

REFERATS

Mathematics

UDC 519.172.2

(1,2)-PARTITION OF A PLANE GRAPH WITH GIRTH AT LEAST 15. *Borodin O. V., Dmitriev I. G., Ivanova A. O.* — Math. notes of YSU. 2009. Vol. 16. No. 1.

We prove that every plane graph with girth at least 15 is (1,2)-partitionable; i.e. its vertices can be partitioned into two subsets such that the first consists of isolated vertices, while the second induces a subgraph of degree at most 1.

Key words: planar graph, coloring, vertex partition, girth.

UDC 514.7

ON APPLICATION OF THE GEOMETRY OF COMPLEX PLANES AND CIRCULAR CONES TO CONSTRUCTION MODELLING. *Bubyakin I. V., Nikitina E. S.* — Math. notes of YSU. 2009. Vol. 16. No. 1.

In this paper we use varieties of planes and circular cones for simulation of surfaces that occur in construction of embankment with slopes uphill roads or during its curvature, as well as in the construction of anti-shafts against water erosion, and in strengthening lake shorelines.

Key words: varieties of planes, circular cone, construction.

UDC 517.742.45

DISCRETE ANALOGS OF INVERSE MEAN CURVATURE FLOWS FOR STRICTLY CONVEX POLYGON. *Vinokurov A. V., Shamaev E. I.* — Math. notes of YSU. 2009. Vol. 16. No. 1.

Discrete analogs of inverse mean curvature flows for polygons are proposed; also, half-invariants which are constants monotonically depending on the discrete flow time are given.

Key words: discrete flow, curvature, polygon.

UDC 517.95

APPLICATION OF THE GALËRKIN METHOD TO THE THIRD BOUNDARY VALUE PROBLEM FOR THE ELLIPTIC-PARABOLIC EQUATION. *Egorov I. E.* — Math. notes of YSU. 2009. Vol. 16. No. 1.

It is proven that under certain conditions on coefficients the unique solution of the third boundary value problem can be found as the limit of close solutions which are found by the Galërkin method.

Key words: Galërkin method, elliptic-parabolic equation.

UDC 518.9

ON SOME PROPERTIES OF STRATEGIES IN RES-PROBLEMS. *Egorov R. I., Kaygorodov S. P.* — Math. notes of YSU. 2009. Vol. 16. No. 1.

This work is devoted to questions of RES-problems. Conditions for interchangeability of compound strategies of players are considered.

Key words: strategie, decision making, matrix.

UDC 517.956.4

BOUNDARY VALUE PROBLEM FOR 2n-PARABOLIC EQUATIONS WITH VARYING EVOLUTION DIRECTION IN THE CASE $n \geq 4$. *Potapova S. V., Popov S. V.* — Math. notes of YSU. 2009. Vol. 16. No. 1.

In this article the unique $2n$ -solvability of boundary value problems for $2n$ -parabolic equations with varying evolution direction in the Hölder spaces for $n \geq 4$ is proven.

Key words: boundary value problem, Hölder space, parabolic equation with varying evolution direction.

UDC 517.982.27+517.984.52

INTERPOLATION OF SOME CLASSES OF WEIGHTED SOBOLEV SPACES AND APPLICATIONS *Pyatkov S. G.* — Math. notes of YSU. 2009. Vol. 16. No. 1.

We examine the question on the fulfillment of the condition

$$\exists s \in (0, 1) : (W_p^r(\Omega), L_{p,g}(\Omega))_{1-s,p} = (\overset{\circ}{W}_p^r(\Omega), L_{p,g}(\Omega))_{1-s,p}, \quad p \in (1, \infty),$$

where $W_p^r(\Omega)$ is the Sobolev space and the space $\overset{\circ}{W}_p^r(\Omega)$ is the closure of the class $C_0^\infty(\Omega)$ in the norm of the space $W_p^r(\Omega)$. The results are applied to the study of the Riesz basis property of eigenfunctions and associated functions of elliptic spectral problems with an indefinite weight function of the form

$$Lu = \lambda Bu, \quad x \in G \subset \beta R^n, \quad B_j u|_\Gamma = 0, \quad j = \overline{1, m},$$

where L is an elliptic operator of order $2m$ defined in a domain $G \subset \mathbb{R}^n$ with boundary Γ , B_j are differential operators defined on Γ , $Bu = g(x)u$ ($g(x)$ is a real-valued function changing its sign in G).

Key words: interpolation of Bahach spaces, Sobolev space, Riesz basis property, indefinite spectral problem.

UDC 517.956

THE DIRICHLET AND POINCARÉ PROBLEMS FOR A MULTIVARIATE HYPERBOLIC EQUATION WITH THE TCHAPLYGIN OPERATOR *Seilhanova R. B.* — Math. notes of YSU. 2009. Vol. 16. No. 1.

Well-posedness of the Dirichlet and Poincaré problems is proved for the multivariate hyperbolic equation with the Tchapygin operator in the field with a withdrawal from the characteristic.

Key words: Dirichlet problem, hyperbolic equation, well posedness.

UDC 517.958

STUDY OF A MATHEMATICAL MODEL WITH 4 PARAMETERS. *Sofronov E. T.* — Math. notes of YSU. 2009. Vol. 16. No. 1.

Stability of the equilibrium of a system of three differential equations is studied. There are three critical cases which are considered completely.

Key words: Lyapunov stability, system of differential equations.

UDC 512.6:519.61

ON THE QUASI-PERIODIC SYSTEMS OF LINEAR ALGEBRAIC EQUATIONS. *Fedorov F. M.* — Math. notes of YSU. 2009. Vol. 16. No. 1.

The so called quasi-periodic infinite systems of linear algebraic equations are studied using the theory of periodic systems. Using that theory, we consider examples of closed solutions of some quasi-periodic infinite systems.

Key words: infinite systems of linear algebraic equations, periodic system, characteristic.

UDC 512.6:519.61

ON THE THEORY OF ALMOST PERIODIC INFINITE SYSTEMS OF LINEAR ALGEBRAIC EQUATIONS. *Fedorov F. M.* — Math. notes of YSU. 2009. Vol. 16. No. 1.

The concept of almost periodic infinite systems of linear algebraic equations, close to periodic infinite systems is introduced. Using the theory of periodic systems, we consider the closed decisions of one class of almost periodic systems.

Key words: infinite systems of linear algebraic equations, fundamental solution.

MATHEMATICAL MODELLING

UDC 519.63

NUMERICAL SOLUTION OF THE INVERSE PROBLEM FOR A NON-STATIONARY CONVECTION-DIFFUSION EQUATION. *Vasilyev V. I., Tikhonova O. A.* — Math. notes of YSU. 2009. Vol. 16. No. 1.

We consider the inverse problem for a non-stationary convection-diffusion equation. For its approximate solution we use the method of successive refinement of the initial condition. We give examples of computations for a model problem with random errors in input data.

Key words: inverse problem, heat conductivity, method of successive refinement.

UDC 51.73

INDUCED OVERVOLTAGES IN AN TRANSMISSION LINE DUE TO A LIGHTNING DISCHARGE BETWEEN CLOUDS. *Grigoriev Y. M., Orlova M. N.* — Math. notes of YSU. 2009. Vol. 16. No. 1.

Analytic and numerical solution of the problem on the current flux and voltage wave in a transmission line due to a lightning discharge are given. The model is constructed under the assumption of instant lightning discharges in a permafrost region.

Key words: mathematical model, analytic solution, numerical solution.

UDC 532.546

MATHEMATICAL MODELING OF SOIL FREEZING PROCESS WITH MOISTURE MOVEMENT IN MELTED ZONE TAKING INTO ACCOUNT. *Pavlov A. R., Matveeva M. V.* — Math. notes of YSU. 2009. Vol. 16. No. 1.

A mathematical model of the soil freezing process is constructed, a numerical algorithm is developed, and computations for different data are carried out.

Key words: heat-and-mass transfer, temperature problem, difference scheme, numerical computation.