Combinational Logic Circuit Analysis

1. Determine the circuit output truth table and logic expression
2. Determine the circuit's intended function
3. Determine whether a circuit is working properly

Circuit Analysis Techniques

Circuit to Truth Table to Logic Expression

From a logic circuit extract the truth table and derive the logic expression

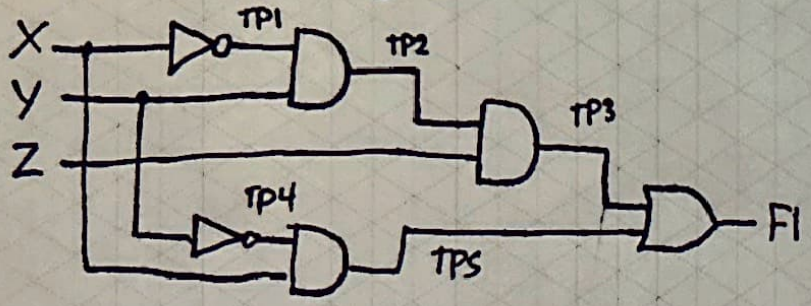
Circuit to Logic Expression to Truth table

From a logic circuit extract the logic expression and derive truth table

PROCEDURE: Circuit to Truth Table to Expression

1. Add test points at the output of every gate
2. Add a column to the truth table for every test-point
3. Work from inputs to the output, complete the truth table for each test-point, ultimately ending at the circuit's output
4. Use the completed truth table to identify the minterms from the truth table where the output is one
5. Use the extracted minterms to write the Sum-of-products logic expression

Circuit, Truth Table, and Logic Example



X	Y	Z	F1	TP1	TP2	TP3	TP4	TP5
0	0	0	0	1	0	0	1	0
0	0	1	0	1	0	0	1	0
0	1	0	0	1	1	0	0	0
0	1	1	0	1	1	0	0	0
1	0	0	1	0	0	0	1	1
1	0	1	1	0	0	0	1	1
1	1	0	0	0	0	0	0	0
1	1	1	0	0	0	0	0	0

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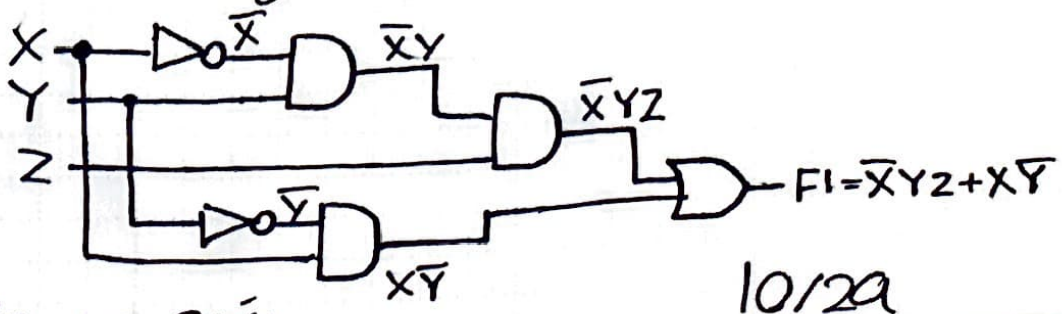
Title: AOI Design: Logic Analysis

$F_1 = \bar{X}YZ + X\bar{Y}\bar{Z} + X\bar{Y}Z$

Circuit to Logic Expression to Truth Table



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