Atividade Eletrônica Digital

Tabela Verdade:

→ (1)

A	B	Soma	Carry
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

$S = \overline{A} \cdot B + A \cdot \overline{B}$

ou $S = A \oplus B$

$C = A \cdot B$

→ (2) Tabela Verdade:

A	B	Entrada (TE)	Soma	Carry (TS)
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	1
1	1	1	1	1

$Soma = \overline{A} \cdot \overline{B} \cdot TE + \overline{A} \cdot B \cdot \overline{TE} + A \cdot \overline{B} \cdot \overline{TE} + A \cdot B \cdot TE$

$\therefore TE \cdot (\overline{A} \cdot \overline{B} + A \cdot B) + \overline{TE} \cdot (\overline{A} \cdot B + A \cdot \overline{B})$

$\therefore TE \cdot (A \oplus B) + \overline{TE} \cdot (A \oplus B)$

$\therefore TE \cdot (\overline{A \oplus B}) + \overline{TE} \cdot (A \oplus B)$

$\boxed{Soma = A \oplus B \oplus TE}$

$TS = \overline{A} \cdot B \cdot TE + A \cdot \overline{B} \cdot TE + A \cdot B \cdot \overline{TE} + A \cdot B \cdot TE$

$\therefore TS = TE \cdot (\overline{A} \cdot B + \overline{B} \cdot TE) + A \cdot B \cdot (\overline{TE} + TE)$

$\boxed{TS = TE \cdot (A \oplus B) + A \cdot B}$

→ ③ Tabela Verdade:

A	B	TE	Soma	TS - Carry
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	1
1	1	1	1	1

Soma:

	$\overline{B}$	$\overline{B}$	B	B
$\overline{A}$	0	1	0	1
A	1	0	1	0
	$\overline{TE}$	TE	TE	$\overline{TE}$

→ $Soma = \overline{A} \cdot \overline{B} \cdot TE + \overline{A} \cdot B \cdot \overline{TE} + A \cdot \overline{B} \cdot \overline{TE} + A \cdot B \cdot TE$

$Soma = TE \cdot (\overline{A} \cdot \overline{B} + A \cdot B) + \overline{TE} \cdot (A \cdot B + A \cdot \overline{B})$

$Soma = TE \cdot (\overline{A \oplus B}) + \overline{TE} \cdot (A \oplus B)$

$\boxed{Soma = A \oplus B \oplus TE}$

TS:

	$\overline{B}$	$\overline{B}$	B	B
$\overline{A}$	0	0	1	0
A	0	1	1	1
	$\overline{TE}$	TE	TE	$\overline{TE}$

→ $\boxed{TS = A \cdot B + A \cdot TE + B \cdot TE}$

→ ④ Tabela Verdade:

A	B	S	TS
0	0	0	0
0	1	1	1
1	0	1	0
1	1	0	0

Saída = $\overline{A} \cdot B + A \cdot \overline{B}$ ou $S = A \oplus B$

$TS = \overline{A} \cdot B$

⑤ Tabela Verdade:

A	B	TE	S	TS
0	0	0	0	0
0	0	1	1	1
0	1	0	1	1
0	1	1	0	1
1	0	0	1	0
1	1	0	0	0
1	1	1	1	1

Saída = $\overline{A} \cdot \overline{B} \cdot TE + \overline{A} \cdot B \cdot \overline{TE} + A \cdot \overline{B} \cdot \overline{TE} + A \cdot B \cdot TE$

$\therefore TE(\overline{A} \cdot \overline{B} + A \cdot B) + \overline{TE} \cdot (A \cdot \overline{B} + \overline{A} \cdot B)$

$\therefore TE \cdot (A \odot B) + \overline{TE} \cdot (A \oplus B)$

$\therefore TE \cdot (\overline{A \oplus B}) + \overline{TE}(A \oplus B)$

Saída = $A \oplus B \oplus TE$

$TS = \overline{A} \cdot \overline{B} \cdot TE + \overline{A} \cdot B \cdot \overline{TE} + \overline{A} \cdot B \cdot TE + A \cdot B \cdot TE$

$TS = \overline{A} \cdot B \cdot (\overline{TE} + TE) + TE \cdot (\overline{A} \cdot \overline{B} + A \cdot B)$

$TS = \overline{A} \cdot B + TE \cdot (A \odot B)$

$TS = (\overline{A \oplus B}) \cdot TE + \overline{A} \cdot B$

⑥ Tabela Verdade:

A	B	TE	S	TS
0	0	0	0	0
0	0	1	1	1
0	1	0	1	1
0	1	1	0	1
1	0	0	1	0
1	0	1	0	0
1	1	0	0	0
1	1	1	1	1

Mapa de Karnaugh:

	$\overline{B}$	$\overline{B}$	B	B
$\overline{A}$	0	1	0	1
A	1	0	1	0
	$\overline{TE}$	TE	TE	$\overline{TE}$

Saída = $\overline{A} \cdot \overline{B} \cdot TE + \overline{A} \cdot B \cdot \overline{TE} + A \cdot \overline{B} \cdot \overline{TE} + A \cdot B \cdot TE$

Saída = $TE \cdot (\overline{A} \cdot \overline{B} + A \cdot B) + \overline{TE} \cdot (\overline{A} \cdot B + A \cdot \overline{B})$

Saída = $TE(\overline{A \oplus B}) + \overline{TE} \cdot (A \oplus B)$

Saída = $A \oplus B \oplus TE$

TS : $\overline{B}$	$\overline{B}$	B	B
A	0	1	1	1
A	0	0	1	0
	$\overline{TE}$	TE	TE	$\overline{TE}$

$TS = \overline{A} \cdot B + \overline{A} \cdot TE + B \cdot TE$

Tabela Verdade:

(4)

M	A	B	TE	S	TS	
0	0	0	0	0	0	0
0	0	0	1	1	0	1
0	0	1	0	1	0	2
0	0	1	1	0	1	3
0	1	0	0	1	0	4
0	1	0	1	0	1	5
0	1	1	0	0	1	6
0	1	1	1	1	1	7
1	0	0	0	0	0	8
1	0	0	1	1	1	9
1	0	1	0	1	1	10
1	0	1	1	0	1	11
1	1	0	0	1	0	12
1	1	0	1	0	0	13
1	1	1	0	0	0	14
1	1	1	1	1	1	15

$M = 0$

$M = 1$

Mapas de Karnaugh:

S	$\bar{B}$	$\bar{B}$	B	B	
$\bar{M}$	0	1	0	1	$\bar{A}$
$\bar{M}$	1	0	1	0	A
M	1	0	1	0	A
M	0	1	0	1	$\bar{A}$
	$\bar{TE}$	TE	TE	$\bar{TE}$	

$S = \bar{B}A\bar{TE} + BATE + \bar{B}\bar{A}TE + BA\bar{TE}$

TS	$\bar{B}$	$\bar{B}$	B	B	
$\bar{M}$	0	0	1	0	$\bar{A}$
$\bar{M}$	0	1	1	1	A
M	0	0	1	0	A
M	0	1	1	1	$\bar{A}$
	$\bar{TE}$	TE	TE	$\bar{TE}$	

$TS = B \cdot TE + \bar{M} \cdot A \cdot \bar{TE} + \bar{M} \cdot A \cdot B + M \cdot \bar{A} \cdot \bar{TE} + M \cdot \bar{A} \cdot B$