced. The corresponding thermoelasticity problem is reduced to integral Volterra type equation of the second kind which is solved by a iteration method.