Ü 5. Hausübung

2.1. Boolische Algebra.

a) $j(a,b,c,d) = a\bar{b} + c + \underbrace{\bar{a}\bar{c}d + b\bar{c}d}$

$(c + \bar{c}d(\bar{a}+b)$

$a\bar{b} + c + d(\bar{a}+b)$

$a\bar{b} + c + d\bar{a} + bd = a\bar{b} + d(\bar{a}+b) + c$

b) $k(a,b,c,d) = \overline{\bar{a}b\bar{c}} \cdot \overline{a\bar{b}\bar{c}}$

$(\bar{\bar{a}} + \bar{b} + \bar{\bar{c}}) \cdot (\bar{a} + \bar{\bar{b}} + \bar{\bar{c}})$

$(a + \bar{b} + c) \cdot (\bar{a} + b + c)$

$\cancel{a\bar{a}} + ab + ac + \bar{b}\bar{a} + \cancel{\bar{b}b} + \bar{b}c + \bar{a}c + bc + cc$

$c(ab + a + \bar{b} + \bar{a} + b + 1) = c(a(b+1) + (\bar{b}+b) + \bar{a} = c(a+\bar{a}) = c$

$X + XY = X$ поглощение

$X + \bar{X}Y = X + Y$ склеиван

c) $l(a,b,c,d) = abc + ab\bar{d} + a\bar{c} + \bar{a}\bar{b}\bar{c}d + \bar{a}c$

$a(bc + b\bar{d} + \bar{c}) + \bar{a}(\bar{b}\bar{c}d + c)$

$a(\underbrace{bc + \bar{c}} + b\bar{d})$ $\quad$ $\bar{a}(c + \bar{c}(\bar{b}d))$

$b + \bar{c} + b\bar{d}$ $\quad$ $c + \bar{b}d$

$b + b\bar{d} + \bar{c}$ $\quad$ $\bar{a}(c + \bar{b}d)$

$b(1+\bar{d}) + \bar{c}$ $\quad$ $\bar{a}c + \bar{a}\bar{b}d$

$b \cdot 1 + \bar{c}$

$b + \bar{c}$

$a(b+\bar{c})$

$ab + a\bar{c}$

$ab + a\bar{c} + \bar{a}c + \bar{a}\bar{b}d$

d) $m(a,b,c,d) = (a+\bar{b}+c)\,\overline{ab + \bar{a}\bar{c}}$

$(\bar{a}+\bar{b})(\bar{\bar{a}}+\bar{\bar{c}})$

$(\bar{a}+\bar{b})\cdot(a+c)$

$(a+\bar{b}+c)(\bar{a}+\bar{b})(a+c)$

$(\bar{b} + \underbrace{a+c)(a+c)}_{\text{поглощение}}(\bar{a}+\bar{b})$

$(a+c)(\bar{a}+\bar{b})$

$a\bar{a} + a\bar{b} + c\bar{a} + c\bar{b}$

$0 + a\bar{b} + c\bar{a} + c\bar{b}$

$a\bar{b} + c\bar{a} + c\bar{b}$

$\underbrace{a\bar{b} + \bar{b}c} + \underbrace{c\bar{a}}$

$a\bar{b} + c\bar{a}$

$a\bar{a} = 0$

$XY + \bar{X}Z + YZ = XY + \bar{X}Z$

теорема консенсуса склеивание

2.1 b) $j(a,b,c,d)$

j_{simpl}: $a\bar{b} + c + \bar{a}d + bd$ | $a\bar{b} + c + \bar{a}\bar{c}d + b\bar{c}d = j_{orig}$

a	b	c	d	$a\bar{b}$	c	$\bar{a}\bar{c}d$	$b\bar{c}d$	j_{orig}	$\bar{a}d$	bd	j_{simpl}
								0			0
0 ->								0			0
								0			0
0 ->			1			1		1			1
		1			1			1			1
		1	1		1			1	1		1
	1							0			0
	1		1			1	1	1	1	1	1
	1	1			1			1		1	1
usw...											

Viel zu viel

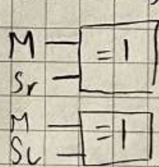
c) $j = \bar{a}\bar{b}\bar{c}d + \bar{a}\bar{b}cd + \bar{a}\bar{b}cd + \bar{a}b\bar{c}d + \bar{a}bcd + \bar{a}bcd + a\bar{b}\bar{c}\bar{d} + a\bar{b}\bar{c}d +$
$+ a\bar{b}c\bar{d} + a\bar{b}cd + ab\bar{c}d + abc\bar{d} + abcd = KDNF$

$c \to c(a+\bar{a})(b+\bar{b})(d+\bar{d})$ — домножить на $\underbrace{(x+\bar{x})}_{1}$

2.2. Прошлая задача

$KDNF = \bar{M}\bar{s_l}s_r + \bar{M}s_l\bar{s_r} + M\bar{s_l}\bar{s_r} + Ms_l\bar{s_r}$

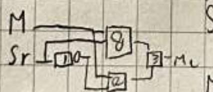
$m_l = \bar{M}s_r(\bar{s_l} + s_l) + M\bar{s_r}(\bar{s_l} + s_l)$
$= Ms_r \cdot 1 + M\bar{s_r} \cdot 1$
$= Ms_r + M\bar{s_r}$



— m_l Лево

— m_r Право

$m_l = Ms_r + M\bar{s_r}$



$Ms_r + M\bar{s_r} = M(s_r + \bar{s_r}) = M$?!

$m_l = M \oplus s_r$

Также $m_r = \bar{M}s_l + Ms_l$ $\quad m_r = M \oplus s_l$

2.3. Konsensus - Gleichung

$xy + \bar{x}z + yz = xy + \bar{x}z$

$yz1$

$yz(x+\bar{x})$

$yzx + yz\bar{x}$

$xy + \bar{x}z + xyz + \bar{x}yz$

Поглощение $(xy + xyz) + (\bar{x}z + \bar{x}yz)$

$xy \quad + \quad \bar{x}z$

Итого: $xy + \bar{x}z = xy + \bar{x}z$

$\left(\begin{matrix} m_r 1 \\ m_l 1 \end{matrix}\right)$ = прямо

4.2.2. $\left.\begin{matrix} m_l = 1 \\ m_r = 1 \end{matrix}\right\}$ an $\begin{matrix} \text{links} \\ \text{rechts} \end{matrix}$ $\Big\{$ Motor / anti-Kette $\left.\begin{matrix} m_l = 0 \\ m_r = 0 \end{matrix}\right\}$ aus

$\left.\begin{matrix} S_l = 1 \\ S_r = 1 \end{matrix}\right\}$ Seite Objekt сенсор $\left.\begin{matrix} S_l = 0 \\ S_r = 0 \end{matrix}\right\}$ Seite: keinen Objekt

$\left.\begin{matrix} M = 0 \\ M = 1 \end{matrix}\right\}$ Modi (Modus) следовать за / избегать - всегда вперёд пока не найдет

$S_{l,r}$ срабатывает - поворот

оба = оставаться стоять

Прямо : $m_r = 1$ $m_l = 1$ Право = $m_r = 1, m_l = 0$ Стоп = $m_r = 0, m_l = 0$

$M = 0$ = следовать $s_r, s_l = 0$ - прямо ($m_r, m_l = 1$)

$s_r = 0, s_l = 1$ = 0. слева $m_r = 1, m_l = 0$ п. влево

$s_l = 0, s_r = 1$ об. справа $m_r = 0, m_l = 1$ поворот в противоположн.

$s_l, s_r = 1$ объект прямо $m_{l,r} = 0$ стоять

a)

M	S_l	S_r	m_l	m_r
0	0	0	0	0
0	0	1	1	0
0	1	0	0	1
0	1	1	1	1
1	0	0	1	1
1	0	1	0	1
1	1	0	1	0
1	1	1	0	0

b.1)

KDNF = <1> в m_l и m_r

$KDNF_{m_l}$: (M S_l S_r) 001, 011, 100, 110

$m_l = (\bar{M}\bar{S_l}S_r) + (\bar{M}S_lS_r) + (M\bar{S_l}\bar{S_r}) + (MS_l\bar{S_r})$

$KDNF_{m_r}$ 010, 011, 100, 101 $= (\bar{M}S_l\bar{S_r}) + (\bar{M}S_lS_r) + (M\bar{S_l}\bar{S_r}) + (M\bar{S_l}S_r)$

$= \bar{M}\bar{S_l}S_r + \bar{M}S_lS_r + M\bar{S_l}\bar{S_r} + MS_l\bar{S_r}$

$\bar{M}S_r(\bar{S_l} + S_l) + M\bar{S_r}(\bar{S_l} + S_l)$

$\bar{M}S_r + M\bar{S_r}$

$M(S_r + \bar{S_r})$

M

$m_r = \bar{M}S_l\bar{S_r} + \bar{M}S_lS_r + M\bar{S_l}\bar{S_r} + M\bar{S_l}S_r$

$\bar{M}S_l(\bar{S_r} + S_r) + M\bar{S_l}(\bar{S_r} + S_r)$

$\bar{M}S_l + M\bar{S_l}$

$M(S_l + \bar{S_l})$

M