

ABSTRACTS

UDK 519

Dem'yanovich Yu. K. **Wavelet decompositions for functions on a differentiable manifold** // Vestnik St.Petersburg University. Ser. 1. 2008. Issue 4. P. 7–15.

Wavelet decompositions for equidistant grid are well-known. In the case of irregular grid the wavelets have been studied before. The treatment of number currents connected with a differentiable manifold is possible with local functions, but creation of effective algorithms requires invoking the wavelet devices. The aim of the paper is to present the scheme of wavelet decompositions using the approximation relations. Here sufficient conditions of embedding of spaces for local functions on a differentiable manifold are discussed, the wavelet expansions and decomposition/reconstruction formulas are constructed, the estimates for the number of arithmetic operations and estimates of values of wavelet components are done. Classic approaches are connected with using the Fourier transform or with application of a lifting scheme. In the paper the approximation relations are initial; the relations mentioned lead to the wavelet expansions, which have asymptotically optimal order of approximation (with respect to N -width of standard compact sets). Besides supports of coordinate wavelets have minimal size (for prescribed order of approximation); in many cases the coordinate wavelets are coordinate splines, and their mean value (in contrast to classic ones) can be nonzero. Note also that the order of smallness of a wavelet component equals to the order of approximation, and the coefficient of linear dependence of calculating complexity on the input data is simply estimated with the help of the approximation order.

Keywords: wavelet, splines, approximation relations, decomposition/reconstruction formulae.

Bibliogr. 12 references.

UDK 517.9

Nazarov A. I., Petrova A. N. **On the sharp constants in some high-order embedding theorems** // Vestnik St.Petersburg University. Ser. 1. 2008. Issue 4. P. 16–20.

We find the sharp constants in embedding theorems $\overset{\circ}{W}_2^k(-1, 1) \hookrightarrow \overset{\circ}{W}_2^{k-1}(-1, 1)$. We show also that the extremals are even functions for all $k \in \mathbb{N}$.

Keywords: sharp constants, Sobolev embedding theorems, symmetry.

Bibliogr. 4 references.

UDK 517.946:539.3

Nazarov S. A. **Bases of singular solutions in problems of the crack mechanics** // Vestnik St.Petersburg University. Ser. 1. 2008. Issue 4. P. 21–34.

Based on the general theory of elliptic boundary value problems in domains with piecewise smooth boundaries, problems in the mechanics of cracks are investigated which are of importance in an application. Consecutively, bases of singular solutions near the crack tip, i.e. an angle of opening 2π , are introduced and investigated. Two such bases are related to force and deformation criteria of fracture and explicit formulae are found out to pass from one basis to the other and to recalculate the classical stress intensity factors into the innovated deformation intensity factors. Besides, for isotropic media, the bases and, therefore the corresponding coefficients, coincide with each other but they differ in the case of arbitrary anisotropic medium whilst it is the deformation basis that, under the transition from isotropy to anisotropy, inherits all the properties playing a crucial role in the fracture mechanics. The deformation basis is also closely connected with the surface enthalpy,

i.e. a functional of Gibbs' type governing curving and kinking cracks in the process of their quasi-static growth. Moreover, the notion of the surface enthalpy provides an intrinsic way to verify main properties of the singular solutions bases. In addition to the opened cracks in homogeneous media, cracks with the contacting surfaces and cracks on interfaces are considered as well. It is established that, in the case of real exponents of stress singularities, bases keep all properties of the bases in homogeneous media. Again with the help of the notion of the surface enthalpy, a certain plausible hypothesis on a criterion for real exponents of singularities is refuted.

Keywords: crack, corner point, bases of singular solutions, surface enthalpy, domains with piecewise smooth boundaries

Bibliogr. 30 references.

UDK 517.547

Nikotin V. M. Extreme values of characteristic functions for the Sturm—Liouville operator // Vestnik St.Petersburg University. Ser. 1. 2008. Issue 4. P. 35–38.

The inverse problem for the Sturm—Liouville operator with an even potential on the interval is considered. It's well-known that inverse problems for one-dimensional differential operators such as the Schrodinger operator is associated with investigation of some special classes of entire or meromorphic functions. The original result about characterization of classes of the functions generated by conformal mapping on a comb is presented, it is analogous to the result of Marchenko and Ostrovski. The most natural spectral parameters for the Sturm—Liouville operator with even potential are eigenvalues (poles of a meromorphic Weil—Titchmarsh's function). However the double sided estimates for the potential in terms of eigenvalues haven't been found up to now. So it would be desirable to consider parameterization and study in detail the class of characteristic functions. In the present paper the question about asymptotical behavior of the extreme values of these functions on the real axis has been completely resolved.

Keywords: inverse spectral problem, conformal mapping on a comb, Sturm—Liouville problem, integer functions with real zeroes.

Bibliogr. 8 references.

UDK 517.5

Sil'vanovich O. V., Shirokov N. A. Smoothness of a function and the rate of approximation // Vestnik St.Petersburg University. Ser. 1. 2008. Issue 4. P. 39–45.

Let $E \subset \mathbb{R}^+$ be a set consisting of a finite number of segments and of a ray $[a, \infty)$, $\omega(x)$ be an increasing continuous function analogous to a module of continuity on \mathbb{R}^+ , satisfying the conditions

$$\omega(0) = 0, \quad \omega(x + y) \leq \omega(x) + \omega(y), \quad \omega(x) \geq cx, x > 0, c > 0, \quad \text{III}$$

$$\int_0^y \frac{\omega(x)}{x} dx + y \int_y^\infty \frac{\omega(x)}{x^2} dx \leq c_0 \omega(y), \quad y > 0$$

where c_0 is independent of y ; we denote through $H_\omega^r(E)$ a space of complex-valued functions f on E , satisfying the condition

$$|f^{(r)}(x) - f^{(r)}(y)| \leq c_f \omega(|x - y|), \quad x, y \in E,$$

endowed with a norm

$$\|f\|_{r,\omega} = |f(0)| + \sum_{\nu=1}^r |f^{(\nu)}(0)| + \sup_{x,y \in E, x \neq y} \frac{|f^{(r)}(x) - f^{(r)}(y)|}{\omega(|x - y|)}$$

Introduce $C_\sigma^{(r,\omega)}$, $\sigma > 0$, a class of entire functions F_σ of order $\frac{1}{2}$ and of a type $\sigma > 0$ with a norm

$$\|F_\sigma\|_{C_\sigma^{(r,\omega)}} = \sup_{z \in \mathbb{C} \setminus \mathbb{R}^+} \frac{|F_\sigma(z)| \cdot e^{-\sigma|Im\sqrt{z}|}}{1 + |z|^r \omega(|z|) + \sigma^{-2r} \omega(\sigma^{-2})}$$

We prove in the present paper an inverse theorem of approximation which corresponds with a direct theorem which was proved in the previous work. We state here that in case a function $f \in C(E)$ may be approximated in a certain scale by means of a some supply of approximating functions $F_\sigma \in C_\sigma^{(r,\omega)}$ with a given rate of approximation then f possesses a definite smoothness, i.e. $f \in H_\omega^r(E)$ and $\|f\|_{r,\omega} \leq c$.

Keywords: inverse theorem, rate of approximation, smoothness.

Bibliogr. 7 references.

UDK 517.968.23

Soloviev A. A. L_p -boundedness of boundary integral operator on contour with peak // Vestnik St.Petersburg University. Ser. 1. 2008. Issue 4. P. 46–58.

The paper continues a number of results, obtained in collaboration with V. G. Maz'ya, about solvability of the boundary integral equations on a plane contour with a peak. It has been proved that on a contour Γ with an outward peak the operator of the boundary equation of the Dirichlet problem maps continuously the space $\mathcal{L}_{p,\beta+1}^1(\Gamma)$ on the space $\mathfrak{N}_{p,\beta}^-(\Gamma)$. The norm of function in $\mathcal{L}_{p,\beta}^1(\Gamma)$ is defined as

$$\|\varphi\|_{\mathcal{L}_{p,\beta}^1(\Gamma)} = \left(\int_\Gamma \left| (\partial/\partial s)\varphi(q) \right|^p |q|^{p\beta} ds_q + \int_\Gamma |\varphi(q)|^p |q|^{p(\beta-1)} ds_q \right)^{1/p},$$

if a cusp is situated in the origin. Then the norms in spaces $\mathfrak{N}_{p,\beta}^\mp(\Gamma)$ are given by

$$\|\varphi\|_{\mathfrak{N}_{p,\beta}^\mp(\Gamma)} = \left[\int_{\Gamma \cup \{|q| < \delta\}} |\varphi(q_+) \mp \varphi(q_-)|^p |q|^{p(\beta-\mu)} ds_q + \|\varphi\|_{\mathcal{L}_{p,\beta+1}^1}^p \right]^{1/p},$$

where q_\pm are points of intersection of Γ with $\{z : |z| = |q|\}$ and $\delta > 0$ is a fixed small number.

On a contour with inward peak the operator of the boundary equation of the interior Dirichlet problem acts continuously from $\mathcal{L}_{p,\beta+1}^1(\Gamma)$ on the space $\mathfrak{M}_{p,\beta}(\Gamma)$, where $\mathfrak{M}_{p,\beta}(\Gamma)$ is the direct sum of $\mathfrak{N}_{p,\beta}^+(\Gamma)$ and the space $\mathfrak{B}(\Gamma)$ of functions on Γ of the form $p(z) = \sum_{k=0}^m t^{(k)} \operatorname{Re} z^k$ with $m = [\mu - \beta - p^{-1}]$.

In this paper the operator $I - 2W$ of the boundary integral equation of the interior first boundary value problems of the plane elasticity, where W is the double layer potential, is considered. The main result is the statement, that $I - 2W$ maps continuously $\mathcal{L}_{p,\beta+1} \times \mathcal{L}_{p,\beta+1}(\Gamma)$ in $\mathfrak{N}_{p,\beta}^- \times \mathfrak{N}_{p,\beta}^-(\Gamma)$.

On a contour with an inward peak from the obtained representation of the operator $I - 2W$ and the theorem of continuity of auxiliary integral operators it follows that images of vector-valued functions from $\mathcal{L}_{p,\beta+1}^1 \times \mathcal{L}_{p,\beta+1}^1(\Gamma)$ have components in the form of the sum of functions from spaces $\mathfrak{N}_{p,\beta}^-(\Gamma)$ and $\mathfrak{M}_{p,\beta}(\Gamma)$.

Keywords: boundary integral equations, integral operator, elasticity potential.

Bibliogr. 5 references.

UDK 519.6

Borzykh A. N. About an optimization algorithm calculating the largest singular value of a real matrix // Vestnik St.Petersburg University. Ser. 1. 2008. Issue 4. P. 59–70.

In this paper we consider a problem of calculation of the largest singular value of a given real matrix. A short overview concerning known solution methods is presented. We propose a new optimization algorithm that calculates the largest singular value. We give grounds for the algorithm

offered and present a proof of linear degree of convergence; we state correlation between matrix rows sum and one of its singular values and deduce new localization theorems. A connection between the algorithm proposed and the Rayleigh ratio relaxation method is shown. Some exceptional situations are described, in which the algorithm converges to a non-maximum singular value. We propose a computational trick that allows us to avoid those situations in almost all cases.

Keywords: singular values, matrix norm, largest singular value, maximum singular value, singular value problem.

Bibliogr. 5 references.

UDK 513.6

Vavilov N. A., Kazakevich V. G. One more variation on the theme of decomposition of transvections // Vestnik St.Petersburg University. Ser. 1. 2008. Issue 4. P. 71–74.

The method of decomposition of unipotents consists in writing elementary matrices as products of factors lying in proper parabolic subgroups, the images of which under specific endomorphisms (say, conjugations) also fall into proper parabolic subgroups. For the general linear group this method was first proposed by Stepanov in 1987 to simplify the proof of Suslin’s famous normality theorem. Soon thereafter Vavilov and Plotkin generalized it to other classical groups and the Chevalley groups. Subsequently, many further results of that type have been discovered. In the present paper we propose one more variation on this theme. Namely, let R be a commutative ring with 1, $g \in \text{GL}(n, R)$, $n \geq 4$. Then the elementary group $E(n, R)$ is generated by transvections $e + uv$, $u \in R^n$, $v \in {}^nR$, $vu = 0$, such that v , gu and vg^{-1} have at least one zero component each. This result emerged in the context of a simplified proof of the theorems due to Waterhouse, Golubchik, Mikhalev, Zelmanov, and Petechuk regarding the standard description of automorphisms of the general linear group, based exclusively on the use of unipotent elements.

Keywords: general linear group, decomposition of unipotents, parabolic subgroups, standard description of automorphisms.

Bibliogr. 11 references.

UDK 519.245

Ermakov S. M., Rukavishnikova A. I., Timofeev K. A. On some quasi-stochastic methods of equations solving // Vestnik St.Petersburg University. Ser. 1. 2008. Issue 4. P. 75–83.

In this article the authors refer to the modification of the Quasi Monte-Carlo method (QMC) that was suggested in their previous works. This modification can be successfully used for solving integral equations of the second kind because it has a number of advantages comparing to the QMC. For example, if one solves an equation of this kind with the use of QMC then the sum of a series is estimated. This series consists of integrals, which constructive dimension tends to infinity. This difficulty is known as one of the most common obstacles to the use of the QMC. The other difficulty is a condition of dominated convergence. This condition induces absolute convergence of the series under consideration.

The mentioned modification allows us to avoid the first difficulty and to weaken the restriction of dominated convergence.

In this article the authors suggest two kinds of estimates which can be used in the modified algorithm of the QMC. The integral equation under consideration is

$$\varphi(x) = \int k(x, y)\varphi(y)\mu(dy) + f(x), \quad (\text{mod } \mu)$$

where $x \in D \subset \mathbb{R}^s$, f and k are given functions determined on supports of μ and $\mu \otimes \mu$. Step by step one estimates $\varphi_n(x) = \int k(x, y)\varphi_{n-1}(y)\mu(dy) + f(x)$. The first kind of estimates allows us to

compute φ_n at a fixed point x' :

$$\xi_1(x') = \frac{1}{N} \sum_{j=1}^N \xi_1^n(y_j), \text{ where } \xi_1^n(y) = \frac{k(x', y)\widehat{\varphi}_{n-1}(y)}{p_{n-1}(y)} + f(x'),$$

y_j are distributed with density p_{n-1} , $\widehat{\varphi}_{n-1}(y)$ is an estimate computed in the previous step. The other kind of estimates allows us to calculate φ_n at random points.

Optimal parameters of the suggested kinds of estimates are presented and the corresponding theorems are proved.

The authors tested their theory on the difference analogue of the Navie—Stocks equation. Results of this research are presented.

Keywords: integral equations of the second kind, Quasi Monte-Carlo method, convergence, dominated convergence.

Bibliogr. 7 references. Fig. 3. Table 1.

UDK 518:517.432.1

Kabardov M. M. On the Euler—Knopp summation of the Laguerre series in the Laplace transform inversion problem // Vestnik St.Petersburg University. Ser. 1. 2008. Issue 4. P. 84–89.

The Laplace transform inversion method based on the expansion of the original in the Laguerre polynomials

$$f(t) = \sum_{k=0}^{\infty} a_k L_k(bt)$$

is considered. The image of the Laguerre series is reduced by a linear-fractional mapping to some power series, which is summed up by the well-known Euler—Knopp method. The summation parameter is chosen in the complex plain in such a way as to get the highest convergence speed of the series

$$f(t) = \exp\left(\frac{bpt}{p-1}\right) \sum_{k=0}^{\infty} \frac{A_k(p)}{(1-p)^{k+1}} L_k\left(\frac{bt}{1-p}\right),$$

which corresponds to the Euler—Knopp transformation. The effect of requirement of regularity of the transformation on the choice of the summation parameter is discussed by means of geometrical representations. Calculations, which have shown high efficacy of the suggested method of choosing the parameter are carried out.

Keywords: Laplace transform, generalized Laplace transform, Laguerre series, convergence speed up, Euler—Knopp method.

Bibliogr. 11 references. Fig. 2. Table 1.

UDK 517.9

Tikhomirov S. B. Interiors of sets of vector fields with shadowing properties corresponding to some classes of reparametrizations // Vestnik St.Petersburg University. Ser. 1. 2008. Issue 4. P. 90–97.

We study $C1$ -interiors of sets of vector fields with various shadowing properties. The main difference between the shadowing problem for flows and the similar problem for discrete dynamical systems generated by diffeomorphisms is related to the necessity of reparametrization of shadowing trajectories in the former case. We consider the Lipschitz and oriented shadowing properties according to the type of reparametrization. It is known that structurally stable vector fields have the Lipschitz shadowing property. Let X be a vector field and let p, q be its rest points or closed trajectories. Assume that the stable manifold of p and the unstable manifold of q have a point of non-transverse intersection. We show that in this case, the vector field X does not have the Lipschitz shadowing property. If either p or q is a closed trajectory, then X does not have the oriented shadowing property. These statements imply that the $C1$ -interior of the set of vector fields with the

Lipschitz shadowing property is equal to the set of structurally stable vector fields. If the dimension of the manifold does not exceed 3, a similar result holds for the oriented shadowing property.

Keywords: dynamical systems, shadowing trajectories, structural stability, vector fields, hyperbolic.

Bibliogr. 9 references.

UDK 539.3

Bauer S. M., Tipyasev A. S. On the Mathematical Model of the Measuring of the Intraocular Pressure by Maklakov Method // Vestnik St.Petersburg University. Ser. 1. 2008. Issue 4. P. 98–101.

Maklakov's tonometer estimates intraocular pressure by estimating the diameter of the circular contact area of the cornea and flat-bottom tonometer of defined load (usually 5 or 10 gr). The first simplest models of the applanation method for measurement of the IOP were based on the approach, in which an eyeball is modeled as a thin-walled spherical liquid-filled shell with the corneal biomechanical properties, and clinic special tables are used to estimate IOP. The calculating of such tables is based on the empirical values of the IOP. But the parameters of eyes vary for different people and change with age. Earlier one model which takes into account properties of the sclera and the cornea was proposed. But in that model both the sclera and the cornea were considered as spherical shells.

In this model we suppose that the cornea and the sclera are parts of elliptic shells. As it was before it's supposed that the two-segment shell is filled with incompressible liquid under the pressure. The deformation of the shell part which models the cornea is significant, and to analyze this deformation the nonlinear theory of momentless shells is used. The dependence of the actual intraocular pressure (the pressure in the shell before loading) on the shape of the cornea and the sclera is discussed.

Keywords: spherical shells, intraocular pressure, deformation.

Bibliogr. 1 references. Fig. 3.

UDK 532.591

Bestuzheva A. N. Problem of diffraction of waves on a cone // Vestnik St.Petersburg University. Ser. 1. 2008. Issue 4. P. 102–109.

L. A. Boiko was the first who considered diffraction of non-stationary gravity waves in non-compressive fluid around an obstacle, which was a vertical half-plane dipped into infinite fluid and the waves were generated by the instantaneous impulse at some point of the free surface. The solution for the problem was obtained by means of decomposition in Bessel's functions. Later L. N. Sretenskiy found the solution of Cauchy–Poisson's problem for a vertical half-plane dipped into infinite fluid by means of the branched solution method proposed by Sommerfeld to study diffraction of light waves. Cauchy–Poisson's problem for a wedge with an arbitrary apex angle submerged into the finite fluid was examined by B. I. Sebekin, who applied the methods of integral transforms. In the present paper the diffraction of waves on a cone is analyzed.

The stationary wave motion of ideal non-compressive fluid in the domain bounded by the free surface and an infinite cone with the vertex on the free surface is analyzed. The wave motion is caused by a plane wave running-on from infinity. The problem set for the velocity potential within the framework of the linear dispersion theory is subsequently reduced to the Laplace equation with boundary conditions of the third kind on the free surface and of the second kind on the conic surface. Based on the specific features of boundary conditions the problem may be split into two by means of the integral transform. The solution of the first problem is constructed as a series in Legendre polynomials. For the second problem we come to a functional equation. Exact (analytical) solutions for a problem of 3D wave motion for the limit cases are obtained.

Keywords: ideal non-compressive fluid, the stationary wave motion, a cone, a diffraction, a linear dispersion theory, the integral transforms, Legendre polynomials, a functional equation.

Bibliogr. 8 references. Fig. 4.

UDK 531.001

Vovnenko N. B., Zimin B. A., Sudenkov U. B. **Specialty of generation of dynamical stresses in heat-conducting and low heat-conducting media under sub-microsecond heating rate** // Vestnik St.Petersburg University. Ser. 1. 2008. Issue 4. P. 110–117.

Experimental results and theoretical analysis of the stress response under sub-microsecond heating of laser are presented. The analysis of thermoelasticity problems has been carried out. The solution of the differential equation of the dynamical thermoelasticity is represented by the sum of two modes of deformations. One of them is predominantly the compression stress and the other is mainly the stretching stress. The form of thermomechanical stress response depends on heat-conducting and low heat-conducting media. The phase of stretching is the main difference of thermoelasticity response between heat-conducting and low heat-conducting media both in the experimental results and theoretical analysis.

Keywords: thermoelasticity, heating of laser, heat-conducting.

Bibliogr. 13 references. Fig. 5.

UDK 539.3

Dahl Yu. M., Morshchinina D. A. **On the stress-strain state of an intraocular lens (IOL)** // Vestnik St.Petersburg University. Ser. 1. 2008. Issue 4. P. 118–124.

The stress-strain state of the modern intraocular lenses (IOL) which are used in treatment of cataract is investigated. In terms of the mechanics of solids the optical part of IOL can be considered as an isotropic disk, and the supporting elements (gaptika) can be regarded as thin curvilinear bars rigidly fixed on the contour of the disk and absolutely free on the other end. After implantation of the intraocular lens into the crystal's capsule the supporting elements are turned out bent, in their junctions with the disk the reaction of interaction (concentrated forces and moments) arise. Thereby, the estimate of the stress-strain state of the intraocular lens consists in the determination of stresses in the disk and calculation of deflections of the supporting elements. In the first case the exact analytical solution of the plane problem of the linear theory of elasticity for a disk loaded with self-balanced concentrated forces and moments on the contour is obtained by using methods of the complex variable theory. The results are compared with analogous solutions for a half-plane. In the second case on the basis of nonlinear theory of thin curvilinear bars the expressions for coordinates of the end point of a bar and stresses arising at the end section of supporting elements are deduced.

Keywords: isotropic disk, concentrated forces and moments on the contour of the disk, stress-strain state.

Bibliogr. 9 references. Fig. 6.

UDK 539.374

Lashkov V. A. **Interaction of solid particles of two-phase flow with a surface of complicated profile** // Vestnik St.Petersburg University. Ser. 1. 2008. Issue 4. P. 125–130.

The article is devoted to investigation of coefficients of velocity restitution of solid particles of two-phase flow at their interaction with a surface of a body. Experimental and theoretical study shows that the roughness of a surface essentially influences rebound parameters of particles. Thus the drag of a body from solid particles depends on peculiarities of the form and roughness of a surface. The experimental investigation of integrated (average on a surface) coefficients of velocity restitution of particles is carried out. In experiments there were used models, the surface of which had the given features. The experiments have shown that the features of a profile of a surface considerably influence the value of coefficient of velocity restitution. The calculation of coefficients of velocity restitution for such surfaces is executed with using the coefficients of velocity restitution measured for a smooth surface. It is shown that the determination of integrated coefficients of velocity restitution of particles for such surface requires to take into account multiply interactions of a particle with the surface. The influence of a ratio of the specific sizes of a particle to magnitudes

of surface peculiarities on the behaviour of impulse transfer is considered. It is shown that at small angles of a surface inclination the coefficient of restitution of normal velocity can be more than unit, and the coefficient of restoration of tangential velocity can decrease down to zero. In defining the coefficient of velocity restitution of particles it is necessary to consider a level of roughness and the surface profile peculiarities.

Keywords: two-phase flow, solid particles, coefficient of velocity restitution, surface peculiarities, collision.

Bibliogr. 7 references. Fig. 4.

UDK 524.3/4-32

Bashakov A. A. The testing of phase models of stellar systems constructed by Schwarzschild's method // Vestnik St.Petersburg University. Ser. 1. 2008. Issue 4. P. 131–143.

The article describes a progress in testing the ways and algorithms designed to build the phase models of stellar systems by the Schwarzschild method, as well as a set of associated routines to check the stability of the constructed model.

The Schwarzschild method allows us to construct the phase model without a priori knowledge of the integrals of motion. During the method realization, a library of orbits is built in a given potential, and then the weights of orbits are calculated, so that the superposition of orbits replicates the observed data by the best way. However, the Schwarzschild method does not guarantee the stability of the phase model constructed, so an additional special research of the stability of the model is made. To this end, the phase model is replaced by a set of N particles, and evolution of this discrete model is studied using the N -body simulations.

The article describes the construction of the phase model and check of its stability for the potentials of the spherical Plummer model and the Galactic model by Kutuzov and Ossipkov. For these potentials, the whole cycle of work is performed: building a phase model by the Schwarzschild method, the transfer to a discrete N -body model that corresponds to the phase model, and the investigation of the discrete model. The tests of developed algorithms and routines show good correspondence between the constructed model and the analytical solution for the spherical Plummer model and the stability of the corresponding discrete model.

Keywords: stellar dynamics, phase model of galaxies, numerical methods.

Bibliogr. 10 references. Fig. 3.