



**FIZIKA, MATEMATIKA VA
MEXANIKANING DOLZARB
MUAMMOLARI
XALQARO ILMIY-AMALIY
ANJUMANI
MATERIALLARI**

BUXORO DAVLAT UNIVERSITETI

Buxoro - 2023

**O‘ZBEKISTON RESPUBLIKASI OLIV TA‘LIM, FAN VA
INNOVATSIYALAR VAZIRLIGI
BUXORO DAVLAT UNIVERSITETI**

**FIZIKA, MATEMATIKA VA MEKANIKANING DOLZARB
MUAMMOLARI**

xalqaro ilmiy-amaliy anjumani

MATERIALLARI

(I qism)

Buxoro, O‘zbekiston, 24-25-may, 2023-yil

**МИНИСТЕРСТВО ВЫСШЕГО ОБРАЗОВАНИЯ, НАУКИ И
ИННОВАЦИЙ РЕСПУБЛИКИ УЗБЕКИСТАН
БУХАРСКИЙ ГОСУДАРСТВЕННЫЙ УНИВЕРСИТЕТ**

ТЕЗИСЫ ДОКЛАДОВ

(Часть I)

международной научно-практической конференции

**АКТУАЛЬНЫЕ ПРОБЛЕМЫ ФИЗИКИ, МАТЕМАТИКИ И
МЕХАНИКИ**

Бухара, Узбекистан, 24-25 мая, 2023 год

**MINISTRY OF HIGHER EDUCATION, SCIENCE AND INNOVATIONS
OF THE REPUBLIC OF UZBEKISTAN
BUKHARA STATE UNIVERSITY**

ABSTRACTS

(Part I)

of the international scientific and practical conference

**ACTUAL PROBLEMS OF PHYSICS, MATHEMATICS AND
MECHANICS**

Bukhara, Uzbekistan, May 24-25, 2023

TASHKILIY QO'MITA

Rais:

Xamidov O.X. BuxDU rektori, professor

Rais o'rinbosari:

Rasulov T.H. BuxDU prorektori, professor

Jurayev H.O. BuxDU Fizika-matematika fakulteti dekani, professor

Tashkiliy qo'mita a'zolari:

Teshayev M.X. V.I.Romanovskiy nomidagi matematika instituti Buxoro bo'linmasi, professor

Djurayev D.R. BuxDU, professor

Mirzayev Sh.M. BuxDU, professor

Qahhorov S.Q. BuxDU, professor

Boltayev Z.I. V.I.Romanovskiy nomidagi matematika instituti Buxoro bo'linmasi, professor

Fayziyev Sh.Sh. BuxDU kafedra mudiri, dotsent

Dilmurodov E.B. BuxDU kafedra mudiri, PhD

Durdiev U.D. BuxDU kafedra mudiri, dotsent

Mirzayev M.S. BuxDU kafedra mudiri, PhD

Nuriddinov J.Z. BuxDU Fizika-matematika fakulteti dekan o'rinbosari, PhD

Turdiev H.H. BuxDU, PhD

Bozorov Z.R. V.I.Romanovskiy nomidagi matematika instituti Buxoro bo'linmasi, PhD

DASTURIY QO‘MITA

Rais:

Durdiev D.K. V.I.Romanovskiy nomidagi matematika instituti Buxoro
bo‘linmasi mudiri, professor

Members of the organizing committee

Laqayev S.N. SamDU kafedra mudiri, akademik
Muqimov K.M. O‘zR FA akademigi
G‘ulomov K.G. O‘zR FA akademigi
Karchevsky L.A. Sobolov nomidagi matematika instituti, professor
Mutti-Ur Rehman Sukkur IBA universiteti, professor
Xaxo‘jayev A.M. V.I.Romanovskiy nomidagi matematika instituti
Samarqand bo‘linmasi mudiri, professor
Ikromov I.A. V.I.Romanovskiy nomidagi matematika instituti
Samarqand bo‘linmasi mudiri, professor
Imomkulov S.A. Navoiy davlat pedagogika instituti, professor
Imomov A.A. Qarshi davlat universiteti, professor
Rasulov X.R. Buxoro davlat universiteti, dotsent
Mamurov B.J. Buxoro davlat universiteti, dotsent
Merojova Sh.B. Buxoro davlat universiteti, PhD
Raxmonov A.A. V.I.Romanovskiy nomidagi matematika instituti Buxoro
bo‘linmasi, PhD
Raxmatov I.I Buxoro davlat universiteti, dotsent
Saidov Q.S Buxoro davlat universiteti, dotsent
Niyazxonova B.E Buxoro davlat universiteti, dotsent

Kotibiat:

Xudayarov S.S., Turdiev H.H., Ochilov L.I, Qodirov J.R.

Konferensiya tashkilotchisi:

Buxoro davlat universiteti Fizika-matematika fakulteti

SOLVABILITY OF INVERSE PROBLEM FOR INTEGRO-DIFFERENTIAL HEAT EQUATION WITH PERIODIC AND INTEGRAL CONDITIONS

J.J. Jumaev

Bukhara branch of the institute of Mathematics named after V.I. Romanovskiy at the Academy of sciences of the Republic of Uzbekistan, Bukhara, Uzbekistan,
jonibekjj@mail.ru

We consider the initial-periodic boundary problem for the heat equation with a convolution-type integral term on the right-hand side

$$\partial_t^\alpha u - u_{xx} + a(t)u = f(x)g(t), \quad (x, t) \in D_T, \quad (1)$$

$$u(x, 0) = \varphi(x), \quad (2)$$

$$u(0, t) = u(1, t), \quad u_x(0, t) = u_x(1, t), \quad \varphi(0) = \varphi(1), \quad \varphi'(0) = \varphi'(1), \quad (3)$$

T is arbitrary positive number and $D_T := \{(x, t): 0 < x < 1, 0 < t \leq T\}$.

The problem of determining a function $u(x, t), (x, t) \in D_T$, that satisfies (1)-(3) with known functions $k(t)$ and $\varphi(x)$ will be called the direct problem.

In the inverse problem, it is required to determine the kernel $k(t), t > 0$, of the integral in (1) using overdetermination condition about the solution of the direct problem (1)-(3):

$$\int_0^1 \omega_i(x)u(x, t)dx = h_i(t), \quad x \in (0, 1), \quad (4)$$

where $\omega(x), h(t)$ are given functions.

Definition. *The pair $\{u(x, t), k(t)\}$ from the class $C^{2,\alpha}(D_T) \cap C^{1,0}(\overline{D_T}) \times C[0, T]$ is said to be a classical solution of problem (1)-(4), if the functions $u(x, t)$ and $k(t)$ satisfy the following conditions:*

- (1) *The function $u(x, t)$ and its derivatives $\partial_t^\alpha u(x, t), u_{xx}(x, t)$ are continuous in the domain D_T ;*
- (2) *the function $k(t)$ is continuous on the interval $[0, T]$;*
- (3) *equation [1] and conditions [2]-[4] are satisfied in the classical (usual) sense.*

In this work, we consider inverse problem of determining $u(x, t)$ and $k(t)$ functions in the one-dimensional integro-differential diffusion equation with the

initial- periodic boundary and overdetermination conditions. The unique solvability of the direct problem are proved. To investigate the solvability of the inverse problem, we first consider an auxiliary inverse boundary value problem, which is equivalent to the original one. Existence and uniqueness of the solution of the equivalent problem is proved using a contraction mapping. Finally, using the equivalency, the existence and uniqueness of classical solution is obtained.

REFERENCES

1. Sumit Sharma, Molecular Dynamics Simulation of Nanocomposites Using BIOVIA Materials Studio, Lammgs and Gromacs, Elsevier, p. 349, <https://doi.org/10.1016/C2017-0-04396-3>
2. I. Baglan, Determination of a coefficient in a quasilinear parabolic equation with periodic boundary condition, *Inverse Probl. Sci. and Eng.* (2014).2. 4. F. Kanca, The inverse coefficient problem of the heat equation with periodic boundary and integral overdetermination conditions, *J. In equal. and Appl.* (2013).
3. D. Durdiev, Zh. Zhumaev, Memory kernel reconstruction problems in the integro-differential equation of rigid heat conductor, *Mathematical Methods in the Applied Sciences*, Vol. 45, No. 14, 2022, pp. 8374-8388
4. A. Kilbas, *Integral equations: course of lectures*, Minsk: BSU, 2005. (In Russian)

A GENERALIZED (G'/G) - EXPANSION METHOD FOR THE LOADED NONLINEAR DEGASPERIS-PROCESI EQUATION

M.M.Khasanov¹, O.Y.Ganjaev¹, U.J.Shermetova²

¹*Urgench state university, Urgench, Uzbekistan,*

²*Academic lyceum of Urgench state university, Urgench, Uzbekistan*

hmuzaffar@mail.ru

This paper is dedicated to find the solutions of the equation of the loaded nonlinear Degasperis-Procesi equation. It is shown that (G'/G) - expansion method is one of the most effective way of finding the solutions.

differential equation.....	133
Fayziev Y.E., Dekhqonov K.T., Nosirov D.E., Makhmudov D.G'. On the inverse problem for a Boussinesq type time-fractional subdiffusion equations...	135
Fayziyev A.K. Inverse problem for Whitham type multi-dimensional differential equation with impulse effects.....	137
Guliyeva F.A. Bessel funksiyasining integral ko'rinishi.....	140
Ibragimov G.I., Tursunaliyev T.G. A linear evasion differential game of one evader and one pursuer.....	140
Ishankulov T., Mannonov M. Bir jinsli bo'lmagan polianalitik tenglama yechimini davom ettirish.....	143
Jovliyeva L. Kasr tartibli aralash tipdagi tenglamalarda manbaa funksiyasini topish bo'yicha teskari masalani yechish.....	146
Jumaev J.J. Solvability of inverse problem for integro-differential heat equation with periodic and integral conditions.....	147
Khasanov M.M., Ganjaev O.Y., Shermetova U.J. A generalized (G'/G) - expansion method for the loaded nonlinear Degasperis-Procesi equation	148
Mamanazarov A.O., Muxtorov D.Q. Umumlashgan Rosenau-Burger tenglamasi uchun chegaraviy masala yechimining mavjudligi haqida.....	150
Matchonov N.A. On the focusing nonlinear Schrödinger equation with non-zero boundary conditions and double poles.....	153
Merajova Sh., Bekjonov M., Zoirov A. Bir o'lchovli model integro-differensial issiqlik o'tkazuvchanlik tenglamasi uchun teskari masalani yechish.....	155
Merajova Sh.B. Integro-differensial model tenglamada yadroni aniqlash uchun teskari masala.....	157
Mirzayev B.R. Bir o'lchamli kasr tartibli diffuziya tenglamasidan manba funksiyasini aniqlash.....	159
Nishonova Sh., Mo'ydinjonova B. Elliptiko – giperbolik tipdagi tenglamalar	