Design Technologies for Integrated Systems – EPFL
Exercise 5   **25/10/2018**

Problem 1

Consider the Boolean function $G = a'c'd + a'cd + ab'c' + abc + ac$. The positional cube notation can be used to compute cofactors, tautology, and implicant containment. Use it to show which of the following implicants are contained by G:

(a) cd

(b) ad

Problem 2

Given the constraint mapping A, find the minimum encoding matrix E that satisfies the constraints of A.

$$A = \begin{pmatrix} 1 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 \\ 0 & 1 & 1 & 0 \end{pmatrix} \tag{1}$$

(a) Write the dichotomies considering that the columns in A correspond to the operations AND, OR, JMP and ADD.

(b) Write the seed dichotomies.

(c) Find the compatible seed dichotomies and draw the compatibility graph.

(d) Find the prime dichotomies.

(e) Write the covering matrix and find a minimum cover.

(f) Write the encoding matrix.