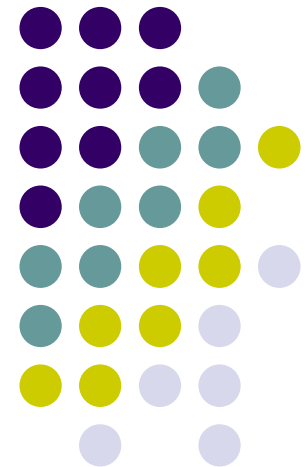
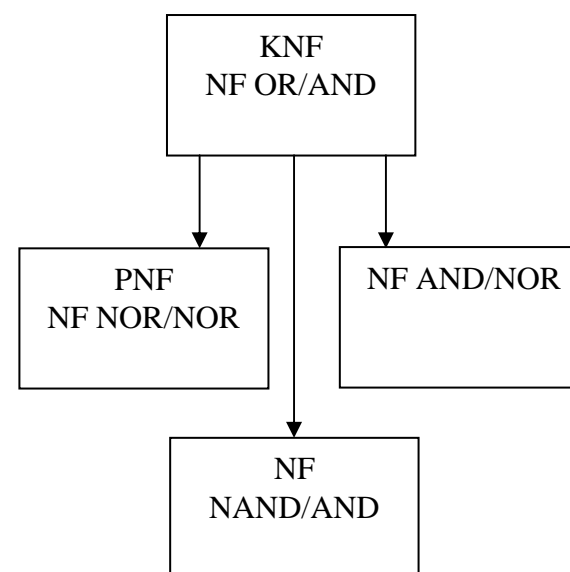
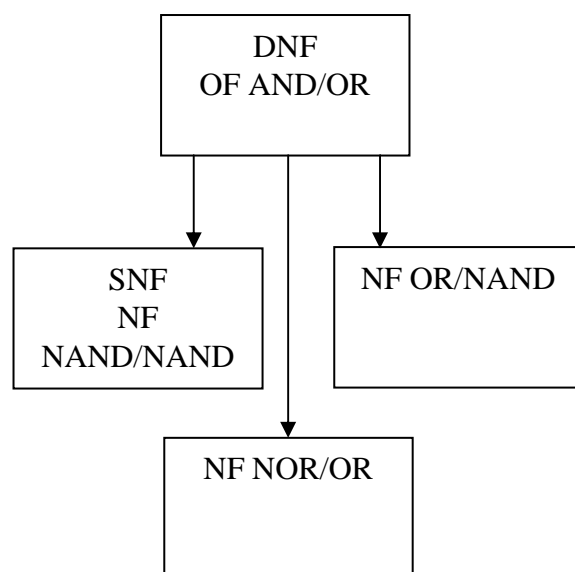


PPI

19.10.2011





Su ekvivalentni výrazy:

$$① \underline{(a+b)(c+\bar{b})(\bar{c}+\bar{a})}$$

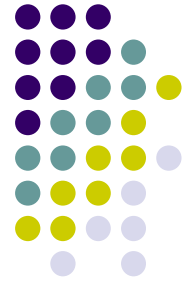
$$② \underline{(a \uparrow \bar{b} \uparrow \bar{c}) \uparrow (\bar{a} \uparrow b \uparrow c)}$$

$$\begin{aligned} ① (a+b)(c+\bar{b})(\bar{c}+\bar{a}) &= (ac+bc+a\bar{b}+\bar{b}\bar{c})(\bar{c}+\bar{a}) = \\ &= (a \cdot \cancel{c} \cdot \bar{c} + b \cdot \cancel{c} \cdot \bar{c} + a\bar{b} \cdot \bar{c} + a\bar{b} \cdot \bar{c} + \bar{b} \cdot \bar{c} \cdot \bar{a} + \bar{b} \cdot \bar{c} \cdot \bar{a}) = \\ &= \underline{a\bar{b} \cdot \bar{c} + \bar{a}bc} \end{aligned}$$

$$② (a \uparrow \bar{b} \uparrow \bar{c}) \uparrow (\bar{a} \uparrow b \uparrow c) = a\bar{b}\bar{c} + \bar{a}bc$$

$$\begin{aligned} \overline{a \cdot \bar{b} \cdot \bar{c} + \bar{a}bc} &= \overline{a \cdot \bar{b} \cdot \bar{c}} + \overline{\bar{a}bc} = \\ &= \underline{a\bar{b} \cdot \bar{c} + \bar{a}bc} \end{aligned}$$

výrazy sú ekvivalentní





Je ekvivalentní výraz? $(\bar{a} \wedge \bar{c}) \vee (a \wedge b) \wedge (b \vee \bar{c})$

$$① (\bar{a} \wedge \bar{c}) \vee (a \wedge b) \wedge (b \vee \bar{c}) =$$

$$\bar{a} \cdot \bar{c} + ab + \overline{b \cdot \bar{c}} = \bar{a} \bar{c} + ab + \bar{b} \cdot c =$$

$$\bar{a} \bar{c} (\underbrace{b + \bar{b}}_1) + ab (\underbrace{c + \bar{c}}_1) + (\underbrace{a + \bar{a}}_1) \cdot \bar{b} \cdot c =$$

$$= \bar{a} \bar{b} \bar{c} + \bar{a} b \bar{c} + ab c + \bar{a} b c + a \bar{b} c + \bar{a} \bar{b} c$$

b	a	1.	1.
		1.	0.
		1.	1.
		0.	1.

$$② (a \cdot \bar{c}) \vee (a \vee \bar{b} \vee \bar{c}) =$$

$$= \overline{a \cdot \bar{c}} + \overline{a \vee \bar{b} \vee \bar{c}} = \overline{a \cdot \bar{c}} + \overline{a \cdot \bar{b} \cdot \bar{c}} =$$

$$= (\bar{a} + c) \cdot (a \cdot b \cdot c) = \bar{a} b c + a c + \bar{a} \bar{b} + \bar{b} c + \bar{a} \bar{c}$$

$$= ac + \bar{a} \bar{c} + \bar{a} \bar{b} + \bar{b} c = \bar{a} b c + \bar{a} \bar{b} c + \bar{a} \bar{b} \bar{c} + \bar{a} b \bar{c} +$$

$$+ \bar{a} b c + \bar{a} \bar{b} c + \bar{a} \bar{b} c + \bar{a} b c$$

$$= \bar{a} b c + \bar{a} \bar{b} c + \bar{a} \bar{b} c + \bar{a} b c$$

$$= \bar{a} b c + \bar{a} \bar{b} c + \bar{a} \bar{b} c + \bar{a} b c$$

a	b	1.	1.
		1.	0.
		0.	1.
		0.	1.

aplikujeme na VANDF

VANDF má řešení, máme to

u nás

výrazy nejsou ekvivalentní

Skupinové minimalizácie - príklady

Minimalizácia petroll. funkcií $x_3 \rightarrow$ MODROU

$$x_1 \mid \begin{array}{c|ccc} & x_2 & x_2 & x_3 \\ \hline & 0 & 1 & 0 \\ \hline 1 & 1 & 0 & 0 \\ 0 & 1 & 0 & 0 \end{array}$$

$$x_1 \mid \begin{array}{c|ccc} & x_2 & x_2 & x_3 \\ \hline & 0 & 1 & 0 \\ \hline 1 & 1 & 0 & 1 \\ 0 & 0 & 0 & 1 \end{array}$$

①

$$x_1 \mid \begin{array}{c|ccc} & x_2 & x_2 & x_3 \\ \hline & 0 & 1 & 0 \\ \hline 1 & 1 & 0 & 0 \\ 0 & 1 & 0 & 0 \end{array}$$

$$x_1 \mid \begin{array}{c|ccc} & x_2 & x_2 & x_3 \\ \hline & 0 & 1 & 0 \\ \hline 1 & 1 & 0 & 1 \\ 0 & 0 & 0 & 1 \end{array}$$

Skupinová minimalizácia $f_1, f_2 \rightarrow$ červená

$$f_1 = \bar{x}_1 \bar{x}_2 \bar{x}_3 + x_1 x_3$$

$$f_2 = \bar{x}_1 \bar{x}_2 \bar{x}_3 + x_1 x_3 + \bar{x}_2 x_3$$

treba 4 + 2 NAND obvodov
 \downarrow
 1. stupeň \rightarrow 2. stupeň

2. stupeň minimalizácie

②

$$x_1 \mid \begin{array}{c|ccc} & x_2 & x_2 & x_3 \\ \hline & 0 & 1 & 0 \\ \hline 1 & 1 & 0 & 0 \\ 0 & 1 & 0 & 0 \end{array}$$

$$x_1 \mid \begin{array}{c|ccc} & x_2 & x_2 & x_3 \\ \hline & 0 & 1 & 0 \\ \hline 1 & 1 & 0 & 1 \\ 0 & 0 & 0 & 1 \end{array}$$



KONEČNÉ STAVOVÉ AUTOMATY

Konečný stavový stroj - automat (Finite State Machine = FSM) je algebrický systém

$$A = (X, S, Y, p, v), A = (X, S, Y, p, v, s_0),$$

kde

$X \Rightarrow$ množina vstupných symbolov, vstupov

$S \Rightarrow$ množina stavov

$Y \Rightarrow$ množina výstupných symbolov, výstupov

$p \Rightarrow$ prechodová funkcia $p: S \times X \rightarrow S$

$v \Rightarrow$ výstupná funkcia $v: S \times X \rightarrow Y$ (Mealy)

$v: S \rightarrow Y$ (Moore)