
数字世界精彩无限

Fundamentals of Logic Design

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Unit 4

——Karnaugh Maps

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更多变量的卡诺图化简

* 展开定理

一个n变量的逻辑函数可以对变量X_i展开为两个n-1变量的逻辑函数

1. $f(x_1x_2....x_i....x_n)$

$= x_i \bullet f(x_1x_2....1....x_n) + \bar{x}_i \bullet f(x_1x_2....0....x_n)$

.....对x_i展开为与或式

2. $f(x_1x_2....x_i....x_n)$

$= [\bar{x}_i + f(x_1x_2...0....x_n)] \bullet [x_i + f(x_1x_2....1....x_n)]$

.....对x_i展开为或与式

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$$F=f(x_1x_2x_3x_4x_5)$$

X_2X_3 \ X_4X_5	00	01	11	10
00	0	1	3	2
01	4	5	7	6
11	12	13	15	14
10	8	9	11	10

$x_1 = 0$

X_2X_3 \ X_4X_5	00	01	11	10
00	16	17	19	18
01	20	21	23	22
11	28	29	31	30
10	24	25	27	26

$x_1 = 1$

化简：F(*ABCDE*)= Σ m(0, 1, 4, 5, 6, 11,12,14,16, 20, 22, 28, 30, 31)

$x_1 = 0$

X_2X_3 \ X_4X_5	00	01	11	10
00	0	1	3	2
01	4	5	7	6
11	12	13	15	14
10	8	9	11	10

$x_1 = 1$

X_2X_3 \ X_4X_5	00	01	11	10
00	16	17	19	18
01	20	21	23	22
11	28	29	31	30
10	24	25	27	26

A= 0

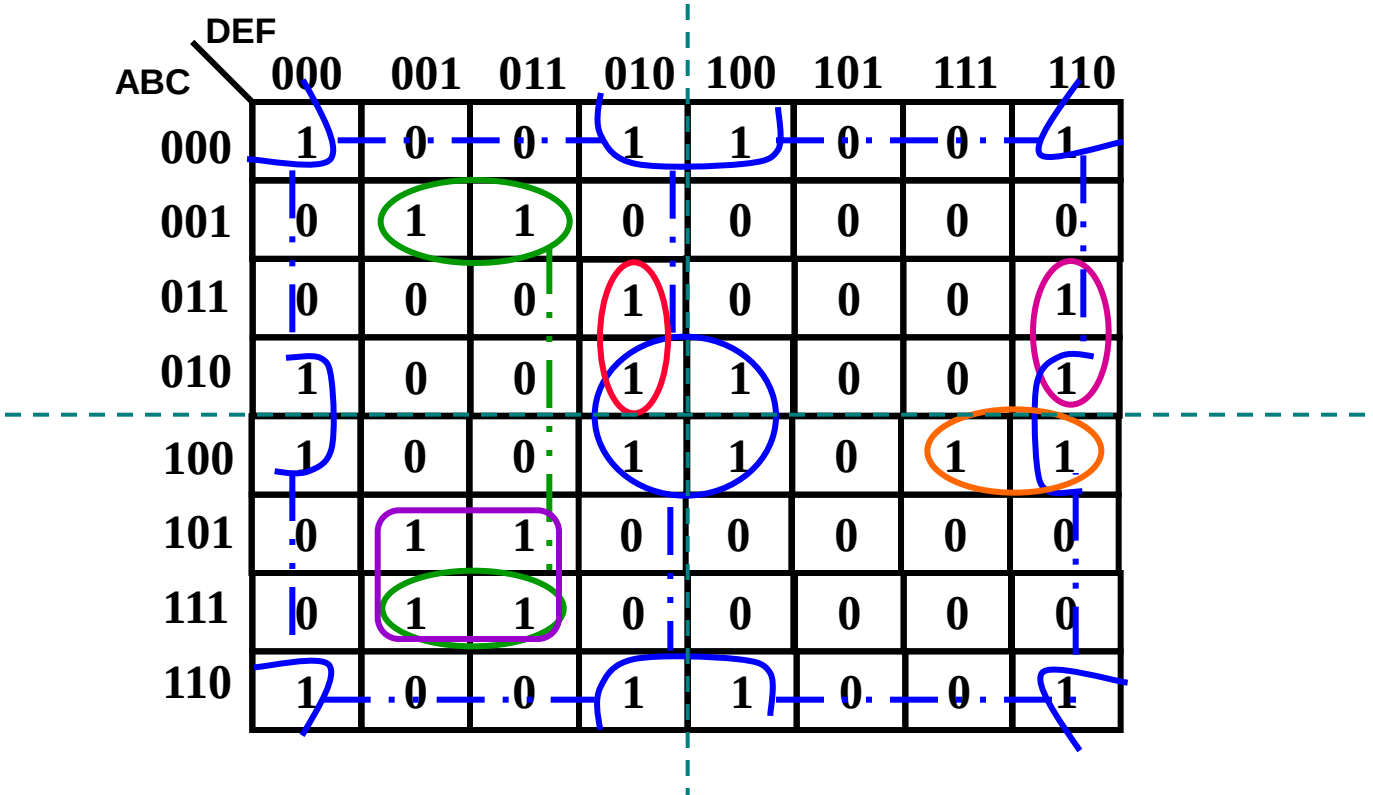
BC \ DE	00	01	11	10
00	1	1	0	0
01	1	1	0	1
11	1	0	0	1
10	0	0	1	0

A = 1

BC \ DE	00	01	11	10
00	1	0	0	0
01	1	0	0	1
11	1	0	1	1
10	0	0	0	0

$F=\bar{A}\bar{B}\bar{D}+\bar{B}\bar{D}\bar{E}+ABCD+\bar{A}BCDE+C\bar{E}$

更多变量的卡诺图化简



$F=C'F' + B'CD'F + ACD'F + A'BD'EF' + A'BDE'F' + ABC'DE'$