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## СРАВНИТЕЛЬНОЕ ИССЛЕДОВАНИЕ МАТЕМАТИЧЕСКОЙ ТЕРМИНОЛОГИИ В УЗБЕКСКОМ И АНГЛИЙСКОМ ЯЗЫКАХ

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**Аннотация.** Математическая терминология представляет собой одну из наиболее систематизированных и универсальных лексических областей в языках мира. Несмотря на универсальный характер математики как научной дисциплины, математические термины демонстрируют языково-специфические семантические, морфологические и культурные особенности. В данном исследовании проводится сравнительный анализ математической терминологии в узбекском и английском языках с лингвосемантической и лингвокультурной точек зрения.

В работе рассматриваются историческое развитие математических терминов, их словообразовательные механизмы, семантическая классификация, метафорические основы и культурная концептуализация числовых категорий. В исследовании применяются сравнительно-типологический анализ, компонентный анализ, когнитивно-семантическая интерпретация и элементы корпусного наблюдения.

Полученные результаты показывают, что, несмотря на общие интернациональные корни (прежде всего греко-латинского происхождения), узбекская математическая терминология характеризуется более высокой словообразовательной продуктивностью и семантической адаптацией, тогда как английская терминология отражает более высокий уровень международной стандартизации. Кроме того, культурная концептуализация чисел различается в их переносном употреблении, особенно в пословицах, идиомах и фольклоре.

Исследование вносит вклад в теорию терминологии, сопоставительное языкознание и переводоведение.

Ключевые слова: математическая терминология, сравнительная лингвистика, узбекский язык, английский язык, лингвосемантика, лингвокультурный анализ, словообразование, терминоведение.

## A COMPARATIVE STUDY OF MATHEMATICAL TERMINOLOGY IN UZBEK AND ENGLISH

**Abstract.** Mathematical terminology represents one of the most systematized and universal lexical domains in world languages. Despite the universal nature of mathematics as

a scientific discipline, mathematical terms demonstrate language-specific semantic, morphological, and cultural characteristics. This study provides a comparative analysis of mathematical terminology in Uzbek and English from linguosemantic and linguocultural perspectives. The research investigates the historical development of mathematical terms, their derivational mechanisms, semantic classifications, metaphorical foundations, and cultural conceptualization of numerical categories. The study employs comparative-typological analysis, componential analysis, cognitive-semantic interpretation, and elements of corpus-based observation. The findings reveal that while mathematical terminology in both languages shares international roots, particularly Greco-Latin sources, Uzbek terminology demonstrates stronger derivational productivity and semantic adaptation, whereas English terminology reflects greater international standardization. Additionally, the cultural conceptualization of numbers differs in figurative usage, particularly in proverbs, idioms, and folklore. The study contributes to terminology theory, contrastive linguistics, and translation studies.

**Keywords:** mathematical terminology, comparative linguistics, Uzbek language, English language, linguosemantics, linguocultural analysis, derivation, terminology studies

## O‘ZBEK VA INGLIZ TILLARIDA MATEMATIK TERMINOLOGIYANING QIYOSIY TADQIQI

**Annotatsiya.** Matematik terminologiya jahon tillaridagi eng tizimlashtirilgan va universal leksik sohalardan biri hisoblanadi. Matematika fan sifatida universal xususiyatga ega bo‘lishiga qaramay, matematik terminlar har bir tilga xos semantik, morfologik va madaniy xususiyatlarni namoyon etadi. Mazkur tadqiqotda o‘zbek va ingliz tillaridagi matematik terminologiya lingvosemantik hamda lingvomadaniy nuqtayi nazardan qiyosiy tahlil qilinadi.

Tadqiqot matematik terminlarning tarixiy rivojlanishi, ularning so‘z yasaliş mexanizmlari, semantik tasnifi, metaforik asoslari va son kategoriyalarining madaniy konseptualizatsiyasini o‘rganishga qaratilgan. Ishda qiyosiy-tipologik tahlil, komponent tahlil, kognitiv-semantik interpretatsiya hamda korpus kuzatuv elementlaridan foydalanilgan.

Natijalar shuni ko‘rsatadiki, har ikki tildagi matematik terminologiya, ayniqsa grek-lotin manbalariga borib taqaluvchi xalqaro ildizlarga ega bo‘lsa-da, o‘zbek terminologiyasi yuqori darajadagi so‘z yasaliş mahsuldorligi va semantik moslashuvchanligi bilan ajralib turadi, ingliz terminologiyasi esa xalqaro standartlashuv darajasining yuqoriligi bilan tavsiflanadi. Bundan tashqari, sonlarning madaniy konseptualizatsiyasi ko‘chma ma’nodagi qo‘llanishda, xususan maqollar, iboralar va folklorda farqlanadi.

Tadqiqot terminologiya nazariyasi, qiyosiy tilshunoslik hamda tarjimashunoslik rivojiga hissa qo‘shadi.

**Kalit so‘zlar:** matematik terminologiya, qiyosiy tilshunoslik, o‘zbek tili, ingliz tili, lingvosemantika, lingvomadaniy tahlil, so‘z yasaliş, terminshunoslik.

### 1. Introduction

In the context of globalization and intensified scientific communication, terminology plays a crucial role in knowledge transmission. Mathematics, as one of the most universal scientific systems, operates through a standardized symbolic and terminological framework. However, although mathematical symbols are internationally shared, the verbal representation of mathematical concepts varies across languages.

English functions as the dominant global language of science, influencing terminological systems worldwide. Uzbek, as a Turkic language with a rich historical background influenced by Arabic, Persian, Russian, and more recently English, presents a unique case for terminological development.

The comparative analysis of mathematical terminology in Uzbek and English is relevant for several reasons:

- understanding cross-linguistic equivalence and translation challenges;
- identifying derivational and morphological patterns;
- analyzing conceptual differences in numerical cognition;
- exploring the linguocultural embedding of mathematical terms.

This study aims to examine mathematical terminology in Uzbek and English from linguosemantic and linguocultural perspectives.

## 2. Theoretical Background

### 2.1 Terminology as a Linguistic Discipline

Terminology studies the system of terms used in specialized fields of knowledge. A term is defined as a lexical unit that precisely denotes a scientific concept within a specific domain. Unlike general vocabulary, terms aim at:

- unambiguity,
- systematic organization,
- conceptual precision,
- contextual stability.

Modern terminology theory intersects with cognitive linguistics, sociolinguistics, and discourse analysis, recognizing that terms are not purely neutral labels but conceptual units embedded in cultural and linguistic systems.

### 2.2 Mathematical Terminology as a Universal and Language-Specific System

Mathematics is often regarded as a universal language due to its symbolic system. However, the lexical realization of mathematical concepts is language-bound.

For example:

Concept	English	Uzbek
Addition	addition	qo‘shish
Subtraction	subtraction	ayirish
Root	root	ildiz
Equation	equation	tenglama

Although the conceptual content is identical, the linguistic forms reveal structural and semantic differences.

## 3. Historical Development of Mathematical Terminology

### 3.1 English Mathematical Terminology

English mathematical terminology largely originates from Greek and Latin:

- geometry (Greek: geo – earth, metria – measurement)
- algebra (Arabic origin via Latin)
- radius (Latin)
- formula (Latin)

The Renaissance period significantly expanded scientific vocabulary through Latin borrowings. Later, English became a source language for scientific terminology globally.

English mathematical terms tend to maintain their classical morphology and exhibit nominalization patterns (integration, differentiation, multiplication).

### 3.2 Uzbek Mathematical Terminology

Uzbek mathematical terminology developed through several historical stages:

1. Arabic-Persian scholarly influence
  - hisob (calculation)
  - algebra
  - kasr (fraction)
2. Russian-mediated internationalisms
  - integral
  - differensial
  - logarifm
3. National derivational formations
  - ko‘paytuvchi (multiplier)
  - bo‘luvchi (divisor)
  - yig‘indi (sum)
4. Modern English influence
  - parametr
  - modul

Uzbek demonstrates productive internal word formation mechanisms, especially suffixation.

## 4. Semantic Classification of Mathematical Terms

Mathematical terminology can be classified semantically into three primary groups:

### 4.1 Quantity-Denoting Terms

These include numerical and quantitative concepts:

- number / son
- integer / butun son
- fraction / kasr
- irrational number / irratsional son

These terms are abstract and universally conceptualized.

### 4.2 Sign-Denoting Terms

These express relational or qualitative properties:

- positive / musbat
- negative / manfiy

- equal / teng
  - greater than / katta
- Although symbols (+, −, =) are universal, their lexical encoding reflects linguistic structures.

### 4.3 Process-Denoting Terms

These refer to mathematical operations:

English	Uzbek
addition	qo‘shish
multiplication	ko‘paytirish
division	bo‘lish
integration	integrallash

English favors nominalized forms (-tion), whereas Uzbek frequently employs verbal derivation (-ish, -lash).

## 5. Morphological and Derivational Analysis

### 5.1 Derivation in English

English commonly forms mathematical terms through:

- nominalization: integrate → integration
- compounding: polynomial, midpoint
- affixation: inequality

Derivational transparency varies depending on classical roots.

### 5.2 Derivation in Uzbek

Uzbek uses agglutinative morphology:

- ko‘payt + ir + ish → ko‘paytirish
- bo‘l + uvchi → bo‘luvchi
- teng + lama → tenglama

Suffixation is highly productive and systematic.

Comparatively, Uzbek shows greater morphological transparency due to agglutination.

## 6. Metaphorical Foundations of Mathematical Terms

Despite their technical nature, many mathematical terms originate from metaphor.

Examples:

Concept	English	Uzbek	Literal Meaning
Root	root	ildiz	plant root
Field	field	maydon	physical area
Line	line	chiziq	drawn stroke

These metaphors reflect embodied cognition, linking abstract mathematics to physical experience.

## 7. Linguocultural Aspects of Numerical Concepts

Numbers carry symbolic meaning beyond mathematics.

### 7.1 In Uzbek Culture

- seven (yetti) – completeness

- forty (qirq) – multiplicity
- one (bir) – unity

Proverb example:

“Yetti o‘lchab, bir kes.” (Measure seven times, cut once.)

## 7.2 In English Culture

- one – individuality
- seven – sacred or lucky number
- zero – emptiness

Proverbs:

“Two heads are better than one.”

“At sixes and sevens.”

These examples demonstrate cultural conceptualization beyond mathematical meaning.

## 8. Translation and Terminological Equivalence

Translation between Uzbek and English mathematical terminology reveals three patterns:

1. Full equivalence (integer – butun son)
2. Partial equivalence (field – maydon)
3. Borrowing or transliteration (integral – integral)

Challenges arise when metaphorical or culturally loaded meanings are involved.

## 9. Discussion

The comparative analysis demonstrates:

- Structural differences in derivation;
- Shared international roots;
- Divergent linguistic realization;
- Cultural embedding of numerical concepts.

English terminology is more internationally standardized, while Uzbek terminology shows adaptive integration and derivational creativity.

## 10. Conclusion

Mathematical terminology, though conceptually universal, reveals significant linguistic and cultural variation. Uzbek and English mathematical terms share international foundations but differ in:

- morphological structure,
- semantic adaptation,
- metaphorical origins,
- cultural symbolic usage.

The study confirms that terminology is not merely technical vocabulary but a reflection of linguistic structure and cultural cognition.

Future research may involve corpus-based quantitative analysis and psycholinguistic investigation of numerical cognition across languages.

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