THE ROLE OF INTERACTIVE METHODS IN TEACHING THE TOPIC «PERFECT CONJUNCTIVE AND DYSFUNCTIONAL NORMAL FORMS»

Jumayeva Charos Ilkhomjan's kizi
Bukhara state university
charosjumayeva2801@gmail.com

Annotation: *Today, in the educational system, it is of particular importance to master the topic under study, effectively using computer technology and modern pedagogical methods and techniques throughout the lesson. In this article, one of the important topics of discrete mathematics and mathematical logic is the thinking of effective approaches to a meaningful explanation of the subject of the «Perfect conjunctive and dysfunctional normal forms» to students and interactive methods that can be used in practical training lessons, their advantage and disadvantage. In particular, there is a need for the widespread promotion of the use of international standards in the practical implementation of computer technologies and related aspects, which are one of the requirements of the Times today. In this regard, the importance of kata is attached to the development of scientific categories of pedagogical methods and methods and their effective application in educational processes.*

Keywords: *Perfect conjunctive normal forms (PCNF), perfect dysfunctional normal forms (PDNF), Complete and correct elementary conjunctions (dysfunctions). «Fish skeleton» method, «Domino» method.*

Today, every subject which is taught to students in higher education institutions is approached scientifically in depth. Great attention is paid to the enrichment of each topic with perfect, latest information. Therefore, the role of modern pedagogical methods and techniques used during the lesson in the long-term memorization of information on the topic is incomparable.

Let's talk about the topic briefly.

n of $x_1, x_2, ..., x_n$ elementary considerations $x_1^{\sigma_1} \vee x_2^{\sigma_2} \vee \cdots \vee x_n^{\sigma_n}$ (1)

elementary dysfunctions and $x_1^{\sigma_1} \wedge x_2^{\sigma_2} \wedge \cdots \wedge x_n^{\sigma_n}$ (2) let be given elementary conjunctions.

Definition 1. (1) elementary diz'unction (2) Elementary conjunction) is said to be pure elementary diz'unction (elementary conjunction)so that, and only then, when in the expression of (1) (2) each elementary reasoning xi has participated once [1].

For example, elementary dysfunctions $x_1 \vee x_2 \vee x_3$ and $\overline{x_1} \vee x_4 \vee x_6$ and elementary conjunctions $x_1\, x_2\, x_3$ and $x_1 \overline{x_3}\, x_6$ are said to be true elementary dysfunctions and elementary conjunctions, respectively.

Definition 2. (1) elementary dysfunctions ((2) elementary conjunctions) are said to be complete elementary dysfunctions (elementary conjunctions) with respect to

$x_1, x_2, ..., x_n$ considerations, when each of the $x_1, x_2, ..., x_n$ considerations is involved once in their expression.

For example, elements $x_1 \vee \overline{x_2} \vee x_3$ and $\overline{x_1} \vee \overline{x_2} \vee x_3$ are dysfunctions and elements $\overline{x_1}\,\overline{x_2}\,\overline{x_3}$, $x_1 x_2\,\overline{x_3}$ are conjunctions x_1, x_2, x_3 are complete elements compared to considerations dysfunctions and elements are conjunctions.

Definition 3. The diz'yunctive normal form (conjunctive normal form) is said to be PCNF (PDNF) if there are no uniform elementary conjunctions (elementary diz'unctions) in the CNF (DNF) expression and all elementary conjunctions (elementary diz'unctions) are correct and complete [2-3].

For example, $xyz \vee xy\bar{z} \vee \bar{x}yz \vee x\bar{y}z$ DNF is PDNF compared to x, y, z considerations. $(x \vee y)\,(x \vee \bar{y})\,(\bar{x} \vee y)$ CNF is PCNF compared to x, y considerations.

The PDNF and PCNF views of the main logical steps will be as follows:

a) PDNF: $\bar{\bar{x}} = x$; $xy = xy$; $x \vee y = xy \vee \bar{x}\,y \vee x\,\bar{y}$; $x \to y = xy \vee \bar{x}\,y \vee \bar{x}\,\bar{y}$; $x \to y = xy \vee \bar{x}\,\bar{y}$

b) PCNF: $\bar{\bar{x}} = x$; $xy = (\bar{x} \vee y)\,(x \vee \bar{y})\,(x \vee y)$; $x \vee y = x \vee y$; $x \to y = \bar{x} \vee y$; $x \to y = (\bar{x} \vee y)\,(x \vee \bar{y})$.

Example. Bring the formula to PCNF. $A = (\overline{x \vee z}) \wedge (x \to y) = (\bar{x} \wedge \bar{y}) \wedge (\bar{x} \vee y)$.

$$A = [\bar{x} \vee (y \wedge \bar{y}) \vee (z \wedge \bar{z})] \wedge [(x \wedge \bar{x}) \vee (y \wedge \bar{y}) \vee \bar{z}] \wedge (\bar{x} \vee y \vee (z \wedge \bar{z}))] =$$

$$= [(\bar{x} \vee y \vee z) \wedge (\bar{x} \vee \bar{y} \vee z) \wedge (\bar{x} \vee y \vee z) \wedge (\bar{x} \vee \bar{y} \vee \bar{z})] \wedge [(x \vee y \vee \bar{z}) \wedge (x \vee \bar{y} \vee \bar{z}) \wedge$$

$$\wedge (\bar{x} \vee y \vee \bar{z}) \wedge (\bar{x} \vee \bar{y} \vee \bar{z})] \wedge [(\bar{x} \vee y \vee z) \wedge (\bar{x} \vee y \vee \bar{z})].$$

$$A = (\bar{x} \vee y \vee z) \wedge (\bar{x} \vee \bar{y} \vee z) \wedge (\bar{x} \vee y \vee \bar{z}) \wedge (\bar{x} \vee \bar{y} \vee \bar{z}) \wedge (x \vee y \vee \bar{z}) \wedge (x \vee \bar{y} \vee \bar{z}).$$

thoughtful perfect conjunctive normal form in the expression instead of and vice versa, instead of when we add we get an important dysfunctional normal form with considerations [4-7].

Each term of the perfect conjunctive normal form is called a conjunctive constituent.

In order to organize effective lessons on this topic we should utilize several interactive techniques, such as «skeleton of a fish» method which is used at the beginning of the lesson. In this method, the formula for the algebra of reflections is written at the top of the skeleton of the fish. Students should write a formula that is equivalent to formulas on the bottom of the skeleton [7-20].

Advantages of this method: to draw students' attention to the topic thoroughly, to enable students to select information correctly, to teach learners how to express opinion clearly.

Disadvantages: almost undetermined.

In the study of the topic on perfect conjunctive and dysfunctional normal forms, the «Domino» method also gives the results we expected.

In this method, we should prepare colorful cards and write some examples connected to this topic on the one sides of the sheets in order. A word «START» should be written on the first sheet. The answers to the previous example are written on another side of the remaining sheets. Then we add another sheet, and on it we write the inscription «END» on the back, and the answer to the last example. Then these cards are shuffled. The game begins with a «START» sheet. Using this method during classes will be very interesting if students are divided into groups and lessons are conducted in a competitive manner [13-20].

Advantages of the method: this method encourages students to be more active and energetic during the lesson; to teach students to work in group and to be responsible; to improve learners' critical thinking skills and helps them to correct their mistakes independently.

Disadvantages of the method: almost undetermined.

When using the method «Domino», the cards can be prepared as follows. It is asked to find the PDNF or PCNF form of each example.

Sheet 1 PDNF $f(x,y,z)=xy \vee xz \vee x\bar{z}$

Sheet 2 PCNF $f(x,y,z)=xy \vee x \vee \bar{x}z$

Sheet 3 PCNF $f(x,y,z)=x \rightarrow (x \rightarrow y)$

Sheet 4 PDNF $f(x,y,z)=xy \vee xz \vee x\bar{z}$

Sheet 5 PDNF $f(x,y,z)=\overline{(x \vee y)} \leftrightarrow \bar{x} \vee \bar{y}$

Sheet 6 PCNF $f(x,y,z)=(x \wedge z) \rightarrow (x \leftrightarrow y)$

Sheet 7 PDNF $f(x,y,z)=\overline{(x \vee y)} \leftrightarrow \bar{x}\,\bar{y}$

Sheet 8 PCNF $f(x,y,z)=(x \vee z) \leftrightarrow (x \leftrightarrow y)$

Nowadays, a number decrees have been signed by the president of our country in order to draw great attention to the development of the subject mathematics and its application in practice. At the core of ensuring the implementation of decrees, of course, lies in teaching mathematics students to use advanced pedagogical methods and techniques. The methods of «Fish skeleton» and «Domino» recommended in the article are welcomed by students positively. Similar advanced pedagogical technologies have also been recommended in a number of scientific studies, and ways to use them have been explained with several examples. It is also widely covered that at present, taking into account the relevance of expanding the practical applications of the theory, it is also important to provide information about the integration of mathematics with other disciplines in the future.

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