9-AMALIY MASHG'ULOT. Chinlik jadvallarini tuzish. Chinlik jadvallari orqali soddalashtirish

Reja:

1. Chinlik jadvallariga oid asosiy tushunchalar.
2. Mustaqil bajarish uchun masala va topshiriqlar

2.1. mantiq funksiyalari uchun rostlik jadvallarini tuzing

2.2. Chinlik to'plamlari bilan berilgan funksiyalarni formula shaklida ifodalang:

1. Mantiq funksiyalari uchun rostlik jadvalini tuzish.

9.1.-Misol $\alpha(A,B,C)=(A\vee B)\leftrightarrow\left(C\rightarrow\overline{A}\right)$

formulaning rostlik jadvalini tuzish uchun amallarni bajarish ketma-ketligidan foydalanamiz: $\alpha(0,0,0)=(0\vee 0)\leftrightarrow\left(0\rightarrow\overline{0}\right)=0\leftrightarrow(0\rightarrow 1)=0\leftrightarrow 1=0;$

$$\alpha(0,0,1)=(0\vee 0)\leftrightarrow\left(1\rightarrow\overline{0}\right)=0\leftrightarrow(1\rightarrow 1)=0\leftrightarrow 1=0;$$
$$\alpha(0,1,0)=(0\vee 1)\leftrightarrow\left(0\rightarrow\overline{0}\right)=1\leftrightarrow(0\rightarrow 1)=1\leftrightarrow 1=1;$$
$$\alpha(0,1,1)=(0\vee 1)\leftrightarrow\left(1\rightarrow\overline{0}\right)=1\leftrightarrow(1\rightarrow 1)=1\leftrightarrow 1=1;$$
$$\alpha(1,0,0)=(1\vee 0)\leftrightarrow\left(0\rightarrow\overline{1}\right)=1\leftrightarrow(0\rightarrow 0)=1\leftrightarrow 1=1;$$
$$\alpha(1,0,1)=(1\vee 0)\leftrightarrow\left(1\rightarrow\overline{1}\right)=1\leftrightarrow(1\rightarrow 0)=1\leftrightarrow 0=0;$$
$$\alpha(1,1,0)=(1\vee 1)\leftrightarrow\left(0\rightarrow\overline{1}\right)=1\leftrightarrow(0\rightarrow 0)=1\leftrightarrow 1=1;$$
$$\alpha(1,1,1)=(1\vee 1)\leftrightarrow\left(1\rightarrow\overline{1}\right)=1\leftrightarrow(1\rightarrow 0)=1\leftrightarrow 0=0.$$

Rostlik jadvalini tuzamiz:

A	**B**	**C**	**A∨B**	**⌐A**	**C→⌐A**	**α (A,B,C)= (A∨B)~(C→⌐A)**
0	0	0	0	1	1	0
0	0	1	0	1	1	0
0	1	0	1	1	1	1
0	1	1	1	1	1	1
1	0	0	1	0	1	1
1	0	1	1	0	0	0
1	1	0	1	0	1	1
1	1	1	1	0	0	0

9.2.-Misol α(A, B, C)= ⌐(A&B)→(A∨B~C)

formulaning rostlik jadvalini topish uchun amallarni bajarilish ketma-ketligi: 1) qavs ichidagi amal bajariladi, 2) ⌐, 3) &, 4) ∨ , 5) ~ va 6) → amallari birin-ketin bajariladi va formulaning rostlik jadvali tuziladi.

A	B	C	A&B	⌐ (A&B)	A∨B	A∨B~C	α(A, B, C)= ⌐(A&B)→(A∨B~C)
0	0	0	0	1	0	1	1
0	0	1	0	1	0	0	0
0	1	0	0	1	1	0	0
0	1	1	0	1	1	1	1
1	0	0	0	1	1	0	0
1	0	1	0	1	1	1	1
1	1	0	1	0	1	0	1
1	1	1	1	0	1	1	1

Rostlik jadvali bo‘yicha mantiq funksiyasi ko‘rinishini tiklash.

Biz shu paytgacha berilgan formula uchun rostlik jadvallarini tuzishni qarab chiqdik. Savol tug’iladi: Aksincha, rostlik jadvali berilgan bo‘lsa, mantiq funksiyasini tiklash mumkinmi?

Aytaylik, bizga A, B, C mulohaza o’zgaruvchilariga bo‘liq bo‘lgan α=α(A,B,C) formula berilgan bo‘lsin.

Ushbu rostlik jadvaliga ega bo‘lgan cheksiz ko‘p teng kuchli formulalar mavjud. Ulardan ikkitasini, ya`ni rostlik jadvalidagi birlar qatori bo’yicha va rostlik jadvalidagi nollar qatori bo’yicha mantiq funksiyasi ko‘rinishini tiklashni ko‘rib chiqamiz,

1) **Rostlik jadvalida α=α(A,B,C) formula 1 ga teng bo‘lgan qator raqamlarini yozib chiqamiz.** 2-qator 3-qator 6-qator 8-qator

Har bir qatorning mantiqiy imkoniyatlaridagina 1 ga teng bo‘lgan, boshqa imkoniyatlarda esa 0 ga teng bo‘lgan formulalarni yozib chiqamiz. Buning uchun 1 ga teng bo‘lgan qatordagi mulohazalar qiymatlarini rostga aylantirib, mantiq qonunlariga asosan mulohazalar kon’yunksiyalarini olish kerak.

2-qator uchun: ⌐A&⌐B&C; 3- qator uchun: ⌐A&B&⌐C;
6-qator uchun: A&⌐B&C; 8-qator uchun: A&B&C

bo‘ladi. Agar 2-,3-,6-,8-qatorlar bo‘yicha olingan formulalar diz’yunksiyalari olinsa, hosil bo‘lgan formula izlanayotgan formula bo‘ladi:

α=α(A,B,C)=⌐A&⌐B&C∨⌐A&B&⌐C∨A&⌐B&C∨A&B&C (1)

2) **Rostlik jadvalida α=α(A,B,C) formula 0 ga teng bo‘lgan qator nomerlarini yozib chiqamiz:** 1-qator 4-qator 5-qator 7-qator

Har bir qator mantiqiy imkoniyatlaridagina 0 ga teng bo‘lgan, boshqa imkoniyatlarda esa 1 ga teng bo‘lgan formulalarni yozib chiqamiz. Buning uchun 0 ga teng bo‘lgan qatordagi fikr o‘zgaruvchilari qiymatlarini 0(yolg‘on) ga aylantirib, fikr o‘zgaruvchilari diz’yumksiyasini olish lozim. U holda

1-qator uchun: A∨B∨C; 4-qator uchun: A∨⌐B∨⌐C;

5-qator uchun: ⌐A∨B∨C; 7-qator uchun: ⌐A∨⌐B∨C

bo‘ladi.

Agar qatorlar bo‘yicha olingan formulalar kon’yunksiyasi olinsa, hosil bo‘lgan formula izlanayotgan formula bo‘ladi.

α=α(A,B,C)=(A∨B∨C)&(A∨⌐B∨⌐C)&(⌐A∨B∨C)&(⌐A∨⌐B∨C) (2)

(1) - MDNSh va (2) - MKNShlar teng kuchli, chunki ularning rostlik jadvallari bir xil. Shuning uchun ham ulardan qaysi birini tuzish kamroq vaqt talab qilsa, shu ko’rinishini tiklash maqsadga muvofiq.

Rostlik jadvali berilgan ixtiyoriy formulani yuqoridagi uslubda qurish mumkin.

Chinlik jadvali asosida formulalarni tiklash. Mantiq algebrasining berilgan ixtiyoriy formulasi uchun chinlik jadvali tuzish mumkinligini ta’kidlab, ushbu paragrafda teskari masala bilan shug‘ullanamiz, ya’ni berilgan chinlik jadvaliga asoslanib formulani topishni (tiklashni) o‘rganamiz. Shuni ham ta’kidlash kerakki, bu masalaning yechimi, topilishi kerak bo‘lgan formulaga qo‘yilgan shartlarga bog‘liq ravishda, turlicha bo‘lishi mumkin. Aniqlik uchun, dastlab, MDNShdagi formula tiklanishi kerak deb shart qo‘yamiz.

Ravshanki, agar berilgan chinlik jadvali tarkibida ishtirok etayotgan elementar mulohazalar n ta bo‘lsa, u holda izlanayotgan formula tarkibida o‘sha elementar mulohazalar qatnashishlari shart, ya’ni agar topilgan formulani soddalashtirish imkoniyati bo‘lsa, u holda bu elementar mulohazalardan ba’zilari (balki, ularning barchasi) formula soddalashgandan so‘ng, uning tarkibida ishtirok etmasliklari ham mumkin.

Bundan buyon, agar qanfaydir F formula tarkibida $x_1, x_2, ..., x_n$ elementar mulohazalar qatnashsa, ya’ni F formula $x_1, x_2, ..., x_n$ o‘zgaruvchilarga bog‘liq bo‘lsa, u holda uni $F(x_1, x_2, ..., x_n)$ ko‘rinishda ham yozamiz. Bundan tashqari, $F(x_1, x_2, ..., x_n)$ formulani $x_1, x_2, ..., x_n$ o‘zgaruvchilar **funksiyasi**, o‘zgaruvchilarni esa **argumentlar** deb ham yuritamiz.

9.1- jadval

x	y	$\bar{x}$	$\bar{y}$	F_1	F_2	F_3	F_4
0	0	1	1	0	0	0	1
0	1	1	0	0	0	1	0
1	0	0	1	0	1	0	0
1	1	0	0	1	0	0	0

$n=1$ bo‘lganda chinlik jadvaliga asoslanib formulani tiklash masalasi trivialdir. Shuning uchun, dastlab, $n=2$ bo‘lgan holda berilgan chinlik jadvaliga asoslanib formulani tiklashni o‘rganamiz. Tiklanayotgan formula tarkibida x va y elementar mulohazalar qatnashayotgan bo‘lsin.

O‘zgaruvchilar soni $n=2$ bo‘lganda berilgan chinlik jadvalidagi qiymatlar satrlari $2^n = 2^2 = 4$ ta bo‘ladi. Shuning uchun bu jadvalning qiymatlari turlicha bo‘lgan barcha ustunlari $2^4 = 16$ tadir.

Agar chinlik jadvalidagi qandaydir ustunning barcha satrlarida yo qiymatlar joylashgan bo‘lsa (bunday ustun bitta: $C_4^0 = 1$), u holda bu ustunga mos formula aynan yolg‘on bo‘ladi. Qolgan 15 ta ustunlarga mos formulalarni (ikki argumentli funksiyalarni) $F_i \equiv F_i(x,y)$, $i=\overline{1,15}$, deb belgilaymiz.

Dastlab, chinlik jadvalining uchta satrida 0 va bitta satrida 1 qiymatga ega ustunlarini (bunday ustunlar $C_4^1=4$ ta) qarab chiqamiz (5.1- jadvalga qarang). 1- jadvalga mos F_i, $i=\overline{1,4}$, formulalarni tiklaymiz.

9.1- jadvaldagi F_1, F_2, F_3 va F_4 ustunlarning, mos ravishda, 4-, 3-, 2- va 1- satrlarida 1 qiymat va qolgan satrlarida 0 qiymat joylashgani sababli, ularni ifodalovchi formulalarda konyunksiya qatnashishi tabiiydir:

$$F_1 \equiv xy\,,\ F_2 \equiv x\bar{y}\,,\ F_3 \equiv \bar{x}y\,,\ F_4 \equiv \bar{x}\,\bar{y}\,.$$

Demak, F_i, $i=\overline{1,4}$,formulalarningharbiriikki o‘zgaruvchili kon’yunktiv konstituyentlardan iborat.

Endi x va y elementar mulohazalar qatnashgan chinlik jadvalining ikki satrida 0 qiymat va ikki satrida 1 qiymat joylashgan bo‘lsin. Chinlik jadvalining bunday shartni qanoatlantiruvchi ustunlari $C_4^2=6$ ta bo‘ladi (2- jadvalga qarang). 9.2- jadvalga mos F_i, $i=\overline{5,10}$, formulalarni topamiz.

9.2- jadval

x	y	F_1	F_2	F_3	F_4	F_5	F_6	F_7	F_8	F_9	F_{10}
0	0	0	0	0	1	0	0	0	1	1	1
0	1	0	0	1	0	0	1	1	0	0	1
1	0	0	1	0	0	1	0	1	0	1	0
1	1	1	0	0	0	1	1	0	1	0	0

9.2- jadvaldanko‘rinibturibdiki, F_i, $i=\overline{5,10}$, formulalarningharbirini, tarkibida x va y elementarmulohazalarqatnashgan F_i, $i=\overline{1,4}$, kon’yunktivkonstituyentlarjuftlaridizyunksiyasisifatidaifodalashmumkin:

$$F_5 \equiv F_1 \vee F_2 \equiv xy \vee x\bar{y}\,,\ F_6 \equiv F_1 \vee F_3 \equiv xy \vee \bar{x}y\,,$$

$$F_7 \equiv F_2 \vee F_3 \equiv x\bar{y} \vee \bar{x}y\,,\ F_8 \equiv F_1 \vee F_4 \equiv xy \vee \bar{x}\,\bar{y}\,,$$

$$F_9 \equiv F_2 \vee F_4 \equiv x\bar{y} \vee \bar{x}\,\bar{y}\,,\ F_{10} \equiv F_3 \vee F_4 \equiv \bar{x}y \vee \bar{x}\,\bar{y}\,.$$

Chinlikjadvaliningbittasatrida 0 vauchtasatrida 1 joylashganustunlari $C_4^1=4$ ta (9.3- jadvalgaqarang) bo‘lganiuchun, buustunlargamoskeluvchi F_i, $i=\overline{11,14}$, formulalarnitiklaymiz. Buformulalarni, F_i, $i=\overline{1,4}$, kon’yunktivkonstituyentlardanuchtadanolib, ularningdizyunksiyalarisifatidaifodalashmumkin: Agarchinlikjadvalidagiqandaydirustunningbarchasatrlarida 1 qiymatjoylashganbo‘lsa (bundayustunbitta, chunki $C_4^4=1$), uholdabuustunga

9.3- jadval

x	y	F_1	F_2	F_3	F_4	F_{11}	F_{12}	F_{13}	F_{14}
0	0	0	0	0	1	0	1	1	1
0	1	0	0	1	0	1	0	1	1

1	0	0	1	0	0	1	1	0	1
1	1	1	0	0	0	1	1	1	0

$$F_{11} \equiv F_1 \vee F_2 \vee F_3 \equiv xy \vee x\bar{y} \vee \bar{x}y \ ,$$

$$F_{12} \equiv F_1 \vee F_2 \vee F_4 \equiv xy \vee x\bar{y} \vee \bar{x}\,\bar{y} \ ,$$

$$F_{13} \equiv F_1 \vee F_3 \vee F_4 \equiv xy \vee \bar{x}y \vee \bar{x}\,\bar{y} \ ,$$

$$F_{14} \equiv F_2 \vee F_3 \vee F_4 \equiv x\bar{y} \vee \bar{x}y \vee \bar{x}\,\bar{y} \ .$$

mos formula (F_{15}) tavtologiya bo‘ladi. F_{15} formula F_1, F_2, F_3 va F_4 kon’yunktiv konstituyentlar dizyunksiyalari sifatida ifodalanishi mumkin:

$$F_{15} \equiv F_1 \vee F_2 \vee F_3 \vee F_4 \equiv xy \vee x\bar{y} \vee \bar{x}y \vee \bar{x}\,\bar{y} \ .$$

Shunday qilib, ikkita elementar mulohaza uchun berilgan chinlik jadvallari asosida mos formulalarni topish masalasi hal qilindi.

Endi tarkibida uchta ($n=3$), masalan, x, y va z elementar mulohazalar ishtirok etgan chinlik jadvali asosida mos formulalarini topish masalasini hal qilamiz.

$n=3$ bo‘lganda berilgan chinlik jadvalidagi qiymatlar satrlari $2^n = 2^3 = 8$ ta bo‘lgani uchun, bu jadvalning qiymatlari turlicha bo‘lgan barcha ustunlari $2^{2^n} = 2^{2^3} = 2^8 = 256$ tadir. $n=3$ bo‘lganda ham, chinlik jadvalidagi qandaydir ustunning barcha satrlarida faqat 0 qiymat joylashsa (bunday ustun bitta: $C_8^0 = 1$), bu ustunga mos formula aynan yolg‘on bo‘ladi. Qolgan 255ta ustunlarga mos formulalarni (uch argumentli funksiyalarni) $G_i \equiv G_i(x, y)$, $i = \overline{1, 255}$, deb belgilaymiz.

Dastlab, chinlik jadvalining yettita satrida 0 va bitta satrida 1 qiymatga ega ustunlarini (bunday ustunlar $C_8^1 = 8$ ta) qarab chiqamiz (9.4- jadvalga qarang). 9.4- jadvalga mos G_i, $i = \overline{1, 8}$, formulalarni tiklaymiz.

9.4- jadvaldagi G_i ($i = \overline{1, 8}$) ustunning ($9-i$)- satrida 1 qiymat va qolgan satrlarida 0 qiymat joylashgani uchun, bu ustunni ifodalovchi formula uch

9.4- jadval

x	y	z	$\bar{x}$	$\bar{y}$	$\bar{z}$	G_1	G_2	G_3	G_4	G_5	G_6	G_7	G_8
0	0	0	1	1	1	0	0	0	0	0	0	0	1
0	0	1	1	1	0	0	0	0	0	0	0	1	0
0	1	0	1	0	1	0	0	0	0	0	1	0	0
0	1	1	1	0	0	0	0	0	0	1	0	0	0
1	0	0	0	1	1	0	0	0	1	0	0	0	0
1	0	1	0	1	0	0	0	1	0	0	0	0	0
1	1	0	0	0	1	0	1	0	0	0	0	0	0
1	1	1	0	0	0	1	0	0	0	0	0	0	0

o‘zgaruvchili kon’yunktiv konstituyent sifatida ifodalanishi tabiiydir:

$$G_1 \equiv xyz \ , \ G_2 \equiv xy\bar{z} \ , \ G_3 \equiv x\bar{y}z \ , \ G_4 \equiv x\bar{y}\bar{z} \ ,$$

$$G_5 \equiv \bar{x}yz \ , \ G_6 \equiv \bar{x}y\bar{z} \ , \ G_7 \equiv \bar{x}\,\bar{y}z \ , \ G_8 \equiv \bar{x}\,\bar{y}\bar{z} \ .$$

Tarkibida x, y va z o‘zgaruvchilarqatnashganchinlikjadvaliningoltitasatrida 0 qiymatvaikkitasatrida 1 qiymatjoylashganbo‘lsin. Chinlik jadvalining bunday shartni qanoatlantiruvchi ustunlari $C_8^2 = \frac{8 \cdot 7}{1 \cdot 2} = 28$ ta bo‘lishi ravshan. Bu ustunlarga mos G_i, $i = \overline{9,\ 36}$, formulalarni G_i, $i = \overline{1,\ 8}$,kon’yunktiv konstituyentlar juftlari dizyunksiyasi sifatida ifodalash mumkin:

$G_9 \equiv G_1 \vee G_2 \equiv xyz \vee xy\bar{z}$, $G_{10} \equiv G_1 \vee G_3 \equiv xyz \vee x\bar{y}z$,…, $G_{36} \equiv G_7 \vee G_8 \equiv \bar{x}\,\bar{y}z \vee \bar{x}\,\bar{y}\bar{z}$.

Chinlik jadvalining beshta satrida 0 va uchta satrida 1 joylashgan ustunlari $C_8^3 = \frac{8 \cdot 7 \cdot 6}{1 \cdot 2 \cdot 3} = 56$ ta. Bu ustunlarga mos G_i , $i = \overline{37,\ 92}$, formulalar G_i , $i = \overline{1,\ 8}$,kon’yunktiv konstituyentlardan uchtadan olib, ularning dizyunksiyalari sifatida tiklanishi mumkin:

$$G_{37} \equiv G_1 \vee G_2 \vee G_3 \equiv xyz \vee xy\bar{z} \vee x\bar{y}z ,$$

$$G_{38} \equiv G_1 \vee G_2 \vee G_4 \equiv xyz \vee xy\bar{z} \vee x\bar{y}\bar{z} ,$$

$$\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots$$

$$G_{92} \equiv G_6 \vee G_7 \vee G_8 \equiv \bar{x}y\bar{z} \vee \bar{x}\,\bar{y}z \vee \bar{x}\,\bar{y}\bar{z}$$

Shunday usulda davom etib, qolgan G_i, $i = \overline{93,\ 255}$, formulalar G_i, $i = \overline{1,\ 8}$,kon’yunktiv konstituyentlardan 4tadan, 5tadan, 6tadan, 7tadan va 8tadan olib, ularning dizyunksiyalari kombinatsiyalari sifatida tiklanishi mumkin. Tabiiyki, chinlik jadvalidagi biror ustunning barcha satrlarida faqat 1 qiymat joylashgan bo‘lsa (bunday ustun bitta, chunki $C_8^8 = 1$), bu ustunga mos formula (uni G_{255} deb belgilagan bo‘lsak) tavtologiyadir. G_{255} formula 8 ta G_i, $i = \overline{1,\ 8}$,kon’yunktiv konstituyentlar dizyunksiyalari sifatida ifodalanadi.

Demak, uchta elementar mulohaza uchun ham berilgan chinlik jadvallari asosida mos formulalarni topish masalasi hal qilindi. Shunga o‘xshah, uchta elementar mulohaza uchun, berilgan chinlik jadvali asosida 0 qiymatga mos formulalarni tiklash masalasi ham hal qilinishi mumkin.

Yuqorida bayon qilingan usuldan foydalanib n ta $x_1, x_2, ..., x_n$ elementar mulohazalar uchun 2^n ta satrga ega chinlik jadvallari asosida mos formulalarni tiklash masalasi yechilishi mumkin.

$$G_{255} \equiv xyz \vee xy\bar{z} \vee x\bar{y}z \vee x\bar{y}\bar{z} \vee \bar{x}yz \vee \bar{x}y\bar{z} \vee \bar{x}\,\bar{y}z \vee \bar{x}\,\bar{y}\bar{z} .$$

9.5- jadval

x	y	z	A_1	A_2	A_3	A_4	A_5
0	0	0	1	1	0	0	1
0	0	1	0	0	1	1	0
0	1	0	1	1	0	0	1
0	1	1	0	0	1	1	1
1	0	0	1	1	0	0	0
1	0	1	0	1	0	1	1
1	1	0	1	0	1	1	0
1	1	1	0	1	1	0	1

9.3-misol. Berilgan9.5-chinlik jadvaliga asoslanib 1 qiymatga mos $A_i \equiv A_i(x,y,z)$, $i=\overline{1,5}$, formulalarni hosil qilish talab etilgan bo‘lsin.

Izlangan formulalarni yuqorida bayon etilgan usuldan foydalanib (9.4-jadvalga qarang) quyidagicha tiklaymiz.

$$A_1 \equiv G_2 \vee G_4 \vee G_6 \vee G_8 \equiv xy\bar{z} \vee x\bar{y}\bar{z} \vee \bar{x}y\bar{z} \vee \bar{x}\bar{y}\bar{z},$$

$$A_2 \equiv G_1 \vee G_3 \vee G_4 \vee G_6 \vee G_8 \equiv xyz \vee x\bar{y}z \vee x\bar{y}\bar{z} \vee \bar{x}y\bar{z} \vee \bar{x}\bar{y}\bar{z},$$

$$A_3 \equiv G_1 \vee G_2 \vee G_5 \vee G_7 \equiv xyz \vee xy\bar{z} \vee \bar{x}yz \vee \bar{x}\bar{y}z,$$

$$A_4 \equiv G_2 \vee G_3 \vee G_5 \vee G_7 \equiv xy\bar{z} \vee x\bar{y}z \vee \bar{x}yz \vee \bar{x}\bar{y}z,$$

$$A_5 \equiv G_1 \vee G_3 \vee G_5 \vee G_6 \vee G_8 \equiv xyz \vee x\bar{y}z \vee \bar{x}yz \vee \bar{x}y\bar{z} \vee \bar{x}\bar{y}\bar{z}. \ \blacksquare$$

9.4-misol. 9.5-chinlik jadvaliga asoslanib 0 qiymatga mos A_i, $i=\overline{1,5}$, formulalarni tiklash talab etilgan bo‘lsin. Dastlab, 9.6-chinlik jadvalini tuzamiz. 9.6-jadvaldagi yettita satrida 1 va bitta satrida 0 qiymatga ega ustunlarga mos B_i, $i=\overline{1,8}$, formulalarni tiklaymiz. Bu jadvaldagi B_i $(i=\overline{1,8})$ ustunning i - satrida 0 qiymat va qolgan satrlarida 1 qiymat joylashgani uchun, bu ustunni ifodalovchi formula uch o‘zgaruvchili diz’yunktiv konstituyent sifatida ifodalanishi mumkin:

$$B_1 \equiv x \vee y \vee z,\ B_2 \equiv x \vee y \vee \bar{z},\ B_3 \equiv x \vee \bar{y} \vee z,\ B_4 \equiv x \vee \bar{y} \vee \bar{z},$$

$$B_5 \equiv \bar{x} \vee y \vee z,\ B_6 \equiv \bar{x} \vee y \vee \bar{z},\ B_7 \equiv \bar{x} \vee \bar{y} \vee z,\ B_8 \equiv \bar{x} \vee \bar{y} \vee \bar{z}.$$

9.6- jadval

x	y	z	$\bar{x}$	$\bar{y}$	$\bar{z}$	B_1	B_2	B_3	B_4	B_5	B_6	B_7	B_8
0	0	0	1	1	1	0	1	1	1	1	1	1	1
0	0	1	1	1	0	1	0	1	1	1	1	1	1
0	1	0	1	0	1	1	1	0	1	1	1	1	1
0	1	1	1	0	0	1	1	1	0	1	1	1	1
1	0	0	0	1	1	1	1	1	1	0	1	1	1
1	0	1	0	1	0	1	1	1	1	1	0	1	1
1	1	0	0	0	1	1	1	1	1	1	1	0	1
1	1	1	0	0	0	1	1	1	1	1	1	1	0

Endi A_i, $i=\overline{1,5}$, formulalarni 9.5-chinlik jadvaliga asoslanib quyidagi formula sifatida tiklash mumkin:

$$A_1 \equiv B_2 \wedge B_4 \wedge B_6 \wedge B_8 \equiv$$

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

$$A_2 \equiv B_2 \wedge B_4 \wedge B_7 \equiv (x \vee y \vee \bar{z}) \wedge (x \vee \bar{y} \vee \bar{z}) \wedge (\bar{x} \vee \bar{y} \vee z),$$

$$A_3 \equiv B_1 \wedge B_3 \wedge B_5 \wedge B_6 \equiv$$

$$\equiv (x \vee y \vee z) \wedge (x \vee \bar{y} \vee z) \wedge (\bar{x} \vee y \vee z) \wedge (\bar{x} \vee y \vee \bar{z}),'$$

$$A_4 \equiv B_1 \wedge B_3 \wedge B_5 \wedge B_8 \equiv$$

$$\equiv (x \vee y \vee z) \wedge (x \vee \bar{y} \vee z) \wedge (\bar{x} \vee y \vee z) \wedge (\bar{x} \vee \bar{y} \vee \bar{z}),'$$

$$A_5 \equiv B_2 \wedge B_5 \wedge B_7 \equiv (x \vee y \vee \bar{z}) \wedge (\bar{x} \vee y \vee z) \wedge (\bar{x} \vee \bar{y} \vee z).$$

Mustaqil yechish uchun masalalar:

2.1. Quyidagi mantiq funksiyalari uchun rostlik jadvallarini tuzing:

2.1.1. $\overline{\overline{x \vee y} \to \overline{x \wedge y}}$

2.1.2 $(x \to y) \to (\bar{y} \to \bar{x})$

2.1.3. $\overline{x \to (y \to x)}$

2.1.4. $\bar{x} \to (x \to y)$

2.1.5. $((x \wedge y) \leftrightarrow y) \to (y \to x)$

2.1.6. $((x \to y) \wedge (y \to z)) \to (x \to z)$

2.1.7. $\overline{(x \to z) \to ((y \to z) \to (x \vee y \to z))}$

2.1.8. $(y \to z) \to ((y \vee x) \to (z \vee x))$

2.1.9. $(p_1 \to (p_2 \to p_3)) \to ((p_1 \to p_2) \to (p_1 \to p_3))$;

2.1.10. $\overline{(y \to z) \to ((y \wedge x) \to (z \wedge x))}$

2.1.11. $\overline{\overline{x \vee y} \to \overline{x \wedge y}}$

2.1.12. $(x \to y) \to (\bar{y} \to \bar{x})$

2.1.13. $\overline{x \to (y \to x)}$

2.1.14. $\bar{x} \to (x \to y)$

2.1.15. $((x \wedge y) \leftrightarrow y) \to (y \to x)$

2.1.16. $((x \to y) \wedge (y \to z)) \to (x \to z)$

2.1.17. $\overline{(x \to z) \to ((y \to z) \to (x \vee y \to z))}$

2.1.18. $(y \to z) \to ((y \vee x) \to (z \vee x))$

2.1.19. $(p_1 \to (p_2 \to p_3)) \to ((p_1 \to p_2) \to (p_1 \to p_3))$;

2.1.20. $\overline{(y \to z) \to ((y \wedge x) \to (z \wedge x))}$

2.1.21. $\overline{\overline{x \vee y} \to \overline{x \wedge y}}$

2.1.22. $(x \to y) \to (\bar{y} \to \bar{x})$

2.1.23. $\overline{x \to (y \to x)}$

2.1.24. $\bar{x} \to (x \to y)$

2.1.25. $((x \wedge y) \leftrightarrow y) \to (y \to x)$

2.1.26. $((x \to y) \wedge (y \to z)) \to (x \to z)$

2.1.27. $\overline{(x \to z) \to ((y \to z) \to (x \vee y \to z))}$

2.1.28. $(y \to z) \to ((y \vee x) \to (z \vee x))$

2.1. 29. $(p_1 \to (p_2 \to p_3)) \to ((p_1 \to p_2) \to (p_1 \to p_3))$;

2.1.30. $\overline{(y \to z) \to ((y \wedge x) \to (z \wedge x))}$

2.2.Chinlik to'plamlari bilan berilgan funksiyalarni formula shaklida ifodalang:

2.2.1. f=(01010101)
2.2.2. f=(01010111)
2.2.3. f=(11010101)
2.2.4. f=(11010111)
2.2.5. f=(01110101)
2.2.6. f=(01110111)
2.2.7. f=(01011101)
2.2.8. f=(01011111)
2.2.9. f=(00010101)
2.2.10. f=(00010111)
2.2.11. f=(01010101)
2.2.12. f=(01010011)
2.2.13. f=(01010001)
2.2.14. f=(01010100)
2.2.15. f=(01011100)
2.2.16. f=(0011001101010110)
2.2.17. f=(1100011101010111)
2.2.18. f=(1101110101010101)
2.2.19. f=(1101110101001001)
2.2.20. f=(1101110101010000)
2.2.21. f=(1101110101010011)
2.2.22. f=(1101110101011001)
2.2.23. f=(1001110101010101)
2.2.24. f=(0111010101001101)
2.2.25. f=(1101110101001010)
2.2.26. f=(1101010001011100)