



ABSTRACTS

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Rakhmanov K. S., Tuychiyev X. M. Analyzing web sites using Artificial Intelligence ..	214
Rasulmuhamedov M. M., Tashmetov K. Sh. Traffic flow forecasting using KAN	215
Samandarov B. S., Tajibaev Sh. Kh. Esbergenov A. J. Forecasting nutrient requirements based on animal physiological status and feed nutritional value	216
Toliyev Kh. I., Geldibayev B. Y. A neural network-based model for predicting milk yield	217
Uteuliev N. U., Djaykov G. M., Dauletnazarov J. I. Efficiency of the YOLOv5 and YOLOv8 models in agriculture for weed detection	218
Yilihamujiang Yusupu Application of Matrices in Plant Recognition and Artificial Intelligence: A PYNQ-Z2-Based Solution	218

Section 6: Mathematical analysis and its applications

Abdikadirov S.M. The Osgood-Brown theorem for α -separately harmonic functions	220
Abduganiyeva O. I., Sayfullayeva M. Z. Adaptive combined control with identification .	220
Abdullayev F.G., Imashkyzy M. Approximation properties of some extremal polynomials in the integral and uniform metrics	221
Akbaraliyeva M. SH., Ne'matillayeva M.D. Carleson's Interpolation Theorem in classical domain of type second	222
Akramov N.S, Rakhimov K.Kh Capacity dimension of the Brjuno set in \mathbb{C}^n	222
Atamuratov A. A. Extremal functions on parabolic manifolds and regular compacts	223
Atamuratov A. A., Bekchanov S. E. Growth order of holomorphic functions on parabolic Stein manifolds	224
Bakhriddinova H.U. Theorem for Weistrass formula	225
Bazarbaev S.U., Boymurodov S.I. Large entropy measures of Hénon-like maps	226
Bazarbaev S.U. On the support of measures of large for polynomial-like maps	227
Bobokhonov Sh.S. The corona theorem for $A(z)$ -analytic functions	228
Davlatov Sh. O. Some signs of convergence of constant-sign numerical series and improper integrals	229
Gadayev S.A. Differentiability of potentials in the sense of Zygmund	230
Ganikhodzhaev R. N., Eshmamatova D. B., Akhmedova D. P., Muminov U. R. Linear homogeneous inequalities and routes of trajectories of Lotka–Volterra operators	231
Husenov B. E. Nevanlinna-Ostrovsky class for $A(z)$ -analytic functions	231
Imomkulov S.A., Tuychiev T.T. On the continuation of the Hartogs series with harmonic coefficients	233
Kamolov X. Q. Some properties of the Green's function on parabolic analytic surfaces	234
Karimov J.J. Limit behavior of the distribution function for circle homeomorphisms	234
Kuldoshev K.K. (m, ψ) -regularity of boundary compacts	235
Khudayarov S.S. About dynamic systems of a $QnSO$	236
Mahkamov E.M., Bozorov J.T. Carleman's formula for a second kind matrix polydisk .	237
Muminov K.K. Equivalence of paths with respect to group action $R^4 \triangleleft H(R^4)$	238
Ne'matillayeva M.D., Rustamova M.S. Analog of the Carleson's interpolation theorem for $A(z)$ -analytic functions	239
Nursultanov E.D., Tleukhanova N.T. Recovery operator of periodic functions from the spaces SH_p^α, SW_p^α	240
Rahmatullaev M.M., Tukhtabaev A.M. Weakly periodic p -adic quasi Gibbs measures for the Potts model on a Cayley tree	240
Rajabov Sh.Sh. The double convolution theorem for symmetric matrix argument functions	241

Let $E \subset \partial D$ be some subset of boundary of the domain $D \subset \mathbb{C}^n$ and ψ is a bounded and non-positive function in E . $\mathcal{U}(E, D, \psi)$ the class of all functions $u(z) \in sh_m(D)$, such that $u^*|_E \leq \psi|_E$, $u|_D < 0$ and let

$$\omega(z, E, D, \psi) = \sup \{u(z) : u(z) \in \mathcal{U}(E, D, \psi)\}.$$

Definition 1. The function

$$\omega^*(z, E, D, \psi) = \overline{\lim_{w \rightarrow z}} \omega(w, E, D, \psi)$$

is called a (m, ψ) -subharmonic measure of boundary set E with respect to D .

As can be seen from the definition, $\omega^*(z, E, D, \psi)$ is m -subharmonic and the inequality $\omega^*(z, E, D, \psi) \leq 0$ holds for all $z \in D$. Also, from the definition of the (m, ψ) -subharmonic of the boundary set, the following equivalence relation is valid.

$$-\inf_{\xi \in E} \psi(\xi) \cdot \omega^*(z, E, D) \leq \omega^*(z, E, D, \psi) \leq -\sup_{\xi \in E} \psi(\xi) \cdot \omega^*(z, E, D), \quad \forall z \in D \quad (1)$$

holds for any set $E \subset \partial D$.

Let $K \subset \partial D$ be a compact.

Definition 2. A point $\xi \in K$ is said to be globally (m, ψ) -regular if $(\omega^*(\xi, K, D, \psi))^* = \psi(\xi)$. It is said to be locally (m, ψ) -regular if for any neighborhood B , $\xi \in B \subset \mathbb{C}^n$, the intersection $K \cap \bar{B}$ is globally (m, ψ) -regular at the point ξ , i.e. $(\omega^*(\xi, K \cap \bar{B}, D, \psi))^* = \psi(\xi)$. If all points of a compact K are (m, ψ) -regular, then the compact K is called a (m, ψ) -regular compact.

Theorem 1. Let $\psi \in C(K)$. A fixed point $\xi \in K \subset \partial D$ is locally (m, ψ) -regular if and only if it is locally m -regular, $(\omega^*(\xi, K \cap \bar{B}, D))^* = -1$.

The proof of this theorem uses the inequality (1).

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About dynamic systems of a QnSO

Khudayarov S.S.

Bukhara State University, Bukhara, Uzbekistan;
Bukhara Branch Institute of Mathematics named after V.I. Romanovsky of the Academy of Sciences of the Republic of Uzbekistan;
s.s.xudayarov@buxdu.uz
xsanat83@mail.ru

Consider the following QnSO on S^2 :

$$W_0 : \begin{cases} x' = ax^2 + 2bxy + cy^2 \\ y' = (1-a)x^2 + 2(1-b)xy + (1-c)y^2 \\ z' = z(2-z). \end{cases} \quad (1)$$

where

$$a, c \in [0, 1], \quad b \in [-\sqrt{ac}, 1 + \sqrt{(1-a)(1-c)}]. \quad (2)$$

Denote

$$\mathcal{Z} = \{(x, y, z) \in S^2 : z = 0\}.$$

It is easy to see that \mathcal{Z} is an edge of the simplex and it is invariant: $z = 0 \Rightarrow z' = 0$.

The fixed points are solutions to the system (1)

$$\begin{cases} x = ax^2 + 2bxy + cy^2 \\ y = (1-a)x^2 + 2(1-b)xy + (1-c)y^2 \\ z = z(2-z) \end{cases} \quad (3)$$

From the third equation of the system we find $z = 0$ and $z = 1$.

1) Case: If $z = 1$, then according to the definition of a simplex, i.e. $x + y + z = 1$, it follows that $x = y = 0$. Thus, the point $e_1 = (0, 0, 1)$ will be a fixed point of the operator W_0 . That is, there is only one fixed point outside \mathcal{Z} .

2) Case: If $z = 0$, then the restriction of operator (1) to \mathcal{Z} is an arbitrary one-dimensional QnSO in S^1 :

$$\begin{cases} x' = ax^2 + 2bxy + cy^2 \\ y' = (1-a)x^2 + 2(1-b)xy + (1-c)y^2, \end{cases} \quad (4)$$

Since $x + y = 1$ the fixed point equation is reduced to one-dimensional form:

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Carleman's formula for a second kind matrix polydisk

Mahkamov E. M.¹, Bozorov J. T.²

National University of Uzbekistan¹, Tashkent, Uzbekistan

Termez satate university², Termez, Uzbekistan

erkin_mahkamov83@mail.ru; jorabek.bozorov.89@mail.ru

Consider the second kind classic domain [1,2]

$$D_2 = \{Z_2 \in \mathbb{C}[m \times m] : Z_2 \overline{Z_2} < I\},$$

where $Z_2 - m \times m$ square matrix, $\overline{Z_2}$ —conjugate matrix of the matrix Z_2 , $I - m \times m$ identity matrix. Also take the skeleton [1,2] of the domain D_2

$$S_2 = \{\xi_2 \in \mathbb{C}[m \times m] : \xi_2 \overline{\xi_2} < I\}.$$

Cartesian product of n copies of the above D_2 domain $\underbrace{D_2 \times D_2 \times \dots \times D_2}_{n \text{ ta}}$, is called a second kind matrix polydisk and denoted as T_2^n , i.e.

$$T_2^n = \left\{ Z = \left(Z_2^{(1)}, Z_2^{(2)}, \dots, Z_2^{(n)} \right) \in \mathbb{C}^n[m \times m] : Z_2^{(j)} \overline{Z_2^{(j)}} < I, Z_2^{(j)} \in D_2 \right\}.$$

Similarly, we write the skeleton of this second kind matrix polydisk as the Cartesian product of n copies of S_2 and denote as $S(T_2^n)$, i.e.

$$S(T_2^n) = \left\{ \xi = \left(\xi_2^{(1)}, \xi_2^{(2)}, \dots, \xi_2^{(n)} \right) \in \mathbb{C}^n[m \times m] : \xi_2^{(j)} \overline{\xi_2^{(j)}} = I, \xi_2^{(j)} \in S_2 \right\}.$$

Let $f(Z)$ be a function on T_2^n .