



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



Buxoro - 2023

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

**FIZIKA, MATEMATIKA VA MEXANIKANING 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

Fizika, matematika va mexanikaning dolzarb muammolari (Xalqaro ilmiy-amaliy konfferensiya materiallari to‘plami, I qism) Buxoro-2023, 357 bet.

Mazkur to‘plam “Fizika, matematika va mexanikaning dolzarb muammolari” Xalqaro ilmiy-amaliy konferensiyasi materiallari to‘plami asosida tayyorlangan bo‘lib, matematik analiz, differensial tenglamalar va matematik fizika, algebra va geometriya, hisoblash matematikasi va mexanika, geolefizika va qayta tiklanuvchi energiya manbalari, kondensirlangan holatlar fizikasi, zamonaviy ta’limda raqamli texnologiyalar, ehtimollar nazariyasi va matematik statistika yo‘nalishlaridagi ilmiy ma’ruzalar o‘rin olgan.

To‘plamga kiritilgan maqola va tezislar mazmuni, ilmiyligi va dalillarining haqqoniyligi uchun mualliflar ma’suldirlar

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	

- [6]. Faddeev L.D., Takhtajan L.A. (1987) Hamiltonian Methods in the Theory of Solitons. Berlin: Springer.
- [7]. Prinari B., Ablowitz M.J., Biondini G. (2006) Inverse scattering transform for the vector nonlinear Schrödinger equation with non-vanishing boundary conditions. J. Math. Phys., 47, 063508.
- [8]. Biondini G., Kraus D.K. (2015) Inverse scattering transform for the defocusing Manakov system with nonzero boundary conditions. SIAM J. Math. Anal., 47, 607-757.
- [9]. Kraus D. K., Biondini G., Kovacic G. (2015) The focusing Manakov system with nonzero boundary conditions. Nonlinearity, 28, 3101-3151.
- [10]. Biondini G., Kovacic G. (2014) Inverse scattering transform for the focusing nonlinear Schrödinger equation with nonzero boundary conditions. J. Math. Phys., 55, 031506.

**BIR O'LCHOVLI MODEL INTEGRO-DIFFERENSIAL ISSIQLIK
O'TKAZUVCHANLIK TENGLAMASI UCHUN TESKARI MASALANI
YECHISH**

*Merajova Sh.B., Bekjonov M.M., Zoirov A.O.
Buxoro davlat universiteti, Buxoro, O'zbekiston
shsharipova@mail.ru*

Teskari va nokorrekt masalalar nazariyasi fanning deyarli barcha sohalarida, xususan, quyidagi kabi amaliy masalalarni hal qilishda keng qo'llaniladi:

- fizika (kvant mexanikasi, akustika, elektrodinamika va boshqalar);
- geofizika (seysmik razvedka, elektr qidiruvi, tortishish kuchi, magnit razvedka va boshqalar);
- tibbiyot (rentgen-tomografiya, NMR-tomografiya, ultratovush va boshqalar);
- ekologiya (havo, suv holatini diagnostikasi, kosmik monitoring va boshqalar);
- iqtisodiyot (optimal boshqaruv nazariyasi, moliyaviy matematika va boshqalar)

Hozirgi kunda teskari masalarni o'rganish dolzarb hisoblanadi [1,2,3]. Maqolada bir o'lchovli model integro-differensial issiqlik o'tkazuvchanlik tenglamasi uchun issiqlik manbalarini aniqlash haqida teskari masala qaralib, yechish usuli berildi.

Quyidagi masalani qaraylik:

$$\begin{cases} u_t - u_{xx} = \int_0^t K(\tau)u(x, (t - \tau))d\tau + f(x) & t \in (0, T] & (1) \\ u|_{t=0} = \varphi(x) & & (2) \\ u|_{x=0} = u|_{x=l} = 0 & & (3) \end{cases}$$

Masalani yechish uchun Furiye usulidan foydalanamiz [4], bu uhcun $u(x, t)$, $\varphi(x)$, $f(x)$ funksiyalarni xos funksiyalar bo'yicha qatorga yoyamiz:

$$u(x, t) = \sum_{n=1}^{\infty} u_n(t) \sin \frac{\pi n}{l} x, \quad (4)$$

$$\varphi(x) = \sum_{n=1}^{\infty} \varphi_n \sin \frac{\pi n}{l} x, \quad (5)$$

$$f(x) = \sum_{n=1}^{\infty} f_n \sin \frac{\pi n}{l} x. \quad (6)$$

(4), (6) ni (1) ga qo'yib quyidagi tenglamani hosil qilamiz:

$$u'_n(t) + \left(\frac{\pi n}{l}\right)^2 u_n(t) = \int_0^t K(\tau)u_n(t - \tau)d\tau + f_n.$$

Quyidagi belgilashlarni kiritamiz:

$$F(t) = \int_0^t K(\tau)u_n(t - \tau)d\tau + f_n. \quad (7)$$

Natijada issiqlik o'tkazuvchalik tenglamasiga qo'yilagan Koshi masalasini hosil qilamiz:

$$\begin{cases} u'_n(t) + (\lambda_n^2)u_n(t) = F(t) & (8) \\ u_n(0) = \varphi_n & (9) \end{cases}$$

(8),(9) masalaning yechimini quyidagi ko'rinishda olamiz:

$$u_n(t) = \int_0^t F(\tau) \cdot e^{-\lambda_n^2(t-\tau)}d\tau + \varphi_n e^{-\lambda_n^2 t}. \quad (10)$$

(7) belgilashni (10) keltirib qo'yamiz, bu yerda $\lambda_n = \frac{\pi n}{l}$. Hosil bo'lgan integral tenglamaning yechimi dastlabki tenglamaning yechimi bo'ladi

ADABIYOTLAR

1. Романов В.Г. Обратные задачи математической физики. Москва. "Наука" , 1984 г , 245 ст.
2. Дурдиев Д.К., Рашидов А.Ш. Обратная задача определения ядра в одном интегро-дифференциальном уравнении параболического типа// Дифференциальные уравнения. том 49, 2013 г.
3. D.K. Durdiev, J.J. Jumaev, Memory kernel reconstruction problems in the integro-differential equation of rigid heat conductor, Mathematical Methods in the Applied Sciences, 2020, DOI: 10.1002/mma.7133.
4. Durdiyev D. K. Merajova Sh. B. Inverse problem for an equation of mixed parabolic–hyperbolic type with a Bessel operator. в журнале // Journal of Applied and Industrial Mathematics. 2022 Год. № 16: 3 С. 394–402.

INTEGRO-DIFFERENTIAL MODEL TENGLAMADA YADRONI ANIQLASH UCHUN TESKARI MASALA

Merajova Sh.B.

Buxoro davlat universiteti, Buxoro, O'zbekiston

shsharipova@mail.ru

Ushbu ishda integro-differensial model parabolik tipdagi tenglamada yadroni aniqlash uchun teskari masala keltirilgan. Teskari masala no'malum funksiyani saqlovchi yordamchi masala yordamida o'rganilgan.

Hozirgi kunda teskari masalalarni o'rganish muhim ahamiyatga ega, chunki bunday masalalar hayotda o'zining amaliy tadbirini topayapti [1]. Ushbu maqolada biz integro-differensial model parabolik tipdagi tenglamada yadroni aniqlash uchun