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Study of Mathematical Terms in Bilingual Dictionaries

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ABSTRACT

In the field of world science, mathematical terminology has always formed the basis of the language of science and technology. Mathematics has a rich historical basis and is one of the sciences that has not lost its importance even in modern development.Attention to the field of mathematics requires a lexicographic description of the terminology of this field

The relevance is due to the little study of the lexicographicfeatures of the mathematical terminology in comparative terms (in Uzbek, English, Russian).

The purpose of this study is a comparative disclosure of lexicographicfeatures of mathematical terms.

It is used techniques and methods of lexicographic development of language units, as well as such a method of language material ascomparative-typological.

The scientific novelty of the study is that, it is analyzedthe methods and types of translation of the field terms in special bilingual dictionaries related to mathematics for the first time in the contrastive aspect (Uzbek, English, Russian), and the quantitative share of each method has been determined.

It is concluded that the translation of language units in the dictionary is carried out in different ways.In the translation of terms, it was found that it is always an important issue to find an alternative version of each term and develop the criteria to translate it.

Keywords: Term, terminilogy, mathematics, lexicography, dictionaries, translation.

Nowadays, the terminology of the field of mathematics constitutes a certain part of the lexicon of any language.

The aim of our research is to identify and analyze different ways of translating the terms of mathematical language units in bilingual dictionaries related to mathematics.

As the first example of terminological dictionaries related to the field of mathematics, the dictionary *Russian-Uzbek Terminological Dictionary in Mathematics* (“Русско-узбекский терминологический словарь по математике”) by Tashmuhammad Kori Niyazi can be mentioned.

In the 20s and 30s of the last century, the services of Kori Niyazi was great in finding a solution to the problem of developing the terminology of various fields of science, especially Mathematics.Specialized dictionaries created in different periods have their own place in terminological systems, as well as in lexicology, in general, in the lexical system of the language.On the basis of these dictionaries, it is possible to get an idea of what terms were used in a certain period, their meanings, changes in meaning, renewal and obsolescence processes (Sharopova 2019).

In the thirties, the State Terminology Committee was established in order to organize the work of terminology.The physics-mathematics department headed by Kori Niyazi prepared and published *Mathematical Terms* (Риёзиёт терминлари) (Issue 1, Uzdavnashr. Tashkent, 1931) consisting of 540 words and “Dictionary of Russian-Uzbek mathematical terms” (Русча-ўзбекча математика терминлари сўзлиги) (Issue 2, Uzdavnashr, Tashkent-Baku, 1933) (Akmalov 2007). As a result of the creation of this dictionary and the accumulation of field-specific experience, the next stages of the development of Uzbek mathematics terminology were relatively easy and a number of works were carried out.This dictionary of mathematical terms, as the first terminological dictionary of the field, served as an important source in the creation of later dictionaries of mathematical terms.This dictionary has a special importance in the terminology of the field of mathematics and certainly in Uzbek lexicography.

Terminological dictionaries are dictionaries that contain the terminology of one or more special fields, and such dictionaries that reflect the achievements of terminological lexicography (terminography), which is one of the branches of general lexicography (Dubinchinsky 2008). In our research it is analyzed *Russian-Uzbek Dictionary of Mathematics* (Русско-узбекскийсловарьпоматематики) authored by M. Sabirov. This dictionary contains not only mathematical terms, but also the most active lexicon of the field, common words and phrases. (For example, speed, cost, hesitancy, optimal allocation, method power, continue, prove, let, task, reinforce, slow down, keep in mind, etc). The provision of such lexical units in the dictionary makes it difficult to clearly demarcate "pure mathematics" and "applied mathematics" and related sciences, and for this reason, some common words and phrases related to such fields are listed in the introduction of the dictionary:

- theoretical physics (boson, dual circuit, invariant capacitance, quadrupole, total mass, pulse image – бозон, дуал схема, инвариант сиғдирма, квадруполь, умумий масса, импульсли образ)
- theoretical mechanics (axoid, support – аксоид, таянч)
- astronomy (azimuth, apogee, apse, aphelion, asteroid, vertical – азимут, апогей, апсида, афелий, астероид, вертикал)
- geodesy (altitude, astralub, baksa – альтитуда, астарлуб, бакса)
- geography (map – харита)
- economy (budget line – бюджет линияси)
- linguistics, philology (word length – сўз узунлиги)
- philosophy (correlate – коррелят)
- technique (transmission line, pipeline – узатиш чизиғи, поток линияси)
- history of mathematics (abacilli, agrimonsor, aporia, attic, astral, gnomon – абакчилар, агримонсор, апория, аттик, астрал, гномон)
- mathematical linguistics (agglutinative – аглютинитив).

They are distinguished by special conditional marks.The author justifies this situation with two important points.

- First, although most common words are not terms in themselves, an active part is involved in making the term. These are mainly adjectives, adverbs and verbs;
- Secondly, the boundary between the word and the term is not clear in many cases (Sabirov 1972).

M. Sabirov's *Russian-Uzbek Dictionary of Mathematics* contains Uzbek translations of more than 3000 Russian lexical units related to the field of mathematics.This dictionary is a translation dictionary.

In the dictionary, it can be determined that the translation of the terms of language units is carried out in different ways:

1. In the dictionary, in cases where there is no Uzbek alternative translation, the terms are expressed as international terms, i.e., in their borrowed forms, which are called borrowed terms:
   - *аксиома – аксиома* (axiom)
   - *биссектриса – биссектриса* (bisector)
   - *функция – функция* (function)
   - *синус – синус* (sinus)

2. Or it is presented in the way of translation through their alternative versions in Uzbek:
   - *угол – бурчак* (corner)
   - *фигурная скобка – катта қавс* (figure bracket)
   - *четверть – чорак* (quarter)
   - *треугольник – учбурчак* (triangle)

3. In some places, lexical units are translated both in the brrowed form and with an alternative translation in Uzbek, i.e. in both ways:
   - *анализ – анализ, таҳлил* (analysis)
   - *база – база, асос, негиз* (base)

- *символ – символ, ишора* (symbol)
- *таблица – таблица, жадвал* (table)

4. Despite the fact that this dictionary is a translation dictionary, in some cases, the translation of some words is not only given by a proper word, an international term, but also explained with a short explanation:
   - *абак – абак - тўрли намограмма, саноқни ўргатиш асбоби;* (abacus (grid namogram, a tool for teaching counting)*;*
   - *вертикал – вертикал - осмонсферасининг зенит нуқтасидан ўтган ҳар қандай катта доираси*;(vertical (any great circle passing through the zenith point of the celestial sphere)

When the words included in the dictionary were structurally analyzed, it was found that they consist of one word (*гипотенуза-hypotenuse, диаметр-diameter, функция-function, тенглама-equation*) or terms in a compound state (*доира диаметри-circle diameter, ўсувчи функция-increasing function, дифференциал тенглама-differential equation*).

The author of the dictionary notes that since most adjectives and adverbs are translated into Uzbek in the same way, in order to distinguish them from each other, adverbs are provided with the conditional sign “adv,” and in the translation, they are written in parentheses in the necessary places with words such as (as an adverb)

- *абсолютный, -ая, -ое – абсолют (absolute)*
- *а.дифференциал – абсолют дифференциал (absolute differential)*
- *абсолютно (рав) – абсолют (равишда)(absolutely)*
- *а. вещественный – абсолют ҳақиқий (absolutelyreal)*

In our research, we also analyzed the *English-Russian-Uzbek Dictionary* designed for mathematicians, published in 2007 under the editorship of D. Dzhumabaeva, candidate of physics-

mathematical sciences, and co-authored by G. Sobirova, Yu. Artikova, Sh. Pidaeva & I. Dzhumabaeva (2004). It is noted that the dictionary mainly includes words and phrases that are common in mathematical texts, and the words are mainly taken from *English-Russian Mathematics Dictionary* (Англо-русский словарь математических терминов) published in Moscow in 1962 and "Russian-Uzbek Dictionary of Mathematical Sciences" (Математик фанлардан русча-ўзбекча луғат) published in Tashkent in 1983.

The dictionary includes words and terms that are widely used in Uzbek language textbooks and manuals. In our research, we analyzed the translation methods of only the mathematical terms included in this dictionary.

The analysis of the terms presented in this dictionary shows that their Uzbek variants were mainly created by calque and transliteration, i.e. directly expressing the term in its own form.

In linguistics, a calque (or loan translation) can be defined as a word-for-word translation from one language into another. The calque method is a method of replacing the lexical unit in the original with its constituent parts - morphemes or words with corresponding lexical words in the translated text.The essence of calque is to create a new word or fixed phrase in the translated text, copying the structure of the original lexical unit (Hakimov 2019).

When the word is translated in calque method, it is observed in two ways, i.e.: full calque and half calque(or semi-calque): full calque – in which the lexical unit is completely translated from one language to another and the meaning of the term is completely preserved:

English	**Uzbek**
circle	*доира*
decimal multiplication	*ўнлик кўпайтма*
deduction	*айириш*
degree	*даража*
denominator	*каср махражи*
directed number	*нисбий сон*
equation	*тенглама*
fraction	*каср*

Semi-calque – in this method, the word is translated by reflecting the elements of both languages:

English	**Uzbek**
commutativa algebra	*ўрин алмаштирувчи алгебра*
descriptive geometry	*чизма геометрия*
ellipsoid of revolution	*айланма эллипсоид*
elliptrical equation	*эллитик тенглама*
fixed format	*аниқланган формат*
identical figures	*тенг фигуралар*
objective function	*мақсадли функция*
unknown parametr	*ноаниқ параметр*

If the semantics, structure and form of the term are also assimilated during the translation process, this is called the method of translation by transliteration.

The method of transliteration is characterized by the representation of lexical units in the target language in a graphical form in the translated language, that is, letter by letter (Agzamova 2015).

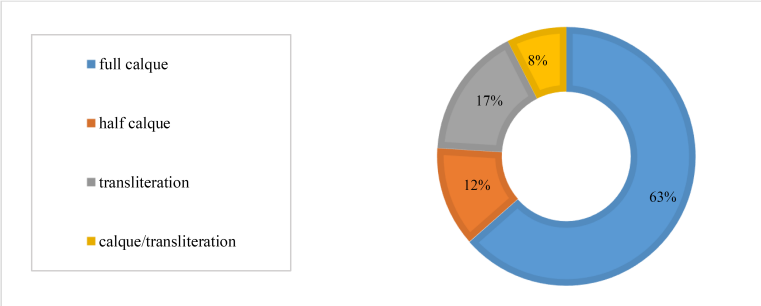
The main reason for using the transliteration method is to avoid situations such as replacing the national character of the original with a character specific to the owners of the translation language or depriving the translation of such a character due to the non-existence of the national characteristic linguistic tools used in the original in the translated language (Musaev 2005).

English	**Uzbek**
cube	*куб*
diameter	*диаметр*
elliptrical function	*эллиптик функция*
elliptrical paraboloid	*эллиптик параболоид*
endomorphism	*эндоморфизм*
express	*экспрес*
module	*модул*
perpendicular	*перпендикуляр*

During the analysis of translation methods, cases where the terms were presented in both methods, i.e., in the methods of calque and transliteration, were also observed:

English	Uzbek
binomial	*икки ҳадли, биноминал*
configuration	*шакл, конфигурация*
equivalent	*эквивалент, тенг*
form	*форма, шакл*
radical	*илдиз, радикал*
regular	*регуляр, тўғри*
sphere	*сфера, шар*
structure	*структура, тузилиш*

Below it is the result of the analysis according to the percentage of the used methods of translating mathematical terms into Uzbek.



We have found out that the translation of language units in the dictionary is carried out in different ways.

In the translation of terms, it was found that it is always an important issue to find an alternative version of each term and develop the criteria to translate it.

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