

COE 561, Term 071
Digital System Design and Synthesis

Assignment # 1

Due date: Sept. 30th

Consider the two functions $f=a\oplus b\oplus c$ and $g=ac+a'b'+bc'$.

- (i) Represent the two functions using:
 - a. Truth Table
 - b. Minimum Implicant Table
 - c. Cubical representation (i.e. Boolean Space)
- (ii) For each function determine if it is positive Unate, negative Unate or Binate
- (iii) Find the following:
 - a. The derivative of g w.r.t. a
 - b. The consensus of f w.r.t. a
 - c. The smoothing of g w.r.t. a
- (iv) Using the following basis: $\Phi_1 = a + b$ and $\Phi_2 = a'b'$
Compute the following functions: $f \cdot g$, $f + g$, and $f \oplus g$
- (v) Verify your results by computing these functions using regular techniques
- (vi) Represent these functions in the Boolean space