

## ABSTRACTS

V.G. Bagrov, B.F. Samsonov, V.V. Shamshutdinova

PARTICLE LOCALIZATION IN A DOUBLE-WELL POTENTIAL AND PSEUDO-SUPERSYMMETRY

**Abstract.** We show that a non-periodical smooth driving force can produce coherent destruction of tunnelling for a particle in a double-well potential having a couple of (lowest) energy levels very close to each other and well enough separated from the other levels (two-level approximation). An analysis of the time behavior of the occupation probability shows that the probability oscillates between a minimal value exceeding  $1/2$  and a maximal value close to 1. In particular, for specific parameter values of the driving force, it becomes a function monotonously increasing up to a value more than  $1/2$ . These non-periodical external fields were obtained with the help of an extension of the transformation operator method to the case of a (non-Hermitian) Dirac-like Hamiltonian describing a two-level system. Two pseudosuperpartners and pseudosupersymmetry generators closing a quadratic pseudosuperalgebra were constructed. This allows us to conclude that a quadratic pseudosupersymmetry may be associated with the two-level system.

**Keywords:** exactly solvable models, Darboux transformation, pseudo-supersymmetry

A.R. Gerfanov, F.H. Mukminov

A WIDE CLASS OF UNIQUENESS OF THE SOLUTION FOR NON-UNIFORMLY ELLIPTIC EQUATION IN UNBOUNDED DOMAIN

**Abstract.** A wide class of uniqueness for solution of the boundary value problem with alternation of the first and third boundary conditions to nonuniform elliptic equation in unbounded domain is established. A solution of elliptic equation is constructed showing that the class of uniqueness may be not made wider essentially.

**Keywords:** elliptic equations, class of uniqueness, unbounded domain.

A.V. Zhiber, Yu.G. Mihaylova

ALGORITHM OF BUILDING THE SOLUTION OF HYPERBOLIC SYSTEM OF EQUATION

**Abstract.** In the work obvious formulas of the solution of hyperbolic system of the equations with the zero generalized Laplace invariants, containing  $2n$  of any functions, are obtained. The algorithm of construction of a boundary problem with the data on characteristics is resulted. As an example the solution of a problem of Gursa for linearized chains of Tody of a series  $D_n$  is resulted.

**Keywords:** Laplace invariants, generalized Laplace invariants, problem of Gursa, chains of Tody.

**V.V. Kartak**

## EXPLICIT SOLUTION OF THE EQUIVALENCE PROBLEM FOR CERTAIN PAINLEVE EQUATIONS

**Abstract.** For an arbitrary ordinary second order differential equation a test is constructed that checks if this equation is equivalent to Painleve I, II or Painleve III with three zero parameters equations under the substitutions of variables. If it is true then in case the Painleve equations I and II an explicite change of variables is given that is written using the differential invariants of the equation.

**Keywords:** Painleve equations, equivalence problem, differential invariants.

**O.S. Kostrigina**

## TWO-COMPONENT HYPERBOLIC SYSTEMS OF EQUATIONS OF EXPONENTIAL TYPE WITH THE FINITE-DIMENSIONAL CHARACTERISTIC LIE ALGEBRA

**Abstract.** The characteristic Lie algebras of linearization of two-component hyperbolic equations with exponential right-hand side are considered. A full list of systems of equations, for which the dimension of Lie algebra does not exceed 9 is found.

**Keywords:** integral of system, Darboux integrability, characteristic Lie algebra.

**A.S. Krivosheyev**THE INVARIANT SUBSPACES IN CONVEX DOMAINS IN  $\mathbb{C}^n$ 

**Abstract.** We study invariant under differentiation subspaces of spaces of analytic functions in arbitrary convex domains of  $\mathbb{C}^n$ . A criterion of analytic continuation of functions belonging to arbitrary closed principal invariant subspaces, admitting spectral synthesis, is obtained.

**Keywords:** invariant subspaces, analytic continuation, entire function, convolution operator.

**M.N. Kuznetsova**

## LAPLACE TRANSFORMATION AND NONLINEAR HYPERBOLIC EQUATIONS

**Abstract.** The pairs of nonlinear equations, whose linearizations are related by Laplace transformations are described. It was shown how Laplace transformations can be used to obtain Backlund transformation for nonlinear equations.

**Keywords:** nonlinear hyperbolic equations, Laplace transformation, Backlund transformation.

## V.O. Lukashchuk

### NON-SIMILAR SIX-DIMENSIONAL APPROXIMATE LIE ALGEBRAS ON PLANES AND INVARIANT SECOND ORDER DIFFERENTIAL EQUATIONS WITH SMALL PARAMETRE

**Abstract.** In this paper a problem of construction of all non-similar six-dimensional approximate Lie algebras in space of first order differential operators from two variables by known classification of approximate algebras and finding of corresponding second order invariant differential equations  $y'' = F_{(0)}(x, y, y') + \varepsilon F_{(1)}(x, y, y') + o(\varepsilon)$  are solved.

**Keywords:** approximate algebra Lie, approximate symmetry of the differential equation with small parameter.

## R.D. Murtazina

### CHARACTERISTIC LIE ALGEBRAS OF SLOW GROWTH AND MSG EQUATION

**Abstract.** Application of characteristic algebra for the description of the higher of symmetry for the modified equation sine-Gordon is considered. In terms forming characteristic algebras the local differential operator transforming higher of symmetry in higher of symmetry of a smaller order is constructed, return to the last is the recurrence operator.

**Keywords:** characteristic equation, Lie algebra, symmetry, recurrence operator.

## A.A. Talyshv

### WIDENING GROUPS AND PARTIALLY INVARIANT SOLUTIONS

**Abstract.** If the system of differential equation admit Lie group and any widening this group on extra variables (parameters), then each invariant solution of the system with respect to widening group may be partially invariant solution with respect to initial group.

**Keywords:** invariant solutions, partially invariant solutions, widening group.

## Y.V. Tarasova

### SUBMODELS OF GAS MOVEMENTS WITH LINER FIELD OF VELOCITY AND WITH INTERMEDIATE MATRIX OF RANK 0

**Abstract.** We found the solutions of gas dynamics equations with the liner field of velocity for an arbitrary state equation. We obtained all submodels of gas movements with null auxiliary matrix.

**Keywords:** equation of gas dynamics, liner field of velocity, intermediate matrix, integrals of motion.

**M.I. Timoshin**

## DYNAMICAL SYMMETRIES OF ODE

**Abstract.** The problem of using dynamical symmetries to integrating ordinary differential equations is considered. The class of dynamical symmetries possessing invariants to make the order of the differential equation low is allocated. Examples are resulted.

**Keywords:** dynamical symmetries, invariants, ordinary differential equations, Abel's equation.

**L.Z. Urazbachtina**

## INVARIANT SUBMODELS OF A RANK OF ONE GAS DYNAMICS WITH THE SPECIAL EQUATION OF STATE

**Abstract.** In work classification of the invariant submodels constructed on three-dimensional subalgebras from optimum system is resulted. Classification of submodels is spent in the order of the invariant submodel modified with the help normalizer and additional integrals.

**Keywords:** equation of gas dynamics, equation of state, subalgebra, submodel, normalizer.

**S.V. Khabirov**

## THE DIFFERENTIAL-INVARIANT SOLUTIONS FOR THE AXIS-SYMMETRIC GAS FLOWS

**Abstract.** We propose the way of the enumeration of the differential invariant solutions for the submodels of rank 2 of gasdynamics on the admitted normalizer. As example we consider the submodel of the axially symmetric gas flow. We give nonisobaric partial invariant and differential invariant solutions.

**Keywords:** gas dynamics, partial invariant solutions, differential invariant solutions.