Homework 1

CSE232

March 2021

1-) $F(x,y,z) = xy + x'z + yz$

$= xy + x'z + yz \cdot 1$

$= xy + x'z + yz(x+x')$

$= xy + x'z + xyz + x'yz$

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

$= xy + x'z$

2-) Derive that $(x+y)(x'+z)(y+z) = (x+y)(x'+z)$

By using Consensus Theorem:

$(x+y)(x'+z)(y+z) = xy + x'z + yz$, and this is the same as before.

$xy + x'z + yz = xy + x'z$

$xy + x'z = (x+y)(x'+z)$ (Consensus theorem)

3-) (a) $F(A,B,C,D) = B'D + A'D + BD$

$= B'D(A'+A) + A'D(B'+B) + BD(A+A')$

$= A'B'D + AB'D + A'B'D + A'BD + ABD + A'BD$

$= A'B'D(C+C') + AB'D(C+C') + A'B'D(C+C') + A'BD(C+C') + ABD(C+C')$

$+ A'BD(C+C')$

$= A'B'CD + A'B'C'D + AB'CD + AB'C'D + A'B'CD + A'B'C'D +$

$A'BCD + A'BC'D + ABCD + ABC'D + A'BCD + A'BC'D$

$= \Sigma(3, 1, 11, 9, 3, 1, 7, 5, 15, 13, 7, 5)$

$= \Sigma(1, 3, 5, 7, 9, 11, 13, 15)$ → Sum of minterms

$= \Pi(0, 2, 4, 6, 8, 10, 12, 14)$ → Product of maxterms

(b) $F(A,B,C,D) = B'D + A'D + BD$

$= (A' + \underbrace{B' + D}_{1})D$

$= (\underbrace{A' + 1}_{1})D =$

$= 1 \cdot D = D$

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