MUKAMMAL DIZYUNKTIV VA MUKAMMAL KONYUKTIV NORMAL SHAKLLARNI BIR NECHA USULDA HISOBLASH

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Annotatsiya: *Ushbu maqolada mukammal dizyunktiv normal forma (MDNSH) va mukammal kon'yunktiv normal forma (MKNSH) tushunchalari batafsil ko'rib chiqiladi. Shuningdek, MDNSH va MKNSH ga oid misollarni yechish usullari ikki xil yo'l bilan haqiqat jadvali yordamida va analitik yondashuv orqali o'rganiladi. Bundan tashqari, maqolada dizyunktiv normal forma (DNSH) va kon'yunktiv normal forma (KNSH) tushunchalari ham tushuntirib beriladi.*

Kalit so'zlar: *Mukammal dizyunktiv normal forma (MDNSH), mukammal kon'yunktiv normal forma (MKNSH), dizyunktiv normal forma (DNSH), kon'yunktiv normal forma (KNSH).*

Аннотация: *В данной статье подробно рассматриваются понятия совершенной дизъюнктивной нормальной формы (СДНФ) и совершенной конъюнктивной нормальной формы (СКНФ). Также изучаются методы решения примеров, связанных с СДНФ и СКНФ, двумя способами: с помощью таблицы истинности и аналитического подхода. Кроме того, в статье разъясняются понятия дизъюнктивной нормальной формы (ДНФ) и конъюнктивной нормальной формы (КНФ).*

Ключевое слово: *Совершенная дизъюнктивная нормальная форма (СДНФ), Совершенная конъюнктивная нормальная форма (СКНФ), Дизъюнктивная нормальная форма (ДНФ),Конъюнктивная нормальная форма (КНФ).*

Annotation: *This article provides a detailed explanation of the concepts of Perfect Disjunctive Normal Form (PDNF) and Perfect Conjunctive Normal Form (PCNF). It also explores how to solve examples related to PDNF and PCNF using two different methods: the truth table approach and the analytical method. In addition, the article explains the general concepts of Disjunctive Normal Form (DNF) and Conjunctive Normal Form (CNF).*

Keyword: *Perfect Disjunctive Normal Form (PDNF), Perfect Conjunctive Normal Form (PCNF) Disjunctive Normal Form (DNF), Conjunctive Normal Form (CNF)*

O‘zgaruvchilarning bir hadi mukammal deyiladi, agarda unda har bir o‘zgaruvchi o‘zi yoki inkori faqat bir marta kirsa.Biror o‘zgaruvchilardan tuzilgan normal shakl mukammal deyiladi, agarda unga kiruvchi har bir had ushbu o‘zgaruvchilarnig mukammal bir hadi bo‘lsa, ularning qisqacha yozuvi:MDNSH-mukammal diz’yunktiv normal shakl, MKNSH-mukammal kon’yuktiv normal shakl ko‘rinishida bo‘ladi.

Barcha ikki o‘zgaruvchili elementar funksiyalarni ikki xil normal shaklidagi ifodalarini keltirib o‘tamiz:

$y = f(x_1, x_2)$	MDNSH	MKNSH
$f_1 = 0$	—	$(x_1 \vee x_2) \wedge (\overline{x_1} \vee x_2) \wedge (x_1 \vee \overline{x_2}) \wedge (\overline{x_1} \vee \overline{x_2})$
$f_2 = x_1 \wedge x_2$	—	$(x_1 \vee x_2) \wedge (\overline{x_1} \vee x_2) \wedge (x_1 \vee \overline{x_2})$
$f_3 = x_2 \setminus x_1$	—	$\overline{x_1} \wedge x_2 = (x_1 \vee x_2) \wedge (\overline{x_1} \vee x_2) \wedge (\overline{x_1} \vee \overline{x_2})$
$f_4 = x_1$	$(\overline{x_1} \wedge x_2) \vee (x_1 \wedge x_2)$	$(x_1 \vee x_2) \wedge (\overline{x_1} \vee x_2)$
$f_5 = x_1 \setminus x_2$	—	$x_1 \wedge \overline{x_2} = (x_1 \vee x_2) \wedge (x_1 \vee \overline{x_2}) \wedge (\overline{x_1} \vee \overline{x_2})$
$f_6 = x_2$	$(x_1 \wedge \overline{x_2}) \vee (x_1 \wedge x_2)$	$(x_1 \vee x_2) \wedge (x_1 \vee \overline{x_2})$
$f_7 = x_1 \oplus x_2$	$(x_1 \wedge \overline{x_2}) \vee (\overline{x_1} \wedge x_2)$	$(x_1 \vee x_2) \wedge (\overline{x_1} \vee \overline{x_2})$
$f_8 = x_1 \vee x_2$	$(x_1 \wedge \overline{x_2}) \vee (\overline{x_1} \wedge x_2) \vee (x_1 \wedge x_2)$	$x_1 \vee x_2$
$f_9 = x_1 \downarrow x_2$	—	$\overline{x_1} \wedge \overline{x_2} = (x_1 \vee x_2) \wedge (x_1 \vee \overline{x_2}) \wedge (\overline{x_1} \vee \overline{x_2})$
$f_{10} = x_1 \leftrightarrow x_2$	$(\overline{x_1} \wedge \overline{x_2}) \vee (x_1 \wedge x_2)$	$(\overline{x_1} \vee x_2) \wedge (x_1 \vee \overline{x_2})$
$f_{11} = \overline{x_2}$	$(\overline{x_1} \wedge \overline{x_2}) \vee (\overline{x_1} \wedge x_2)$	$(\overline{x_1} \vee x_2) \wedge (\overline{x_1} \vee \overline{x_2})$
$f_{12} = x_2 \rightarrow x_1$	$(\overline{x_1} \wedge \overline{x_2}) \vee (\overline{x_1} \wedge x_2) \vee (x_1 \wedge x_2)$	—
$f_{13} = \overline{x_1}$	$(\overline{x_1} \wedge \overline{x_2}) \vee (x_1 \wedge \overline{x_2})$	$(x_1 \vee \overline{x_2}) \wedge (\overline{x_1} \vee \overline{x_2})$
$f_{14} = x_1 \rightarrow x_2$	$(\overline{x_1} \wedge \overline{x_2}) \vee (x_1 \wedge \overline{x_2}) \vee (x_1 \wedge x_2) = x_1 \vee \overline{x_2}$	—
$f_{15} = x_1 \mid x_2$	$(\overline{x_1} \wedge \overline{x_2}) \vee (x_1 \wedge \overline{x_2}) \vee (\overline{x_1} \wedge x_2)$	—
$f_{16} = 1$	$(\overline{x_1} \wedge \overline{x_2}) \vee (x_1 \wedge \overline{x_2}) \vee (\overline{x_1} \wedge x_2) \vee (x_1 \wedge \overline{x_2})$	—

1-ta’rif:DNSH ifodasida barcha elemenrat kon’yuksiyalar $x_1, x_2, \dots, x_n$ o‘zgaruvchilarga nisbattan to‘lq va to‘g‘ri bo‘lib,takrorlanuvchilari bo‘lmasa mukammal diz’yunktiv normal shakl (MDNSH) deyiladi.

$$A(x_1, x_2, \dots, x_n) = \bigvee_{\substack{(\sigma_1,\sigma_2,\dots,\sigma_n) \\ A(\sigma_1,\sigma_2,\dots,\sigma_n)=1}} x_1^{\sigma_1} x_2^{\sigma_2} \dots x_n^{\sigma_n}$$

0 dan tashqari istalgan $A(x_1, x_2, \dots, x_n)$ formulani mukammal diz’yunktiv normal shaklga keltirish mumkin.[1-5].

Misol:$(x \leftrightarrow y) \vee (y \leftrightarrow z)$ MDNSH ko‘rinishiga keltiring.

Yechimi:

1-usul(jadval usuli):MDNSH ifodasini aniqlashning jadval usuli quyidagicha:

1.Berilgan formulaning chinlik jadvalini tuziladi.

2.Chinlik jadvalidan funksiyasining 1 ga teng bo‘lgan qiymatlari to‘plamini $(\sigma_1, \sigma_2, \dots, \sigma_n)$ ajratib olinadi.

3.Har bir ajratib olingan qiymatlari to‘plamiga mos elementar kon’yuksiyalar tuziladi.

4.Hosil bo‘lgan elementar kon’yuksiyalar diz’yunksiya amali bilan bog‘lanadi.

x	y	z	$x \leftrightarrow y$	$y \leftrightarrow z$	$(x \leftrightarrow y) \vee (y \leftrightarrow z)$
0	0	0	1	1	1
0	0	1	1	0	1
0	1	0	0	0	0
0	1	1	0	1	1
1	0	0	0	1	1
1	0	1	0	0	0
1	1	0	1	0	1
1	1	1	1	1	1

$$(x \leftrightarrow y) \vee (y \leftrightarrow z) = x^0y^0z^0 \vee x^0y^0z^1 \vee x^0y^1z^1 \vee x^1y^0z^0 \vee x^1y^1z^0 \vee x^1y^1z^1$$

Formulaga ko‘ra quyidagini hosil qilamiz:

$(x \leftrightarrow y) \vee (y \leftrightarrow z)=$

$=\bar{x}\bar{y}\bar{z} \vee \bar{x}\bar{y}z \vee \bar{x}yz \vee x\bar{y}\bar{z} \vee xy\bar{z} \vee xyz$

2-usul (analitik usul):

Formulani qo‘llab quyidagiga ega bo‘lamiz:

$(x \leftrightarrow y) \vee (y \leftrightarrow z)=xy \vee \bar{x}\bar{y} \vee yz \vee \bar{y}\bar{z}$

Endi yana formuladan foydalanib MDNSHga keltiramiz:

$xy(z \vee \bar{z}) \vee \bar{x}\bar{y}(z \vee \bar{z}) \vee yz(x \vee \bar{x}) \vee \bar{y}\bar{z}(x \vee \bar{x})=$

$=xyz \vee xy\bar{z} \vee \bar{x}\bar{y}z \vee \bar{x}\bar{y}\bar{z} \vee xyz \vee \bar{x}yz \vee x\bar{y}\bar{z} \vee \bar{x}\bar{y}\bar{z}=$

$=xyz \vee xy\bar{z} \vee \bar{x}\bar{y}z \vee \bar{x}\bar{y}\bar{z} \vee \bar{x}yz \vee x\bar{y}\bar{z}.$

2-ta’rif: KNSH ifodasida barcha elementar diz’yunksiyalar $x_1,x_2,\dots,x_n$ o‘zgaruvchilarga nisbattan to‘liq va to‘g‘ri bo‘lib takrorlanuvchilari bo‘lmasa mukammal kon’yuktiv normal shakl (MKNSH)deyiladi.

$$A(x_1, x_2, \dots, x_n) = \mathop{\&}_{\substack{(\sigma_1, \sigma_2, \dots, \sigma_n) \\ A(\sigma_1, \sigma_2, \dots, \sigma_n) = 0}} (x_1^{\bar{\sigma}_1} \vee x_2^{\bar{\sigma}_2} \vee \dots \vee x_n^{\bar{\sigma}_n})$$

1 konstanta tashqari istalgan $A(x_1, x_2, \dots, x_n)$ formulani mukammal kon’yuktiv normal shaklga keltirish mumkin.[6-9].

Misol: $(x + y)(z \rightarrow x)$MKNSH ko‘rinishiga keltiring.

Yechimi:

1-usul:(Jadval usuli): MKNSH ifodasini aniqlashning jadval usuli quyidagicha:

1.Berilgan formulaning chinlik jadvalini tuziladi;

2.Chinlik jadvalidan foydalaning 0 ga teng bo‘lgan qiymatlari to‘plamini $(\sigma_1, \sigma_2, \dots, \sigma_n)$ ajratib olinadi;

3.Har bir ajratib olingan qiymatlari to‘plamiga mos elementar diz’yunksiyalar tuziladi;

4.Hosil bo‘lgan elementar diz’yunksiyalar kon’yuksiya amali bilan bog‘lanadi.

x	y	z	$x + y$	$z \rightarrow x$	$(x + y)(z \rightarrow x)$
0	0	0	0	1	0
0	0	1	0	0	0
0	1	0	1	1	1
0	1	1	1	0	0
1	0	0	1	1	1
1	0	1	1	1	1
1	1	0	0	1	0
1	1	1	0	1	0

$(x + y)(z \rightarrow x)=\left(x^{\overline{0}} \vee y^{\overline{0}} \vee z^{\overline{0}}\right)\left(x^{\overline{0}} \vee y^{\overline{0}} \vee z^{\overline{1}}\right)$

$(x^{\overline{0}} \vee y^{\overline{1}} \vee z^{\overline{1}})(x^{\overline{1}} \vee y^{\overline{1}} \vee z^{\overline{0}})(x^{\overline{1}} \vee y^{\overline{1}} \vee z^{\overline{1}})=$

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

2-usul.(analitik usul):

$(x + y)(z \rightarrow x)=(\bar{x}y \vee \bar{y}x)(\bar{z} \vee x)=$

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

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

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

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

Misol:$((x \wedge y) \rightarrow \bar{z}) \rightarrow ((z \rightarrow \bar{y}) \rightarrow x)$ MDNSH va MKNSH ko‘rinishiga keltiring.

Yechimi:

MDNSH ko‘rinishiga keltiramiz:

1-usul.(Jadval usuli):

x	y	z	$\bar y$	$\bar z$	$x\wedge y$	$(x\wedge y)\to\bar z$	$z\to\bar y$	$(z\to\bar y)\to x$	$((x\wedge y)\to\bar z)\to((z\to\bar y)\to x)$
0	0	0	1	1	0	1	1	0	0
0	0	1	1	0	0	1	1	0	0
0	1	0	0	1	0	1	1	0	0
0	1	1	0	0	0	1	0	1	1
1	0	0	1	1	0	1	1	1	1
1	0	1	1	0	0	1	1	1	1
1	1	0	0	1	1	1	1	1	1
1	1	1	0	0	1	0	0	1	1

$((x\wedge y)\to\bar z)\to((z\to\bar y)\to x)=$
$=x^0y^0z^0\vee x^0y^0z^1\vee x^0y^1z^0\vee x^0y^1z^1\vee x^1y^0z^0\vee x^1y^0z^1\vee x^1y^1z^0\vee x^1y^1z^1=$
$=\bar x\bar y\bar z\vee\bar x\bar y z\vee\bar x y\bar z\vee\bar x yz\vee x\bar y\bar z\vee x\bar y z\vee xy\bar z\vee xyz.$

2-usul.(Analitik usul):

$((x\wedge y)\to\bar z)\to((z\to\bar y)\to x)=(\overline{(x\wedge y)}\vee\bar z)\to((z\to\bar y)\to x)=$
$=\overline{(\overline{(x\wedge y)}\vee\bar z)}\vee(\overline{(\bar z\vee\bar y)}\vee x)=((x\wedge y)\wedge z)\vee((z\wedge y)\vee x)=xyz\vee zy\vee x=$
$=xyz\vee zy(x\vee\bar x)\vee x(y\vee\bar y)=xyz\vee xyz\vee\bar x yz\vee xy\vee x\bar y=$
$=xyz\vee\bar x yz\vee xy(z\vee\bar z)\vee x\bar y(z\vee\bar z)=xyz\vee\bar x yz\vee xyz\vee xy\bar z\vee x\bar y z\vee x\bar y\bar z=$
$=xyz\vee\bar x yz\vee x\bar y z\vee xy\bar z\vee x\bar y\bar z.$

MKNSH ko‘rinishiga keltiramiz:

1-usul(jadval usuli):

x	y	z	$\bar y$	$\bar z$	$x\wedge y$	$(x\wedge y)\to\bar z$	$z\to\bar y$	$(z\to\bar y)\to x$	$((x\wedge y)\to\bar z)\to((z\to\bar y)\to x)$
0	0	0	1	1	0	1	1	0	0
0	0	1	1	0	0	1	1	0	0
0	1	0	0	1	0	1	1	0	0
0	1	1	0	0	0	1	0	1	1
1	0	0	1	1	0	1	1	1	1
1	0	1	1	0	0	1	1	1	1
1	1	0	0	1	1	1	1	1	1
1	1	1	0	0	1	0	0	1	1

$\left((x \wedge y) \to \bar{z}\right) \to ((z \to \bar{y}) \to x)=$

$=\left(x^{\bar{0}} \vee y^{\bar{0}} \vee z^{\bar{0}}\right)\left(x^{\bar{0}} \vee y^{\bar{0}} \vee z^{\bar{1}}\right)\left(x^{\bar{0}} \vee y^{\bar{1}} \vee z^{\bar{0}}\right)=(x \vee y \vee z) \wedge (x \vee y \vee \bar{z}) \wedge (x \vee \bar{y} \vee z)$

2-usul.(Analitik usuli):

$\left((x \wedge y) \to \bar{z}\right) \to ((z \to \bar{y}) \to x)=$

$=(\overline{(x \wedge y)} \vee \bar{z}) \to ((\bar{z} \vee \bar{y}) \to x)=\overline{\overline{(x \wedge y)} \vee \bar{z}} \vee (\overline{(\bar{z} \vee \bar{y})} \vee x)=$

$=\left((x \wedge y) \wedge z\right) \vee \left((z \wedge y) \vee x\right) = xyz \vee zy \vee x = yz(x \vee 1) \vee x =$

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

Bul funksiyasining o‘zgaruvchilar bo‘yicha yoyilmasi ning

MDNSH VA MKNSH larda qo‘llanilishi

Teorema 1. E to‘plamdagi har bir $f(x_1, \dots, x_n)$ funksiya quyidagi ko‘rinishda ifodalanishi mumkin:

1. $f(x_1, \dots, x_n)=x_1 \cdot f(1, x_2, \dots, x_n) \vee \bar{x_1} \cdot f(0, x_2, \dots, x_n)$,
2. $f(x_1, \dots, x_n)=x_1 \cdot f(1, x_2, \dots, x_n) \oplus \bar{x_1} \cdot f(0, x_2, \dots, x_n)$,
3. $f(x_1, \dots, x_n)=(x_1 \vee f(0, x_2, \dots, x_n))\&(\bar{x_1} \vee f(1, x_2, \dots, x_n))$.

Isbot. Ushbu formulalarni isbotlash uchun

1) Agar $x_1 = 0$ bo‘lsa, unda

$f(0, x_2, \dots, x_n)=0 \vee f(0, x_2, \dots, x_n) = f(0, x_2, \dots, x_n)$.

2) Agar $x_1 = 1$ bo‘lsa, unda

$f(1, x_2, \dots, x_n)=1\& f(1, x_2, \dots, x_n) \vee 0\&f(0, x_2, \dots, x_n)=f(1, x_2, \dots, x_n)$.

Xuddi shunday 2-3- tasdiqlarni ham isbotlashimiz munkin.[10-11].

Teorema 2. Har bir E dan olingan $f(x_1, \dots, x_n)$ funksiyani quyidagicha ifodalash mumkin,bunda $\forall \kappa, 1 \le k \le n$:

$$1.\ f(x_1, \dots, x_n) = \bigvee_{(\sigma_1, \dots, \sigma_k)} x_1^{\sigma_1}\& \dots \&x_k^{\sigma_k}\& f(\sigma_1, \dots, \sigma_k, x_{k+1}, \dots, x_n),$$

bunda

$$x^{\sigma} = \begin{cases} x, \text{agar } \sigma = 1; \\ \bar{x}, \text{agar } \sigma = 0; \end{cases} \qquad \bigvee_{i=1}^{n} x_i = x_1 \vee x_2 \vee \dots \vee x_n.$$

$$2.\ f(x_1, \dots, x_n) = \sum\nolimits_{(\sigma_1, \dots, \sigma_k)} x_1^{\sigma_1}\& \dots \&x_k^{\sigma_k}\& f(\sigma_1, \dots, \sigma_k, x_{k+1}, \dots, x_n), \text{ bunda}$$

$$\sum_{i=1}^{n} x_i = x_1 \oplus x_2 \oplus \dots \oplus x_n.$$

$$3.\ f(x_1, \dots, x_n) = \underset{(\sigma_1, \dots, \sigma_k)}{\&} \left(x_1^{\overline{\sigma_1}} \vee \dots \vee x_k^{\overline{\sigma_k}} \vee f(\sigma_1, \dots, \sigma_k, x_{k+1}, \dots, x_n)\right),$$

bunda $\underset{i=1}{\overset{n}{\&}} x_i\&x_2\& \dots \&x_n$, $\qquad x^{\bar{\sigma}} = \begin{cases} x, \text{agar } \sigma = 0; \\ \bar{x}, \text{agar } \sigma = 1; \end{cases}$

1-tasdiqning isboti: k-$(\alpha_1, \dots, \alpha_k)$ bo‘lsak, $f(x_1, \dots, x_n)$ funksiya quyidagi ko‘tinishga keladi - $f(\alpha_1, \dots, \alpha_k, x_{k+1}, \dots, x_n)$.

Ta’rifga asosan,

$$\left.\begin{array}{l}\alpha_1^{\sigma_1} = 1 \Leftrightarrow \alpha_1 = \sigma_1\\ \alpha_2^{\sigma_2} = 1 \Leftrightarrow \alpha_2 = \sigma_2\\ \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\\ \alpha_k^{\sigma_k} = 1 \Leftrightarrow \alpha_k = \sigma_k\end{array}\right\}$$

Bundan esa $\alpha_1^{\sigma_1}\&\alpha_2^{\sigma_2}\&\ldots\&\alpha_k^{\sigma_k} = 1 \Leftrightarrow \alpha_1 = \sigma_1, \alpha_2 = \sigma_2, \ldots, \alpha_k = \sigma_k$.

$1\&x = x$ dan f funksiya berilgan formulaga faqat va faqat $\alpha_1 = \sigma_1, \alpha_2 = \sigma_2, \ldots, \alpha_k = \sigma_k$ bo‘lganda o‘rinli.

Bundan, formulaning o‘mg tomoni

$V_{(\sigma_1,\ldots,\sigma_k)} x_1^{\sigma_1} \ldots x_k^{\sigma_k}\& f(\sigma_1, \ldots, \sigma_k, x_{k+1}, \ldots, x_n) = f(\sigma_1, \ldots, \sigma_k, x_{k+1}, \ldots, x_n)$ ga teng chunki qolgan barcha kon’yuksiyalar=0. Formulaning chap tomonining ham $f(\sigma_1, \ldots, \sigma_k, x_{k+1}, \ldots, x_n)$ ko‘rinishga ega chumki, $\alpha_1 = \sigma_1, \alpha_2 = \sigma_2, \ldots, \alpha_k = \sigma_k$.

Demak, $f(\sigma_1, \ldots, \sigma_k, x_{k+1}, \ldots, x_n) = f(\sigma_1, \ldots, \sigma_k, x_{k+1}, \ldots, x_n)$.

Xuddi shunday 2-3- tasdiqlarni isbotlashimiz mumkin.

MDNSH va MKNSH

Natija 1.2-teoremaning 1-tasdiqida k=n bo‘lsa, unda yoyilma quyidagi ko‘rinishga ega bo‘ladi:

$$f(x_1, \ldots, x_n) = V_{(\sigma_1,\ldots,\sigma_n)} x_1^{\sigma_1} \ldots x_n^{\sigma_n} \cdot f(\sigma_1, \ldots, \sigma_n). \qquad (1)$$

Agar $f \neq 0$, unda (1) formuladan

$$f(x_1, \ldots, x_n) = \bigvee_{\substack{(\sigma_1,\ldots,\sigma_n)\\ f(\sigma_1,\ldots,\sigma_n)=1}} x_1^{\sigma_1}\&\ldots\&x_n^{\sigma_n} - \text{ Mukammal diz'yunktiv normal}$$

shakl (MDNSH).

Natija 2. Agar 2-teremaning 3-tasdiqida k=n bo‘lsa, unda unga yoyilma quyidagi ko‘rinishga ega bo‘ladi:

$$f(x_1, \ldots, x_n) = \underset{(\sigma_1, \ldots, \sigma_n)}{\&} \left(x_1^{\overline{\sigma_1}} \vee \ldots \vee x_n^{\overline{\sigma_n}} \vee f(\sigma_1, \ldots, \sigma_n)\right). \qquad (2)$$

Agar $f \neq 1$, unda (2) formuladan

$$f(x_1, \ldots, x_n) = \underset{\substack{(\sigma_1, \ldots, \sigma_n)\\ f(\sigma_1, \ldots, \sigma_n) = 0}}{\&} \left(x_1^{\overline{\sigma_1}} \vee \ldots \vee x_n^{\overline{\sigma_n}}\right)$$

$-$Mukammal kon’yuktiv normal shakl(MKNSH).

Natija 3. Agar 2-teoremaning 2-tasdiqida k=n bo‘lsa, unda unga yoyilma quyidagi ko‘rinishga ega bo‘ladi:

$$f(x_1, \ldots, x_n) = \sum_{(\sigma_1,\ldots,\sigma_n)} x_1^{\sigma_1}\&\ldots\&x_n^{\sigma_n}\& f(\sigma_1, \ldots, \sigma_n) \qquad (3)$$

Agar $f \neq 0$, unda (3) formuladan

$$f(x_1, \dots, x_n) = \sum_{\substack{(\sigma_1,\dots,\sigma_n) \\ f(\sigma_1,\dots,\sigma_n)=1}} x_1^{\sigma_1} \,\&\, \dots \,\&\, x_n^{\sigma_n}.$$

Xulosa.MDNSH (MKNSH)quyidagi xususiyatlarga ega:

1.Tarkibida ikkita bir xil elementar kon’yuksiyalarni (elementar diz’yunksiyalarni) mavjud bo‘lmaydi.

2.Birorta ham elementar kon’yuksiyada (elementar kon’yuksiyada)ikkita bir xil o‘zgaruvchi qatnashmaydi.

3.Elementar kon’yuksiyada (elementar diz’yunksiyada)birorta o‘zgaruvchi o‘zining inkori bilan birgalikda qatnashmaydi.

4.To‘liq elementar kon’yuksiyada (elementar diz’yunksiyada) formulaga kiruvchi barcha x_i o‘zgaruvchi, yoki uning inkori bo‘lgan $\overline{x_i}$ o‘zgaruvchi qatnashadi.

FOYDALANILGAN ADABIYOTLAR:

1. Umida Umarova. Diskret matematika va matematik mantiq fanidan misol va masalalar to’plami: o’quv qo’llanma\ U. Umarova. 191 b.

2. Sadaddinova S.S., Abduraxmanova Yu.M., Raximova F.S. diskret
Matematika. O’quv qo’llanma

3. Kasimov Nadimulla Xabibullayevich, Dadajanov Ro‘zimat Normatovich, Ibragimov Farhod Nurmuhamadjonovich diskret matematika va matematik mantiq asoslari.o`quv qo`llanma.

4.Abdurashidov Nuriddin, Tog‟ayev Turdimurod, Rustamov Bilol, Eshtemirov Eshtemir “Equation of the Result of Second-Order Surfaces” excellencia: international multi-disciplinary journal of education https://multijournals.org/index.php/excellencia-imje

5.Abdurashidov Nuriddin,Tog‘ayev Turdimurod,Rustamov Bilol. “Laplas tenglamasining fundamental yechimi” . “So‟ngi ilmiy tadqiqotlar nazariyasi” Ilmiy-uslubiy jurnali. 13-iyun 2024- yil 7-jild 6-son (33-37).

6. Rustamov Bilol, Baltabayeva Saida, Choriyeva Munira,Normo‘minova Charos ‟ Diskret tasodifiy miqdorning sonli xarakteristikalari”.”O‘zbekistonda fanlararo innovatsiyalar va ilmiy tadqiqotlar ” 20-fevral 2025- yil 37-son (292-297).

7.B.M.Rustamov, N.G‘.Abdurashidov, Sh.Ashirov, A.Saitniyozov. “” International Journal of Education, Social Science & Humanities. Finland Academic Research Science Publishers 369-372-bet 22-02-2025.

8.Abdurashidov Nuriddin, Tog’ayev Turdimurod, Rustamov Bilol, Eshtemirov Eshtemir “Equation of the Result of Second-Order Surfaces” EXCELLENCIA: INTERNATIONAL MULTI-DISCIPLINARY JOURNAL OF EDUCATION https://multijournals.org/index.php/excellencia-imje

9.Abdurashidov Nuriddin G‘iyoziddin o‘g‘li ,Tog‘ayev Turdimurod Xurram o‘g‘li,Rustamov Bilol Muxbiddinovich. “Laplas tenglamasining fundamental yechimi” .

"So'ngi ilmiy tadqiqotlar nazariyasi" Ilmiy-uslubiy jurnali. 13-iyun 2024-yil 7-jild 6-son (33-37).

10.Rustamov Bilol, Abdurashidov Nuriddin, Eshtemirov Eshtemir, Baltabayeva Saida. "DERIVATION OF THE DISTANCE BETWEEN PARALLEL PLANES" Journal of Multidisciplinary Sciences and Innovations. German internatsional journals.company. 392-396- bett. 18.04.2025.

11.Rustamov B, Ashurov Sh,Abdurashidov N, Chutboyev X. "Uniqueness of the solution of a boundary value problemfor a nonclassical parabolic-type equation" << JOURNAL OF MULTIDISCIPLINARY SCIENCES AND INNOVATIONS>> . German internatsional journals.companyVolume 05. 20.01.2026.