THE FORMULA FOR THE ALGEBRA OF CONSIDERATIONS IS MUTUALLY EXCLUSIVE ONE OF THE WAYS TO CHECK THAT

https://doi.org/10.5281/zenodo.10829683

Ro'zikov Maxammadjon Mamirali o'g'li
Lecturer at the Department of Mathematics, Fergana State University

Note: *This article makes it easy to check that the formula of the algebra of reasoning is mutually strong.*

Key words: *Algebra of propositions, disjunctive normal form, conjunctive normal form, perfect disjunctive normal form, perfect conjunctive normal form, perfect conjunctive normal forms are equal to each other, perfect disjunctive normal forms are equal to each other.*

Several dizyunctive normal forms (conjunctive normal form) may exist for a single formula of feedback algebras. For example , the $(x \vee y)(x \vee z)$ formula can be brought to the following, $x \vee yz$, $x \vee xy \vee xz \vee yz$ dizyunctive normal forms. These are derived from the application of distributivity and idempotence laws.

To describe the formulas in a one-valued normal form, the so-called perfect dizyunctive normal form and perfect conjunctive normal form (perfect dizyunctive normal form and perfect conjunctive normal form) are used.

n $x_1, x_2, ..., x_n$ of 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 dizyunction(2) Elementary conyunction) is said to be pure elementary dizyunction (elementary conyunction)so that and only then, when in the expression of (1) (of(2)) each elementary reasoning x_i has participated once.

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

Definition 2. (1) elementary disjunction ((2) elementary conjunction) is said to be a complete elementary disjunction (elementary conjunction) with respect to $x_1, x_2, ..., x_n$ propositions, when each of the $x_1, x_2, ..., x_n$ propositions is involved in their expression only once.

For example. Elementary disjunctions $x_1 \vee \overline{x_2} \vee x_3$ and $\overline{x_1} \vee \overline{x_2} \vee x_3$ and elementary conjunctions $\overline{x_1}\,\overline{x_2}\,\overline{x_3}$, $x_1 x_2 \overline{x_3}$ are complete elementary disjunctions and elementary conjunctions with respect to propositions x_1, x_2, x_3.

Definition 3. A disjunctive normal form (conjunctive normal form) is called a perfect disjunctive normal form (perfect conjunctive normal form) if the disjunctive normal form (conjunctive normal form) expression does not contain the same elementary conjunctions (elementary disjunctions) and all elementary conjunctions (elementary disjunctions) if correct and complete.

For example. The disjunctive normal form $xyz \vee xy\bar{z} \vee \bar{x}yz \vee x\bar{y}z$ is a perfect disjunctive normal form with respect to propositions x, y, z. $(x \vee y)\,(x \vee \bar{y})\,(\bar{x} \vee y)$ conjunctive normal form x, y is a perfect conjunctive normal form with respect to propositions.

Theorem 1. In order for arbitrary two formulas $f_1(x_1, x_2, x_3 \ldots x_n)$ and $f_2(x_1, x_2, x_3 \ldots x_n)$ of the algebra of considerations to be equally strong, it is enough that their perfect conjunctive normal form $f_1^*(x_1, x_2, x_3 \ldots x_n)$ and $f_2^*(x_1, x_2, x_3 \ldots x_n)$ (perfect disjunctive normal form) are mutually equal.

Proof. Let $f_1(x_1, x_2, x_3 \ldots x_n)$ and $f_2(x_1, x_2, x_3 \ldots x_n)$ be the formulas of the reasoning algebra, and let their perfect conjunctive normal form be equal to $f_1^*(x_1, x_2, x_3 \ldots x_n)$ and $f_2^*(x_1, x_2, x_3 \ldots x_n)$, respectively. According to the condition, equality of $f_1^*(x_1, x_2, x_3 \ldots x_n) = f_2^*(x_1, x_2, x_3 \ldots x_n)$ is appropriate. As we know, the formula and its perfect conjunctive normal form are equivalent.

That is,

$$f_1(x_1, x_2, x_3 \ldots x_n) = f_1^*(x_1, x_2, x_3 \ldots x_n)$$

$$f_2(x_1, x_2, x_3 \ldots x_n) = f_2^*(x_1, x_2, x_3 \ldots x_n)$$

equalities are appropriate. It can be seen that

$$f_1(x_1, x_2, x_3 \ldots x_n) = f_2(x_1, x_2, x_3 \ldots x_n)$$

equality is appropriate.

Example. Prove that the formulas $f_1(x, y, z, t) = y\bar{z} \vee \bar{x}zt \vee \bar{y}zt \vee xy\bar{t}$ and $f_1(x, y, z, t) = y\bar{z} \vee \bar{x}zt \vee \overline{xy}zt \vee xyz\bar{t}$ of the algebra of reasoning are equally strong.

Solution: we find the perfect conjunctive normal form of the formula $f_1(x,y,z,t) = y\bar{z} \vee \bar{x}zt \vee \bar{y}zt \vee xy\bar{t}$ and $f_1(x,y,z,t) = y\bar{z} \vee \bar{x}zt \vee \overline{xy}zt \vee xyz\bar{t}$.

$$f_1^*(x,y,z,t) = xy\bar{z}t \vee xy\bar{z}\bar{t} \vee \bar{x}y\bar{z}\bar{t} \vee \bar{x}y\bar{z}t \vee \bar{x}yzt \vee \bar{x}\bar{y}zt \vee$$

$$\vee x\bar{y}zt \vee xyz\bar{t}$$

$$f_2^*(x,y,z,t) = xy\bar{z}t \vee xy\bar{z}\bar{t} \vee \bar{x}y\bar{z}\bar{t} \vee \bar{x}y\bar{z}t \vee \bar{x}yzt \vee \bar{x}\bar{y}zt \vee$$

$$\vee x\bar{y}zt \vee xyz\bar{t}$$

It can be seen from the found perfect conjunctive normal formulas that $f_1^*(x,y,z,t) = f_2^*(x,y,z,t)$

equality is appropriate.

$$f_1(x,y,z,t) = f_2(x,y,z,t)$$

than that it follows that equality is appropriate.

REFERENCES:

1. Kodirov, K., Nishonboyev, A., Ruzikov, M., & Tuxtasinov, T. (2022). SUBADDITIVE MEASURE ON VON NEUMANN ALGEBRAS. *International scientific journal of Biruni*, *1*(2), 134-139.

2. Kodirov, K., Nishonboyev, A., Ruzikov, M., & Alimov, Z. (2022). FORMATION OF STUDENTS'KNOWLEDGE AND SKILLS IN THE EDUCATIONAL PROCESS BASED ON THE ACTIVE APPROACH. *International scientific journal of Biruni*, *1*(2), 339-344.

3. Рузиков, М. (2022). УЧ ЎЛЧОВЛИ ЛАПЛАС ТЕНГЛАМАСИ УЧУН ЯРИМ ЧЕКСИЗ ПАРАЛЛЕЛЕПИПЕДДА НОЛОКАЛ ЧЕГАРАВИЙ МАСАЛА. *Yosh Tadqiqotchi Jurnali*, *1*(5), 128-137.