

ISSN 2181-8622

Manufacturing technology problems



Scientific and Technical Journal Namangan Institute of Engineering and Technology

INDEX  COPERNICUS
INTERNATIONAL

**Volume 10
Issue 4
2025**



NamMTI ILMIY-TEXNIKA JURNALI TAHRIR HAY'ATI A'ZOLARI

Bosh muharrir: f-m.f.d., prof. O.O. Mamatkarimov

Bosh muharrir o'rinbosari: k.f.d., prof. O.K. Ergashev

TEXNIKA FANLARI (PAXTA, TO'QIMACHILIK VA YENGIL SANOAT)

- | | | |
|------------------------------|---|--|
| 1. Prof. Dr. Metin ÇOLAK | – | Ege Universiteti, Turkiya |
| 2. Prof. Dr. Suneel KATERIYA | – | Javoharlal Nehru Universiteti, Hindiston |
| 3. Prof. Dr. Muradov RUSTAM | – | Namangan To'qimachilik Sanoat Instituti |
| 4. Prof. Dr. Obidov AVAZBEK | – | Namangan Muhandislik-Texnologiya Instituti |
| 5. Prof. Dr. Maxkamov ANVAR | – | Namangan Muhandislik-Texnologiya Instituti |
| 6. Prof. Dr. Azizov SHUXRAT | – | Namangan Muhandislik-Texnologiya Instituti |
| 7. Dr. Qorabayev SHERZOD | – | Namangan Muhandislik-Texnologiya Instituti |

TEXNIKA FANLARI (QISHLOQ XO'JALIGI VA OZIQ-OVQAT TEXNOLOGIYALARI)

- | | | |
|------------------------------------|---|--|
| 1. Prof. Dr. Sakina BINTU ABDULLAH | – | Malaya Universiteti, Malayziya |
| 2. Prof. Dr. Abdalova GULISTAN | – | Taraz davlat universiteti, Qozog'iston |
| 3. Prof. Dr. Xudayberdiyev ABSALOM | – | Namangan muhandislik-texnologiya instituti |
| 4. Prof. Dr. Merganov AVAZXON | – | Namangan muhandislik-texnologiya instituti |
| 5. Prof. Dr. Sherquziyev DONIYOR | – | Namangan muhandislik-texnologiya instituti |
| 6. Prof. Dr. Qanoatov XAYRULLO | – | Namangan muhandislik-texnologiya instituti |
| 7. Prof. Dr. Mamatov SHERZOD | – | Toshkent shahridagi Vebster Universiteti |

TEXNIKA FANLARI (MEXANIKA VA MASHINASOZLIK)

- | | | |
|--|---|--|
| 1. Dr. Jaclyn SHARP | – | Pittsburg Universiteti, AQSH |
| 2. Prof. Dr. Aleksey KAZINSKY | – | Saratov davlat texnologiya universiteti, Rossiya |
| 3. Akad. Prof. Zaynobbiddinov SIROJIDDIN | – | Andijon Davlat Universiteti |
| 4. Prof. Dr. Usmanov PAZLITDIN | – | Namangan muhandislik-texnologiya instituti |
| 5. Prof. Dr. Matkarimov PAXRIDDIN | – | Namangan muhandislik-texnologiya instituti |
| 6. Prof. Dr. Sharibayev NOSIRJON | – | Namangan muhandislik-texnologiya instituti |
| 7. Prof. Dr. Erkaboyev ULUG'BEK | – | Namangan muhandislik-texnologiya instituti |

KIMYO FANLARI (KIMYO VA KIMYOVIY TEXNOLOGIYALAR)

- | | | |
|---------------------------------|---|---|
| 1. Prof. Dr. Abel SANTOS | – | Porto Universiteti, Portugaliya |
| 2. Prof. Dr. Junli YANG | – | Lanzhou kimyoviy fizika instituti, Xitoy |
| 3. Akad. Prof. Namazov ShaFOAT | – | O'zR FA Umumiy va Noorganik Kimyo instituti |
| 4. Prof. Dr. Botirov ERKIN | – | O'zR FA O'simlik Moddalar Kimyosi Instituti |
| 5. Prof. Dr. Akbarov HAMDAM | – | O'zbekiston Milliy Universiteti |
| 6. Prof. Dr. Nurmanov SUVANKUL | – | O'zbekiston Milliy Universiteti |
| 7. Prof. Dr. Salihanova DILNOZA | – | O'zR FA Umumiy va Noorganik Kimyo instituti |
| 8. Prof. Dr. Kattayev NURIDDIN | – | O'zbekiston Milliy Universiteti |
| 9. Prof. Dr. Sultonov PO'LATJON | – | Geologiya fanlari universiteti |

TA'LIMDA ILG'OR PEDAGOGIK TEXNOLOGIYALAR

- | | | |
|--------------------------------|---|--|
| 1. Prof. Dr. Paul TIKALSKY | – | Oklahoma Davlat Universiti, AQSH |
| 2. Dr. David Leffler | – | Liberty Universiteti, AQSH |
| 3. Prof. Dr. Wen-Jian ZHANG | – | Zhejiang Universiteti, China |
| 4. Prof. Ergashev SHARIBBOY | – | Namangan Muhandislik-Qurilish Instituti |
| 5. Prof. Dr. Musayev JAHONGIR | – | OFIV |
| 6. Prof. Dr. Eshbayeva ULBOSIN | – | Namangan Muhandislik-Texnologiya Instituti |
| 7. Prof. Dr. Xoshimova DILDORA | – | Namangan Muhandislik-Texnologiya Instituti |

IQTISODIYOT FANLARI

- | | | |
|----------------------------------|---|--|
| 1. Dr. Biral MERCAN | – | Necmettin Erbakan Universiteti, Turkiya |
| 2. Dr. Orsolya KATONA | – | Miskolc Universiteti, Vengriya |
| 3. Prof. Dr. Soliyev AHMADJON | – | Namangan Muhandislik-Texnologiya Instituti |
| 4. Prof. Dr. Saidboyev ShERMIRZA | – | Namangan Muhandislik-Texnologiya Instituti |
| 5. Prof. Matkarimov KAMOLIDDIN | – | Namangan Muhandislik-Texnologiya Instituti |
| 6. Dr. Bustonov MANSUR | – | Namangan Muhandislik-Texnologiya Instituti |
| 7. Dr. Rashidov RAKHMATILLA | – | Namangan Muhandislik-Texnologiya Instituti |

Muharrirlar guruhi

O. Kazakov, B. Xolmirzayev, A. Mirzaev, Sh. Maksudov,
A. Tursunov, O. R. Qodirov (mas'ul muharrir)



**EDITORIAL BOARD OF SCIENTIFIC AND TECHNICAL JOURNAL OF NAMANGAN
INSTITUTE OF ENGINEERING AND TECHNOLOGY**

Chief Editor: Prof. Dr. O.O.Mamatkarimov

Deputy Editor-in-chief: Prof. Dr. O.K. Ergashev

TECHNICAL SCIENCES (COTTON, TEXTILE AND LIGHT INDUSTRY)

- | | | |
|------------------------------|---|---|
| 1. Prof. Dr. Metin ÇOLAK | – | <i>Ege University, Turkey</i> |
| 2. Prof. Dr. Suneel KATERIYA | – | <i>Jawaharlal Nehru University, India</i> |
| 3. Prof. Dr. Muradov RUSTAM | – | <i>Namangan Institute of Textile Industry</i> |
| 4. Prof. Dr. Obidov AVAZBEK | – | <i>Namangan Institute of Engineering and Technology</i> |
| 5. Prof. Dr. Makhamov ANVAR | – | <i>Namangan Institute of Engineering and Technology</i> |
| 6. Prof. Dr. Azizov SHUXRAT | – | <i>Namangan Institute of Engineering and Technology</i> |
| 7. Dr. Korabaev SHERZOD | – | <i>Namangan Institute of Engineering and Technology</i> |

TECHNICAL SCIENCES (AGRICULTURE AND FOOD TECHNOLOGIES)

- | | | |
|------------------------------------|---|---|
| 1. Prof. Dr. Sakina BINTU ABDULLAH | – | <i>Malaya University, Malaysia</i> |
| 2. Prof. Dr. Abdalova GULISTAN | – | <i>Taraz State University, Kazakhstan</i> |
| 3. Prof. Dr. Xudayberdiyev ABSALOM | – | <i>Namangan Institute of Engineering and Technology</i> |
| 4. Prof. Dr. Merganov AVAZXON | – | <i>Namangan Institute of Engineering and Technology</i> |
| 5. Prof. Dr. Sherkuziyev DONIYOR | – | <i>Namangan Institute of Engineering and Technology</i> |
| 6. Prof. Dr. Kanoatov XAYRULLO | – | <i>Namangan Institute of Engineering and Technology</i> |
| 7. Prof. Dr. Mamatov SHERZOD | – | <i>Webster University in Toshkent</i> |

TECHNICAL SCIENCES (MECHANICS AND MECHANICAL ENGINEERING)

- | | | |
|---|---|---|
| 1. Dr. Jaclyn SHARP | – | <i>Pittsburg University, USA</i> |
| 2. Prof. Dr. Aleksey KAZINSKY | – | <i>Saratov State Technical University, Russia</i> |
| 3. Acad. Prof. Zaynobiddinov SIROJIDDIN | – | <i>Andijan State University</i> |
| 4. Prof. Dr. Usmanov PAZLITDIN | – | <i>Namangan Institute of Engineering and Technology</i> |
| 5. Prof. Dr. Matkarimov PAXRIDDIN | – | <i>Namangan Institute of Engineering and Technology</i> |
| 6. Prof. Dr. Sharibaev NOSIRJON | – | <i>Namangan Institute of Engineering and Technology</i> |
| 7. Prof. Dr. Erkaboiev ULUGBEK | – | <i>Namangan Institute of Engineering and Technology</i> |

CHEMICAL SCIENCES (CHEMISTRY AND CHEMICAL TECHNOLOGIES)

- | | | |
|---------------------------------|---|---|
| 1. Prof. Dr. Abel SANTOS | – | <i>Porto University, Portugal</i> |
| 2. Prof. Dr. Junli YANG | – | <i>Lanzhou Institute of Chemical Physics, China</i> |
| 3. Akad. Prof. Namazov ShaFOAT | – | <i>Institute of General and Inorganic Chemistry of the ASRU</i> |
| 4. Prof. Dr. Botirov ERKIN | – | <i>Institute of Chemistry of Plant Substances of the ASRU</i> |
| 5. Prof. Dr. Akbarov HAMDAM | – | <i>National University of Uzbekistan</i> |
| 6. Prof. Dr. Nurmanov SUVANKUL | – | <i>National University of Uzbekistan</i> |
| 7. Prof. Dr. Salihanova DILNOZA | – | <i>Institute of General and Inorganic Chemistry of the ASRU</i> |
| 8. Prof. Dr. Kattaev NURIDDIN | – | <i>National University of Uzbekistan</i> |
| 9. Prof. Dr. Sultonov POLATJON | – | <i>University of Geological Sciences</i> |

TA'LIMDA ILG'OR PEDAGOGIK TEXNOLOGIYALAR

- | | | |
|--------------------------------|---|---|
| 1. Prof. Dr. Paul TIKALSKY | – | <i>Oklahoma State University, USA</i> |
| 2. Dr. David Leffler | – | <i>Liberty University, USA</i> |
| 3. Prof. Dr. Wen-Jian ZHANG | – | <i>Zhejiang University, China</i> |
| 4. Prof. Ergashev ShARIBBOY | – | <i>Namangan Institute of Engineering and Construction</i> |
| 5. Prof. Dr. Musaev JAHONGIR | – | <i>MHESIRU</i> |
| 6. Prof. Dr. Eshbaeva ULBOSIN | – | <i>Namangan Institute of Engineering and Technology</i> |
| 7. Prof. Dr. Xoshimova DILDORA | – | <i>Namangan Institute of Engineering and Technology</i> |

IQTISODIYOT FANLARI

- | | | |
|---------------------------------|---|---|
| 1. Dr. Biral MERCAN | – | <i>Necmettin Erbakan University, Turkey</i> |
| 2. Dr. Orsolya KATONA | – | <i>Miskolc University, Hungary</i> |
| 3. Prof. Dr. Soliev AHMADJON | – | <i>Namangan Institute of Engineering and Technology</i> |
| 4. Prof. Dr. Saidboev SHERMIRZA | – | <i>Namangan Institute of Engineering and Technology</i> |
| 5. Prof. Matkarimov KAMOLIDDIN | – | <i>Namangan Institute of Engineering and Technology</i> |
| 6. Dr. Bustonov MANSUR | – | <i>Namangan Institute of Engineering and Technology</i> |
| 7. Dr. Rashidov RAKHMATILLA | – | <i>Namangan Institute of Engineering and Technology</i> |

Editorial team

O. Kazakov, B. Xolmirezayev, A. Mirzaev, Sh. Mahsudov,
A. Tursunov, O. Kodirov (Executive editor)



THEORETICAL STUDY AND CHARACTERISTICS OF YARNS IN THE PRODUCTION OF CIRCULAR KNIT FABRICS

SOLIYEV AZIZBEK

Associate Professor, Namangan State Technical University, Namangan, Uzbekistan

Phone.: (0588) 860-5656, e-mail.: azizbek_0789@mail.ru

Abstract: The article analyzes the properties of yarns used in circular knit fabrics, which are currently in high demand, as well as the research conducted by scientists in this field. Based on these analyses, conclusions were drawn regarding the investigation of the deformational properties of yarns for the production of circular knit fabrics and the mathematical modeling of yarn as a solid body.

Keywords: loop, yarn, deformation, model, dynamics, force, discrete.

Introduction. Globally, the textile industry is one of the fastest-growing sectors, with modern technologies being implemented across various branches of the industry. Particular attention is paid to improving product quality indicators and producing competitive products in new assortments through the introduction of nanotechnology, artificial intelligence, high-precision equipment, and the latest advances in electronics.

In our country, extensive efforts are being made to rapidly develop the textile industry, expand the range of produced finished and semi-finished products, implement new innovative technologies, and enhance the export potential of textile enterprises.

In the textile industry, improving product quality is closely associated with the optimization of technological processes. In particular, the deformational properties of yarns and fabrics during the knitting process are key factors that determine process efficiency and the quality of the final product. These deformational properties vary at different stages of the technological process and manifest through parameters such as yarn flexibility, elongation, and elasticity during knitting. Consequently, they affect the strength, appearance, and usability of the product [1].

In our study, we investigate the deformational behavior of yarns used in circular knit products, which currently constitute a significant portion of domestically produced and export-oriented goods. These products include various towels, table linens, upholstery for furniture, decorative items, robes, and similar items.

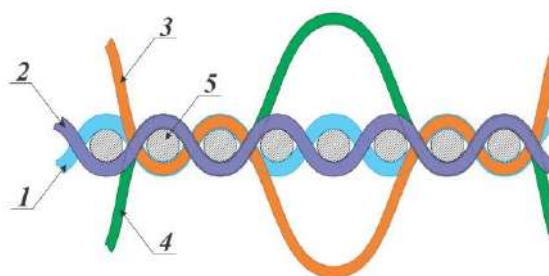


Figure 1. Arrangement of yarns in circular knit fabric: 1, 2 – ground pile yarns; 3, 4 – loop pile yarns; 5 – guide yarns.

Circular knit fabric is formed as a result of the interlacing of ground, pile, and guide yarns (Figure 1). Circular knit fabrics can generally be single- or double-knit and may feature patterns on the fabric surface (Figure 2).



Figure 2. Circular knit fabric and products

The development of the global textile industry has been studied over the years through scientific research. However, the increasing use of towels and circular knit fabrics in daily life indicates that several challenges remain in this area.

The knitting process is a complex procedure in which pile and guide yarns are interlaced under controlled tension to create a stable fabric structure.

Knitting machines operate under complex mechanical dynamics, where yarn tension plays a crucial role in determining fabric quality, machine efficiency, and operational stability. Understanding how yarns deform under tension is essential for controlling the properties of the knitted fabrics.

The properties and performance of pile fabrics are largely determined by the characteristics of the yarn. Different technologies used in yarn production result in various fiber compositions, allowing for the manufacture of different types of yarns. Additionally, other methods are employed to modify yarn structure, which can positively influence the properties and usability of pile fabrics. These technological processes include alterations in pile density, capillarity, and fiber volume.

The use of mathematical models to predict yarn deformation behavior and its response to process conditions has demonstrated significant potential for reducing product defects and optimizing technological processes. At the same time, the physical and mechanical properties of yarns used in the production of pile fabrics—particularly the dependence of yarn stiffness coefficients on their testing lengths—remain insufficiently studied. This issue affects critical aspects such as needle bed dimensions, pile yarn tension in knitting machines, and the optimization of knitting parameters.

Deformation is the change in shape and size of a body under the influence of external forces. It can be elastic or plastic: if the deformation disappears after the external force is removed (the body returns to its original state), it is elastic deformation; if it

remains (the body does not return to its original state), it is plastic deformation. Types of deformation include tension, compression, bending, and twisting (Figure 3).

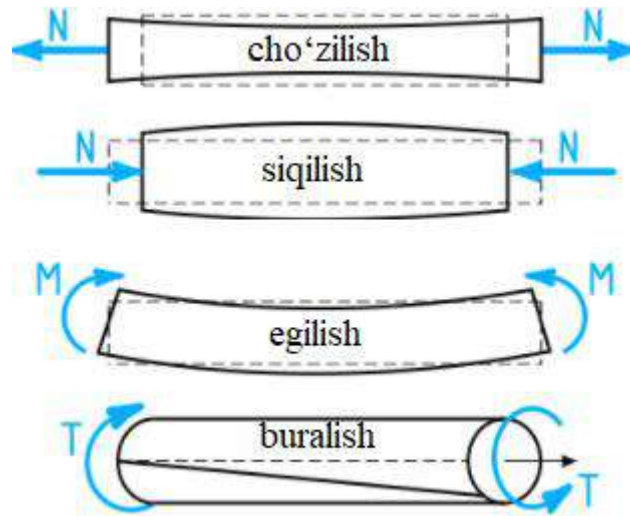


Figure 3. Types of deformation: tension, compression, bending, and twisting

Researchers studying polyester and cotton yarns under various tension levels have identified elastic deformation, emphasizing the linear stress–strain relationship within the elastic limit [2].

According to studies on the plastic deformation of high-strength synthetic yarns [3], relative stresses exceeding 70% of the ultimate strength led to plastic deformation. These investigations provided fundamental insights into the plastic deformation behavior of synthetic yarns. Determining the threshold of relative strength for deformation was found to be of significant importance.

Rahman and other researchers [4] analyzed the effects of moisture and temperature variations on the elastic and plastic deformation of cotton and silk yarns. They recommended adjusting environmental conditions to minimize deformation inconsistencies. The studies identified the influence of humidity and temperature on both elastic and plastic deformations in fibers.

Researchers examining the deformation behavior of blended yarns found that polyester–cotton blends exhibited improved elastic recovery compared to pure cotton yarns [5].

In the study of fabric formation, several investigations have explored the use of artificial intelligence to analyze yarn properties. These include: “A Geometric Feature Set-Based Neural Network for Classifying Textile Defects” [6], “Assessment of Knitted Fabric Properties Using Artificial Neural Networks” [7], and “Application of Artificial Neural Networks (ANN) to Predict Thermal Resistance of Knitted Fabrics at Various Humidity Levels” [8].

Cotton yarns are doubled with fine polyvinyl acetate (vinyl acetate or polyvinyl alcohol complex ester and acetic acid polymer) (PVA) filaments or yarns. The primary reason for using such yarns without introducing twists is to provide pile fabrics with

softness and high water absorption properties. For the production of these yarns, cotton yarns are combined with PVA filaments or very fine PVA yarns. The applied twist is in the opposite direction to that of the single yarn, which untwists the main yarn and aligns the fibers nearly parallel to each other. The PVA component envelops the untwisted main yarn, providing the necessary tension. This tension is required during the knitting of the fabrics [9].

Considering the knitting process of textile fabrics, researchers [44] investigated yarn-to-yarn friction through analytical modeling and experimental validation. They identified that friction between twisted yarns, if excessive, can significantly affect the mechanical properties of reinforced composites, potentially degrading the performance of the reinforcing fibers. This makes the control of yarn friction a critical issue in the production of fabric reinforcing elements.

Abdulloh al-Farruhi has conducted scientific research focused on pile fabrics, which are increasingly in demand, examining the effects of chemical processes applied during production on the properties of the fabrics.

He highlights that in the modern textile industry, various methods are being implemented to enhance the water absorption and softness of pile fabrics. According to his conclusions, the softness of pile fabrics largely depends on the softness of the pile yarns, which in turn is influenced by two main factors: the type and characteristics of the fiber, and the number of twists in the yarn. These factors are identified as key determinants directly affecting the functional properties of pile fabrics. Furthermore, the study notes that reducing the number of twists in the pile yarns increases the water absorption and softness of pile towels [11].

In recent years, the development of science has been closely linked to computerization, which provides an objective basis for the advancement of discrete methods in mathematics and mechanics. A review of recent literature [12–21] supports the use of practical modeling of systems and processes, deformable solid mechanics, and structural mechanics via discrete modeling, establishing it as an independent direction in science.

However, in yarn mechanics theory, studies dedicated to discrete modeling are very limited. When attempting to solve such problems using computer methods, any task ultimately needs to be reduced to a discrete form.

The construction of a discrete model primarily involves two steps: first, replacing the continuous yarn with a structure composed of discrete elements, and second, describing the interactions between these discrete elements. As a result of this description, the differential equations that characterize the interactions within an infinitely small continuous filament are replaced by algebraic equations for elements of finite size.

Regardless of the chosen numerical method, constructing the discrete structure of a yarn begins with representing the real continuous yarn as a collection of interconnected discrete elements. The resulting sampled structure should geometrically resemble the

actual yarn. Additionally, the model must account for the physical and mathematical properties of the yarn's constituent components.

In general, the discrete structure only approximately reflects, that is, models, the behavior of a continuous yarn.

We assume a yarn capable of deformation under tension, bending, and twisting, possessing a spatial configuration in equilibrium or in a stationary contour under the action of external forces.

In considering yarn dynamics, the deformation properties are taken into account by accumulating internal forces at the spherical joints connecting the discrete elements of the yarn. Modeling the behavior of the discrete yarn under external loads is divided into two levels: macro and micro. At the macro level, the model should reflect the physical response of the entire yarn structure to the applied forces and moments, i.e., it should capture the change in shape and volume under deformation and determine the interconnections between individual discrete elements. At the micro level, the model should determine the internal response of the discrete structural elements to external forces. Physically, this means that the micro-level model defines the stress-strain relationships and the rheological properties of the yarn.

To visually demonstrate the physics of deformation in a discrete yarn structure, Figure 4 presents the classification of macro-level models. Representing the deformation model of transverse entanglements in a figure is challenging because it must depict dependent and normally sheared interactions, which are defined mathematically in the deformation description.

At the macro level, the deformation and shape of the entire yarn segment involved in the simulated technological process are determined as a set of elementary deformation changes of the discrete filament elements relative to each other, which are identified at the micro level.

Deformation	Analog	Model
Stretching		
Bending		
Twisting		
Compression		

Figure 4. Classification of deformation models at the macro level

In technological process models, a yarn may simultaneously be subjected to external longitudinal and transverse forces, as well as bending and torsional moments. This leads to complex deformation behavior of the yarn.

According to [22], the relationship between stress intensity, bending and torsional strain for yarn models subjected to complex deformation at each point of the yarn cross-section is the same as the corresponding stress-strain relationships for simple stretching, bending and torsion. This provides a basis for introducing assumptions in yarn technological models that deformations are independent of complex loading of the yarn.

References

1. Абдужаббаров М.З. Paxta tolasidan ip yigirish va ulardan mato to'qish texnologik jarayonlarida ularning cho'ziluvchanlik xossalari o'zgarishini tadqiq etish // техн.фан.фалс.докт.дисс. НамТСИ, Наманган. 2025 й
2. Chidambaram, A., et al. (2022). *Elastic deformation of yarns in weaving: A comparative study*. Journal of Textile Research, 45(2), 123-135.
3. Ali, S., et al. (2020). *Plastic deformation in synthetic yarns: Causes and consequences*. Textile Science and Engineering, 37(4), 312-324.
4. Rahman, T., et al. (2020). *Environmental effects on yarn deformation in weaving*. Textile Chemistry and Physics, 19(6), 567-580.
5. Miller, R., et al. (2023). *Deformation properties of blended yarns in modern looms*. Fabric Science Journal, 14(7), 98-115.
6. Habib M, Rokonzaman M (2012) A set of geometric features for neural network-based textile defect classification. Int Schol Res Notices 2012
7. Türker E (2017) A research on estimation of the weave fabric properties with the artificial neural networks. Text Apparel 27(1):10–21
8. Kanat ZE, Özdil N (2018) Application of artificial neural network (ANN) for the prediction of thermal resistance of knitted fabrics at different moisture content. J Text Inst 109(9):1247–1253
9. Долимов А. С. Сузда эрийдиган иплардан фойдаланган ҳолда халқа тукли тўқималарни ишлаб чиқаришнинг технологик жараёнини мақбуллаштириш // техн.фан.фалс.докт.дисс. НамТСИ, Наманган. 2023й
10. Wang, Y., Jiao, Y. & Wang, P. Yarn/Yarn Friction Analysis Considering the Weaving Process of Textile Fabrics: Analytical Model and Experimental Validation. Tribol Lett 71, 91 (2023).
11. Md. Abdullah Al Faruque Terry towel in Bangladesh European Scientific Journal January 2015 edition vol.11, No.3
12. Арайс Б. А., Дмитриев В.М. Автоматизация моделирования многосвязных механических систем. - М.; Машиностроение, 1987.
13. Бенерджи П., Баттерфилд Р. Методы граничных элементов в прикладных науках. - М.: Мир, 1984.
14. Бреббия К., Уокер С. Применение метода граничных элементов в технике. - М.: Мир, 1982.

15. Математическое моделирование. / Под ред. Дж. Эндрюса Р. МакЛоуна -М.:Мир, 1979
16. Мигушов И. И. Механика текстильной нити и ткани. - М.: Легкая индустрия, 1980
17. Мигушов И.И. Обобщенная теория и основные вопросы приложения механики текстильной нити и ткани.: Дис... док. техн. наук.-Кострома; КТИ, 1981
18. Мигушов И. И. Плоское движение упругой на изгиб нити // Изв. вузов. Технология текстильной промышленности. - 1967. - № 3. - С. 138-142.
19. Мигушов И. И. Определение характеристик нелинейной зависимости напряжение - деформация при динамическом растяжении текстильных нитей // Изв. вузов. Технология текстильной промышленности. - 1977.- № 2, - С. 11-15
20. Мигушов И. И., Кутузова И. Е. Метод определения характеристик изгибной жесткости текстильных и других материалов. // Изв. вузов. Технология текстильной промышленности. - 1988. - № 5. - С. 8-11.
21. Раус Э. Динамика системы твердых тел: В 2-х томах. - М.: Наука, 1983.
22. Щербаков В. П. Расчет прочности пряжи с применением теории упругости анизотропного тела // Изв. вузов. Технология текстильной промышленности. - 1990, № 6. С.13-16.

C O N T E N T S

TECHNICAL SCIENCES: COTTON, TEXTILE AND LIGHT INDUSTRY

Saloxiddinova M.	3
Improving the separator design to prevent cotton fiber loss.	
Juraeva G.	9
Optimizing cotton fiber quality during the production process.	
Mamadaliyev F.	16
Analysis of problem in the aerodynamic system of cottonseed linting equipment in cotton processing plants.	
Kozokov S.	23
Conducting experiments with newly designed saw gin ribs in the cotton cleaning process for different cotton varieties.	
Usmonov I., Abdullajonov S.	30
Methods and results for determining the parameters and operating modes of irradiating watermelon seeds with ultraviolet rays.	
Majidov A.	36
Theoretical foundations of the technological parameters of a straight-flow fiber separation device.	
Rahmatova S.	44
Scientific approach to considering properties in the design of garments made from knitted fabrics.	
Rahmatova S.	48
Technology for obtaining knitted fabrics from various raw materials.	
Turaboyev G.	54
Methodology for determining the tribotechnical properties of structural materials interacting with raw cotton.	

TECHNICAL SCIENCES: AGRICULTURE AND FOOD TECHNOLOGIES

Khurmamatov A., Boyturayev S.	58
Results of industrial water treatment from mechanical impurities.	
Khurmamatov A., Alimardonov Kh., Akhmedova K.	65
Two-stage installation for deep air purification from fine-dispersed solid particles.	
Mamatusmonova D., Mamatov Sh.	73
Technical characteristics of the use of vibrating conveyors for drying rosa caninas.	
Toshboyeva S., Dadamirzayev M.	79
Physicochemical properties of a functional sauce for fish canned products.	

Saribayeva D., Maxmudova D.	
Study of protein–lipid composition in food products.	83
Gulomkhojaeva N., Zokirova M.	
Study of polyphenolic compounds in jujube (<i>Ziziphus jujuba</i> mill.) grown in Uzbekistan.	88
Gulomkhojaeva N., Zokirova M.	
Investigation of the amino acid composition in black and white mulberry (<i>Morus nigra</i> l. and <i>Morus multicaulis</i> perr.) varieties.	94
Kadirov A., Vokosov Z.	
New technology for growing microorganisms of the bacillus sp, rhizobium sp, azotobacter sp.	101
Rakhimova G.	
Development of an effective technology for producing soy milk from local soy raw materials, studying its composition and physical and chemical properties	107

CHEMICAL SCIENCES

Khabibullaev J., Shomurotov Sh.	
Oxidation of various cellulose containing materials using the $\text{HNO}_3/\text{H}_3\text{PO}_4\text{-NaNO}_2$ system.	112
Nuritdinov A., Abdullaev O.	
Technical parameters and energy efficiency of an oil sludge processing unit	122
Okhundadaev A.	
Study of the effect of various factors on the synthesis of vinyl esters of wine acids	127
Usmonova Z.	
Effectiveness analysis of thermally and steam activated plum seed adsorbents	133
Kaxarova M.	
Technological scheme for extracting naphthalene from pyrolysis oil by the extraction (phase separation) method	139
Oribzhonov M., Bektemirov A., Arislanov A., Azizov V.	
Method for producing biosuperphosphate fertilizers containing humic compounds	143
Erkinov R., Soliyev M., Arislanov A.	
Synthesis of sulfur containing organic compounds by reaction of thiol-en and thiol-in	151
Yusupov M., Nuritdinov A.	
Elemental analysis of carboxyl-modified copper phthalocyanine pigment	156

Nuritdinov A.
Thermal analysis of carboxyl-modified cobalt and calcium metal phthalocyanine pigments 162

Isakov B.
Development and study of an anti-caking additive to improve the physico-mechanical properties of ammonium nitrate 168

TECHNICAL SCIENCES: MECHANICS AND MECHANICAL ENGINEERING

Gulamova D., Bobokulov S., Eshonkulov E.
Resistance and voltage anomalies above 200k bscco synthesized by solar technology 173

Kutbidinov O., Abdullabekov D., Usmonov D., Xushbakov M.
Analytical and experimental model for assessing the depreciation rate of transformer oil based on physicochemical factors 182

Obidov A., Abdurasulov A.
Basis of implementation of resource-effective shaft production 188

Utaev S.
Calculation of oil change intervals in diesel-based gas engines 193

Isomiddinov A.
Derivation of differential equations for spindle oscillation in a system of rectangular coordinates 200

Dedakhanov A.
Determination of fuel consumption for drying cotton raw materials 209

Atambaev D.
Difference of the individual yarns in the composition of a wrapped yar on the quality of the yar and determination of acceptable values of the main factors affecting their production 215

Rokhmonov D., Sulaymonov J.
Development of a control algorithm for a smart irrigation system based on soil moisture and meteorological data 224

Mamakhonov A., Khikmatillaev I.
Modeling of a vibratory cleaning device with cosinoidal and sinusoidal shapes in matching the longitudinal and transverse cutting surface 227

Soliyev A.
Theoretical study and characteristics of yarns in the production of circular knit fabrics 239

Nomanov M.

With improved blade mixer results of research work on the development of the 5lp linter **246**

Lastochkin P.

The influence of carding parameters optimization on the useful time coefficient of a rotor spinning machine **259**

Mirzaakbarov A.

Improving the efficiency of the ginning process to enhance fiber quality **260**

ADVANCED PEDAGOGICAL TECHNOLOGIES IN EDUCATION

Abdumanonov A.

Enhancing the methodology for applying intelligent control systems in the teaching of technical sciences **265**

Makhmudov Z.

Increasing students' activity and knowledge level using test assignments **271**

ECONOMICAL SCIENCES

Sarimsakov B., Mirzabdullayev R.

The role of contemporary HR technologies in improving business performance **275**
