# Design Technologies for Integrated Systems – EPFL

**Exercise 4** **18th October 2018**

## Problem 1

Compute the truth table both in binary and hexadecimal notation for the function:

$$F = \bar{a}\bar{b}c + ad + \bar{a}bc + a\bar{b}\bar{c} + a\bar{b}\bar{d} + a\bar{b}c + a\bar{b}\bar{c}d.$$

## Problem 2

Given the function $F$:

(a) Find a minimum cover using McCluskey's method.

(b) Show the obtained cover on the cube.

## Problem 3

Consider the Boolean function $G = \bar{a}\bar{c}d + \bar{a}cd + a\bar{b}\bar{c} + abc + ac$. Given, $G$ and the orthonormal basis $\phi_1 = \bar{a}\bar{b}$, $\phi_2 = a + b$:

(a) show that the basis is orthonormal

(b) find the upper and lower bounds of cofactors with respect to the basis

## Problem 4

Given the Boolean function $G$, compute:

(a) The Boolean difference $\partial G/\partial a$.

(b) The smoothing $S_a(G)$.

(c) The consensus $C_a(G)$.