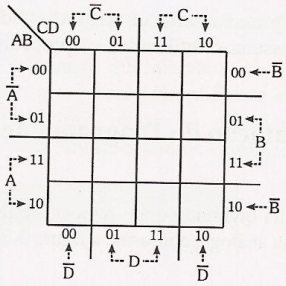

Figura 3.76

3.10 Exercícios Propostos

3.10.1 - Simplifique cada expressão, utilizando a Álgebra de Boole.

a) $S = AB\overline{C} + \overline{A}\,\overline{B}C + ABC + \overline{A}BC + \overline{A}B\overline{C}$

b) $S = AB\overline{C}D + \overline{A}\,\overline{B}CD + AB\overline{C}\,\overline{D} + \overline{A}BC\overline{D} + ABCD + A\overline{B}C\overline{D} + ABCD$

3.10.2 - Simplifique utilizando a Álgebra de Boole:

$$S = [\overline{(\overline{B} + \overline{C} + \overline{D})\,(\overline{A} + B + C)} + C] + \overline{A}\,\overline{B}C + \overline{B}\,\overline{(A + C)}$$

3.10.3 - Idem, para a expressão:

$$S = A[\overline{B\,\overline{(C + D)} + \overline{A}\,\overline{(B + C)}}] + C\overline{D} + A\overline{B}C + AB$$

3.10.4 - Idem, para a expressão:

$$S = \overline{(A \oplus B + \overline{B}C\overline{D})}\,[\overline{D} + \overline{B}C + D\,\overline{(\overline{A} + B}\,] + \overline{A}\,\overline{D}$$

3.10.5 - Idem, para a expressão:

$$S = \overline{[(B + C\overline{D} + \overline{D} + AC)\,(A + \overline{B} + \overline{C}) + \overline{B}\,\overline{(C + \overline{A}BC + AC)}]\,(A + B)}$$

3.10.6 - Desenhe o circuito que executa a expressão, simplificado.

$$S = \overline{(\overline{B} + \overline{D})}\,\overline{\{\overline{B} + C \odot D + \overline{A}\,[B\overline{C} + \overline{B}C + A + B\,\overline{(\overline{C} + \overline{D})}]\}}$$

3.10.7 - Simplifique através da Álgebra de Boole:

$$S = \overline{(\overline{A}B + C\overline{D} + AD)}\,\overline{\{\overline{B}[C \oplus D + \overline{A}(\overline{B} + \overline{C}) + A\overline{B}\overline{C}] + \overline{A}\}}$$

3.10.8 - Demonstre que:

$$A \odot (B \oplus C) = A \oplus (B \odot C)$$

3.10.9 - Através dos diagramas de Veitch-Karnaugh, determine a expressão simplificada de S_1 e S_2 da tabela 3.26.

A B	S_1	S_2
0 0	1	1
0 1	0	1
1 0	1	0
1 1	1	0

Tabela 3.26

3.10.10 - Simplifique as expressões de S_1, S_2, S_3 e S_4 da tabela 3.27, utilizando os mapas de Veitch-Karnaugh.

A	B	C	S_1	S_2	S_3	S_4
0	0	0	1	1	0	0
0	0	1	0	1	1	1
0	1	0	1	1	0	1
0	1	1	1	0	0	0
1	0	0	1	1	1	1
1	0	1	1	1	1	0
1	1	0	0	1	1	1
1	1	1	1	0	0	1

Tabela 3.27

3.10.11 - Idem ao anterior, para a tabela 3.28.

A	B	C	D	S_1	S_2	S_3	S_4
0	0	0	0	1	1	0	0
0	0	0	1	1	0	0	0
0	0	1	0	1	1	1	0
0	0	1	1	1	0	0	1
0	1	0	0	1	1	1	1
0	1	0	1	0	1	1	1
0	1	1	0	0	1	1	0
0	1	1	1	1	1	0	1
1	0	0	0	1	1	0	0
1	0	0	1	1	1	0	1
1	0	1	0	1	0	1	0
1	0	1	1	1	0	0	0
1	1	0	0	1	0	0	0
1	1	0	1	0	1	1	1
1	1	1	0	0	0	0	1
1	1	1	1	1	1	0	1

Tabela 3.28

3.10.12- Simplifique as expressões utilizando diagramas de Veitch-Karnaugh:

a) $S = A\overline{B}\,\overline{C} + A\overline{B}C + \overline{A}BC + \overline{A}B\overline{C} + ABC$

b) $S = \overline{A}\overline{B}C\overline{D} + \overline{A}\overline{B}CD + \overline{A}B\overline{C}\,\overline{D} + AB\overline{C}D + \overline{A}BCD + A\overline{B}\overline{C}D$
$ABCD + A\overline{B}\overline{C}\,\overline{D}$

c) $S = \overline{B}\,\overline{D} + \overline{A} + A\overline{B}\,\overline{C}D + A\overline{B}CD + \overline{A}\,\overline{C}$

d) $S = ABC + AB + \overline{A}BCD + BD + CD + \overline{B}C\overline{D} + \overline{A}B\overline{C}\,\overline{D}$

3.10.13 - Determine as expressões simplificadas para S_1 e S_2 da tabela 3.29.

A	B	C	D	E	S_1	S_2
0	0	0	0	0	1	1
0	0	0	0	1	1	0
0	0	0	1	0	1	1
0	0	0	1	1	1	0
0	0	1	0	0	0	1
0	0	1	0	1	1	1
0	0	1	1	0	0	1
0	0	1	1	1	1	1
0	1	0	0	0	0	1
0	1	0	0	1	0	0
0	1	0	1	0	1	1
0	1	0	1	1	0	0
0	1	1	0	0	1	1
0	1	1	0	1	1	1
0	1	1	1	0	0	1
0	1	1	1	1	1	1
1	0	0	0	0	1	1
1	0	0	0	1	1	0
1	0	0	1	0	0	1
1	0	0	1	1	0	1
1	0	1	0	0	0	1
1	0	1	0	1	1	1
1	0	1	1	0	0	1
1	0	1	1	1	1	1
1	1	0	0	0	0	1

Tabela 3.29 (parte)

A	B	C	D	E	S_1	S_2
1	1	0	0	1	0	0
1	1	0	1	0	1	1
1	1	0	1	1	0	0
1	1	1	0	0	0	1
1	1	1	0	1	1	1
1	1	1	1	0	0	1
1	1	1	1	1	1	1

Tabela 3.29

3.10.14 - Simplifique as expressões de S_1 e S_2 da tabela 3.30.

A	B	C	S_1	S_2
0	0	0	X	1
0	0	1	0	X
0	1	0	1	0
0	1	1	X	0
1	0	0	1	0
1	0	1	X	1
1	1	0	X	X
1	1	1	1	X

Tabela 3.30

3.10.15 - Determine as expressões simplificadas de S_1, S_2, S_3 e S_4 da tabela 3.31.

A	B	C	D	S_1	S_2	S_3	S_4
0	0	0	0	1	X	0	X
0	0	0	1	X	X	0	0
0	0	1	0	X	1	0	X
0	0	1	1	X	0	1	1
0	1	0	0	1	X	X	1
0	1	0	1	0	1	X	X
0	1	1	0	X	0	1	0
0	1	1	1	X	1	0	1
1	0	0	0	X	1	X	0
1	0	0	1	1	0	1	1
1	0	1	0	X	X	0	0
1	0	1	1	1	1	0	X
1	1	0	0	X	0	1	1
1	1	0	1	X	1	0	1
1	1	1	0	1	1	X	1
1	1	1	1	0	X	1	X

Tabela 3.31

3.10.16 - Desenhe os circuitos minimizados que executam as saídas S_1 e S_2 da tabela da verdade:

A	B	C	D	E	S_1	S_2
0	0	0	0	0	0	1
0	0	0	0	1	0	X
0	0	0	1	0	1	1
0	0	0	1	1	0	X
0	0	1	0	0	1	X
0	0	1	0	1	1	1
0	0	1	1	0	0	X
0	0	1	1	1	1	1
0	1	0	0	0	0	1
0	1	0	0	1	0	0
0	1	0	1	0	1	1
0	1	0	1	1	0	0
0	1	1	0	0	1	X
0	1	1	0	1	1	1
0	1	1	1	0	0	0
0	1	1	1	1	1	1
1	0	0	0	0	0	1
1	0	0	0	1	0	X
1	0	0	1	0	1	1
1	0	0	1	1	0	0
1	0	1	0	0	1	X
1	0	1	0	1	1	1
1	0	1	1	0	0	0
1	0	1	1	1	1	1
1	1	0	0	0	0	X
1	1	0	0	1	0	1
1	1	0	1	0	1	1
1	1	0	1	1	0	1
1	1	1	0	0	1	1
1	1	1	0	1	1	X
1	1	1	1	0	0	1
1	1	1	1	1	1	X

Tabela 3.32

3.10.17 - Obtenha a expressão simplificada:

$$S = \overline{(\overline{A}+B)\{\overline{B}+(B \oplus C)[\overline{A}B\overline{C}+B(\overline{A}+\overline{D})+\overline{B}\overline{C}+\overline{B}D]+A\overline{E}D\}}$$

3.10.18 - Prove que:

$$\overline{A \oplus B \oplus C \oplus D} = A \odot B \odot C \odot D$$