ECE124: Discussion

Discussion #4

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- Simplifying Boolean expression:

(a) $xy + (xy)'$

$xy + (xy)'$
$xy+x'+y'$
$(x+x')(y+x')+y'$
$y+x'+y'$
$1+x'+1$
1

(b) $xy + x'y'$

$(xy+x')(xy+y')$
$\{(x+x')(y+x')\}\{(x+y')(y+y')\}$
$(1(y+x')((x+y)1)$
$(y+x')(x+y')$
$(yx+x'x)+(yy'+x'y')$
$xy+x'y'$

2.8 Find the complement of F = wx + yz; then show that FF' = 0 and F + F' = 1.

(wx+yz)(wx+yz)'
(wx+yz){(w'+x')(y'+z')}
{wx(w'+x')(y'+z')} + {yz(w'+x')(y'+z')}
0 + 0

wx+yz+{(wx)'(yz)'}
wx + {(yz+(wx)'*(yz+(yz'))
wx+yz+(wx)'
1+yz
1

2.9 Find the complement of the following expression.

(a) $F(x,y) = xy' + x'y$

$xy'+x'y$

$(xy'+x'y)'$

$(xy')'(x'y)'$

$(x'+y)(x+y')$

$(x'+y)x + (x'+y)y'$

$x'x+yx+y'x'(y'y)$

$xy+x'y'$

2.9 Find the complement of the following expression.

(b) $F(a,b,c) = (a + c)(a + b')(a' + b + c')$

{(a+c)(a+b')(a'+b+c')}
(a+c)'+(a'b)+(ab'c)

a'c'+a'b+ab'c

a'c'(b+b')+a'b(c+c')+ab'c
a'bc'+a'b'c'+a'bc+ab'c

a'bc'+a'b'c'+a'bc+ab'c
m2 + m0 + m3 + m5
f' = 1

2.9 Find the complement of the following expression.

(c) $F(x,y,z,v,w) = z + z'(v'w + xy)$

$f' = \{z+z'(v'w+xy)\}$

$z'\{z'(v'w+xy)\}'$

$F' = z' (z+v+w')(z+x'+y')$

$z'+0$

2.10 Given the Boolean functions F_1 and F_2, show that

(a) The Boolean function $E = F_1 + F_2$ contains the sum of the minterms of F_1 and F_2.

f1 = or => f1(xy) = x+y

f2 = and => f2 (xy) = xy

E1 = f1+f2 = x+y+xy

x(y+y')+y(x+x')+xy

xy+xy'+x'y

m3 + m2 + m1

sum(123)

E2 = f1*f2

(x+y)xy

x(xy)+y(xy)

xxy+xyy

xy+xy = xy = m3

2.10 Given the Boolean functions F_1 and F_2, show that

(b) The Boolean function $E = F_1F_2$ contains only the minterms that are common to F_1 and F_2.

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