Ü 5. Hausübung

2.1. Boolische Algebra.

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

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

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

$a\bar{b} + c + d\bar{a} + bd$ DNF

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

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

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

c

X+XY=X поглощение

$X + \bar{X}Y = X + Y$ склеиван

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

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

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

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

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

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

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

$b + \bar{c}$

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

$ab + a\bar{c}$

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

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

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

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

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

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

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

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

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

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

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

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

$a\bar{a} = 0$

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

теорема консенсуса

склеивание

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

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

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

usw.

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

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

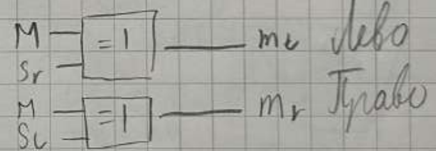
2.2. Прошлая задача.

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

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

$= \bar{M}s_r \cdot 1 + M\bar{s_r} \cdot 1$

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



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

$m_l = M \oplus s_r$

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

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

4.2.2. $m_l = 1$ links, $m_r = 1$ rechts } an — Motor / Kette — anti-: $m_l = 0$, $m_r = 0$ } aus

$\binom{m_r\ 1}{m_l\ 1}$ = прямо

$S_l = 1$, $S_r = 1$ } Seite Objekt сенсоры — $S_l = 0$, $S_r = 0$ } Seite: keinen Objekt

$M = 0$, $M = 1$ } 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)

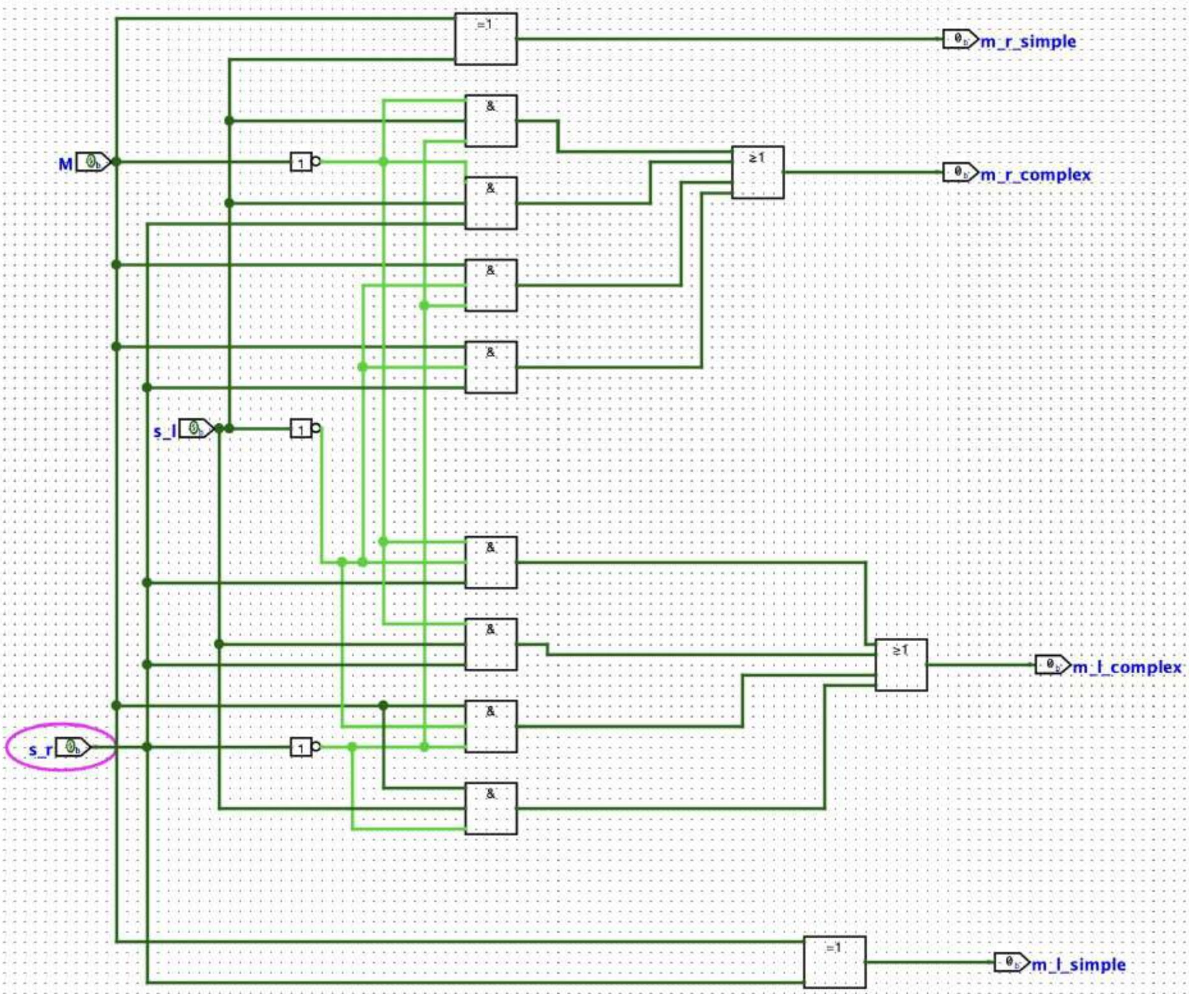
	M	S_l	S_r	m_l	m_r
folgen	0	0	0	0	0
	0	0	1	1	0
	0	1	0	0	1
	0	1	1	1	1
ausweichen	1	0	0	1	1
	1	0	1	0	1
	1	1	0	1	0
	1	1	1	0	0

KDNF = <1> в m_l и m_r

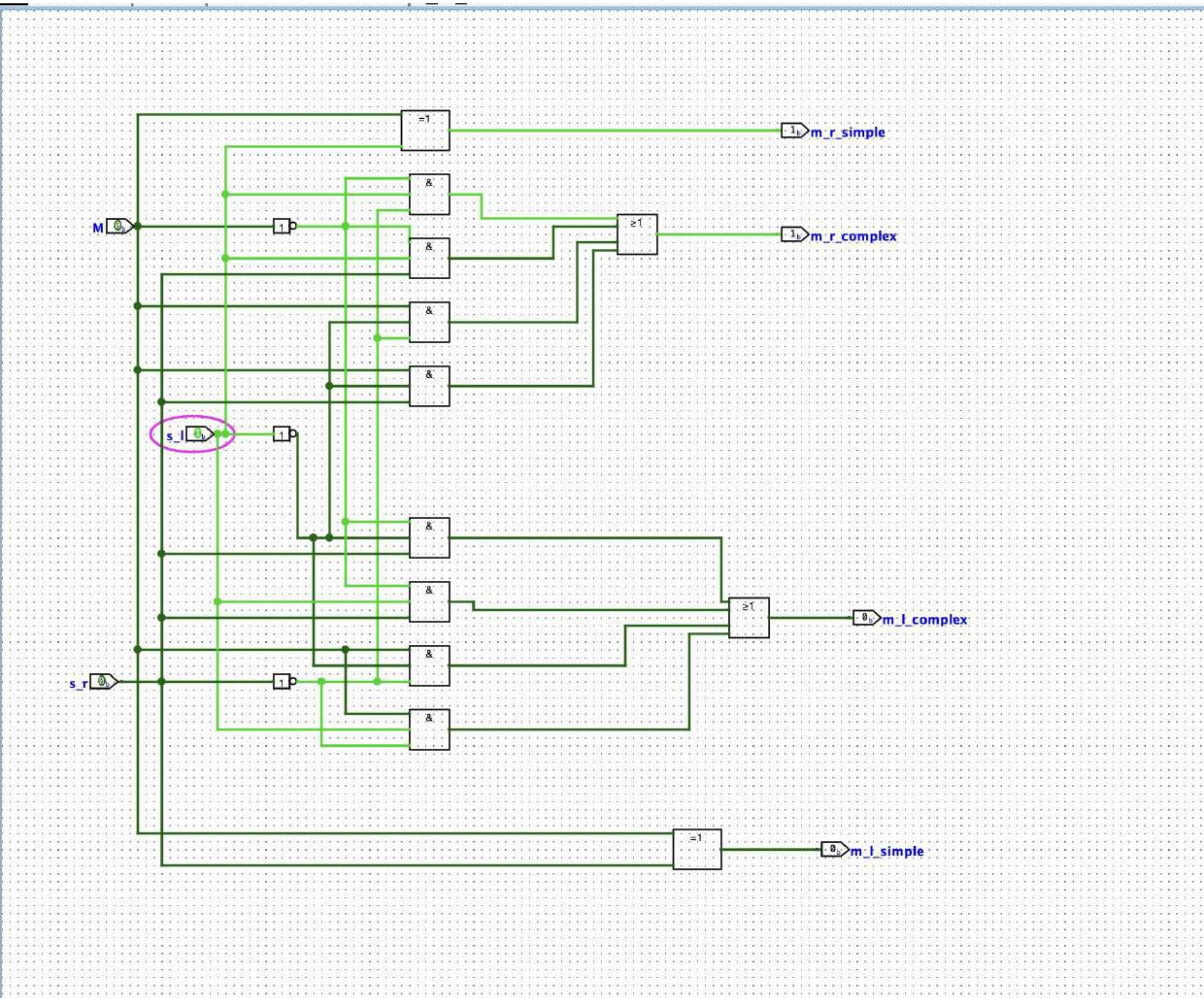
b.1) KDNF m_l : (M S_l S_r)
001
011
100
110

$m_l = (\bar{M}\bar{s}_l s) + (\bar{M} s_l s_r) + (M \bar{s}_l \bar{s}_r) + (M s_l \bar{s}_r)$

b.2) $KDNF_{m_r}$ 010, 011, 100, 101 $= (\bar{M} s_l \bar{s}_r) + (\bar{M} s_l s_r) + (M \bar{s}_l \bar{s}_r) + (M \bar{s}_l s_r)$



M
s_l
s_r
m_r_simple
m_r_complex
m_l_complex
m_l_simple



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m_r_simple
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m_r_complex
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m_l_complex
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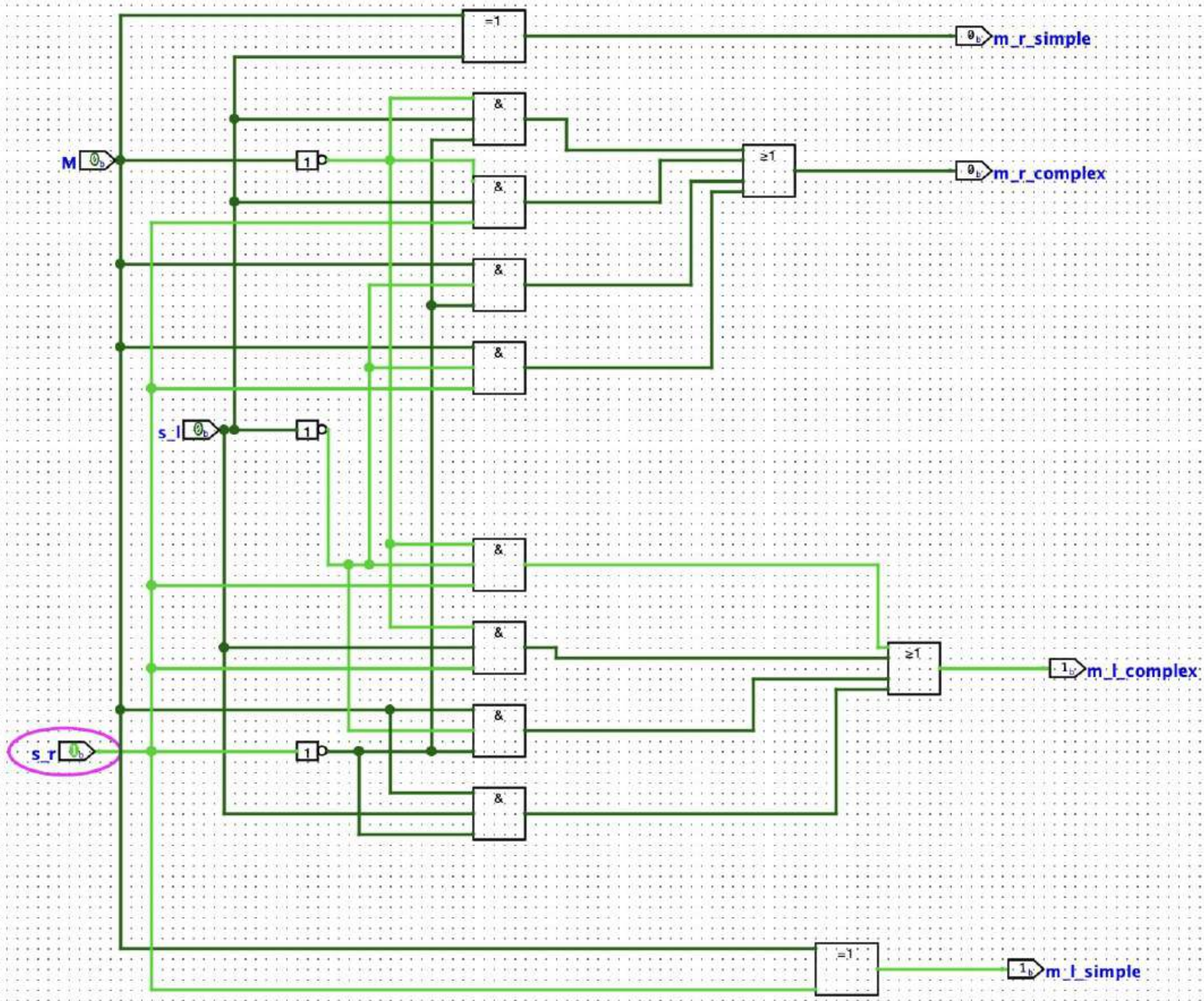
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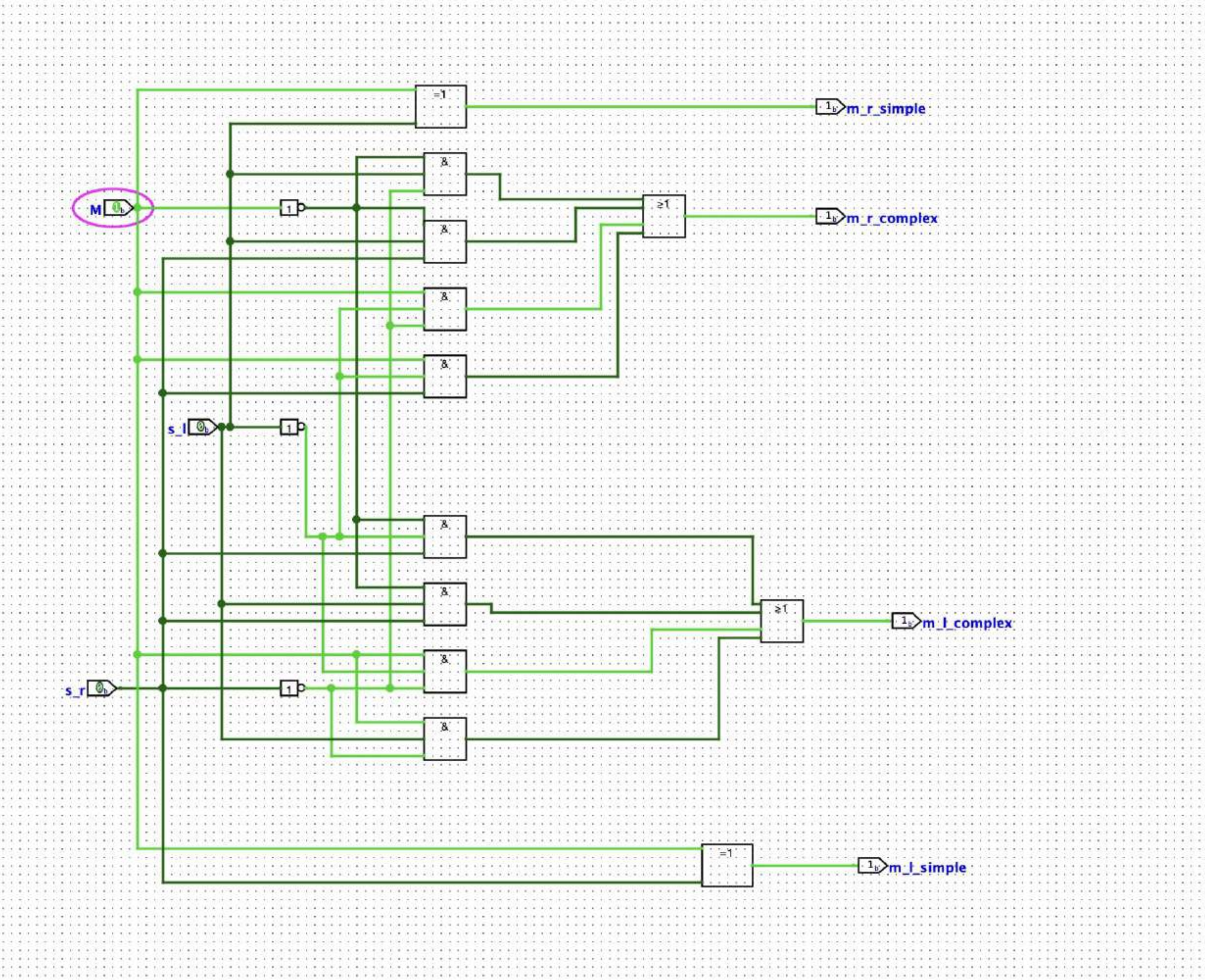
m_r_complex
s_l
m_l_complex
s_r
m_l_simple



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