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On teaching the concepts of number sequence and its limit in academic lyceums

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Annotation

This article analyzes the teaching of the concepts of number sequence and its limits in academic lyceums and offers suggestions for its improvement.

Key words: numerical sequence, limit, cutoff, infinitesimal quantities, infinitely large quantities .

are studied based on the concept of the limit of the sequence . Therefore, it is necessary to pay great attention to learning this concept . Currently, the sequence and its limits are studied starting from academic lyceums .

to present our proposals for improving the study of the topic "Sequence and its limit" in the textbook "Fundamentals of Algebra and Mathematical Analysis" (Part II, 10th edition, 2011) .

of the textbook is called "Numerical sequences and their limits" , § 2 defines the concept of limit using the concept of cut of the sequence . The last concept is defined as follows .

$\{x_n\}$ Let the sequence be given . An infinite number of sequences $\{x_n\}$ formed by $x_N, x_{N+1}, x_{N+2},...$ discarding its first term $N-1$ is called a cut $\{x_n\}_{n=N}^{\infty}$ of the sequence and is defined in N the form . Then the 1st $\{x_n\}$ cut, 2nd cut and 3rd cut of the sequence are given to explain the definition [1].

This definition in the textbook is related to the concept of the circumference of 0 ε . If the inequality is satisfied for all $n \geq N$ natural numbers , $|x_n| < \varepsilon$ it is said that the cutoff lies around $\{x_n\}_{n=N}^{\infty}$ 0 ε .

Let us first analyze ε this last definition . no conditions are placed on the number and there is N no idea that the number ε depends on For example, $\varepsilon = 2$ for a sequence defined by division and $x_n = (-1)^n$ equality, $\{x_n\}$ the condition in the definition is fulfilled , i.e., the inequality holds from the 1st cut $|x_n| < \varepsilon$. True , from the inequality for all cuts of the sequence, $|(-1)^n| < 2$ the terms of this sequence belong to the 2 neighborhood of 0, but to say that the cut belongs to the neighborhood of 0 will only mislead the reader .

Now let's comment on the introduction of the concept of clipping. In fact, the concept of clipping is just a type of part sequence, so we do not think it is necessary to introduce it as a new concept .

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On the other hand, in part I, chapter II, page 22 of this textbook, defining natural numbers , the infinite set formed by all natural numbers is defined by the letter N: $N = \{1,2,3,...,n,...\}$ without taking into account N the fact that the letter is considered as one natural number in the concept of cutting . N This also causes the students to pay attention to the accepted designations .

attention to the following idea on page 27 of the textbook .

As it turns out , let 's not take an $a = 0$ arbitrary ε neighborhood of the number, there $x_n = \frac{1}{n}$ exists a cut of the sequence that belongs to this neighborhood .

In our opinion, it was necessary to start with the idea that even if we take an $a = 0$ arbitrary ε area of the number (not if we take it).

will quote 3 theorems proved in the "Main theorems about infinite small sequences" section of the textbook [2].

1 . α_n, β_n If the sequences are infinite subsequences , then the sequence $\gamma_n = \alpha_n + \beta_n$ is also an infinite subsequence .

Theorem 2. $\{x_n\}$ is a bounded sequence and α_n is an infinite subsequence , then the sequence $\gamma_n = \alpha_n \cdot x_n$ is an infinite subsequence .

Using these two theorems, the following theorem is proved.

Theorem 3. If the sequences α_n, β_n are infinite subsequences , then the sequence $\alpha_n - \beta_n$ is also an infinite subsequence .

regarding the statement of these theorems :

In the initial definition x_n of the sequence, it is called the general term of the sequence, and the sequence is defined $\{x_n\}$ as the form . But later the sequence is also written in α_n, β_n the form . In fact α_n $\{\alpha_n\}$ is the general term of the sequence.

2) Theorem 3 follows from Theorem 2, according to the property of the absolute value of a number

$$|\alpha_n + \beta_n| < |\alpha_n| + |\beta_n| \text{ âà } |\alpha_n - \beta_n| < |\alpha_n| + |-\beta_n| = |\alpha_n| + |\beta_n|$$

inequality is appropriate . Therefore, there is no need to quote this theorem , or we think it is appropriate to quote it as a result .

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