Q5 $F = \{ \bar{w}x\bar{y}z, wx\bar{y}z, \bar{w}xyz, wxy \}$

(a) $xz \subset F$? Yes!

Formulate: $\alpha \subseteq F \Leftrightarrow F_{\alpha} = 1$

$xz \subseteq F \Leftrightarrow F_{xz} = 1$

$F_{xz} = \{ \bar{w}\bar{y}, w\bar{y}, \bar{w}y, wy \} = 1$

(b) Is xz a prime?

A prime cannot be expanded

Expand $xz \xrightarrow{to} z$. Does $F \supseteq z$? No

$F_z = 1$?

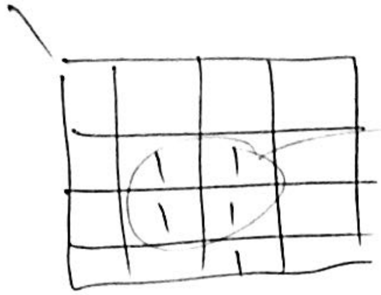
Expand $xz \xrightarrow{to} x$

Does $F \supseteq x$?

$\Leftrightarrow F_x = 1$? No.

So $xz \neq$ prime

Q5 (c) How to check if xz = essential?



→ xz = essential, of course

but algorithm?

See slides on two-level-heuristic.pdf.

Let $F = G \cup \alpha$, where α = prime disjoint from α.

$$\alpha = xz, \quad G = F - \alpha = F - xz = F \cap \overline{xz}$$

$$G = F \cap (\overline{xz}) = F \cap (\bar{x} + \bar{z}) = \{wxy\bar{z}\}$$

Then α = essential $\Leftrightarrow$ $\text{Consensus}(G, \alpha) \not\supseteq \alpha$

$$\text{Consensus}(G, \alpha) = \text{Con}(wxy\bar{z}, xz)$$

$$= wxy$$

Does "wxy" cover 'α' $= xz$?

<u>No</u>, so $\alpha = xz$ = essential.