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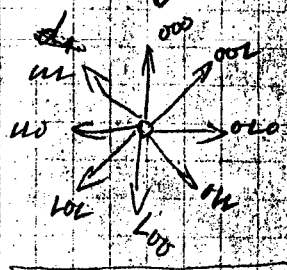
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- 012/012
- 1) $\sim 2 \text{ of } 6 \text{ of } 6$
 - 2) $15 \sim 2 \text{ of } 15 \text{ of } 15 \sim 0 \text{ of } 15 \text{ of } 6$
 - 3) $\sim 2 \text{ of } 2 \text{ of } 2$
 - 4) $\sim 2 \text{ of } 2$
 - 5) $\sim 2 \text{ of } 2$
 - 6) $\sim 2 \text{ of } 5 \sim 1 \div 3$

$\text{geom}(x, y) = \dots$
 $\text{Richt}(x, y) = \dots \parallel y \text{ of } \dots \parallel x$

$\text{Richt}(x, y) \neq P \quad 3 \times D$



$4 \sim n \text{ of } 3 \text{ of } 2$
 $\text{Richt}(x, y, z)$
 $\sim 2 \text{ of } 2 \text{ of } 2$

$\sim 2 \text{ of } 2 \text{ of } 2$

- 1) $\sim 2 \text{ of } 2 \text{ of } 2$
- 2) $\sim 2 \text{ of } 2 \text{ of } 2$
- 3) $\sim 2 \text{ of } 2 \text{ of } 2$
- 4) $\sim 2 \text{ of } 2 \text{ of } 2$

$\text{Chr.}(x)$, $\text{Winn}(x)$

$$\text{Zone}(N) = \dots \text{PD}$$

$\text{Nord}(x)$

$$Eck(x) \sim \mathbb{N} \quad Eck(x) \rightarrow (Zone(x))_{\mathbb{P}} = \mathbb{L}$$

$$\text{Lehr}(x) \sim [\text{Faub}(x) = 0]$$

$$\text{Weins}(x) \sim [\text{Farb}(x) = L]! \quad \text{Kont}_p(x) \not\sim p$$

$K_1(x)$ $K_{1,2}(x)$ *Handwritten signature*

$$\underline{K_{1,2}(x)} = \underline{K_2(K_1(x))}$$

$K_{1,2}(x)$ — index 1,2 S_x

$$R_2$$

$$V = J \cdot R$$

$$J_1 \cdot R_1 + J_2 \cdot R_2 = V$$

$$(J_1 + J_2) \cdot R_G = V$$

$$\begin{aligned} J_1 \cdot R_1 &= V \\ J_2 \cdot R_2 &= V \end{aligned} \quad \left/ \quad \begin{aligned} J_1 &= \frac{V}{R_1} \\ J_2 &= \frac{V}{R_2} \end{aligned} \right.$$

$$\left(\frac{V}{R_1} + \frac{V}{R_2} \right) \cdot R_G = V$$

$$R_G = \frac{V}{\frac{V}{R_1} + \frac{V}{R_2}}$$

$$1 = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2}}$$

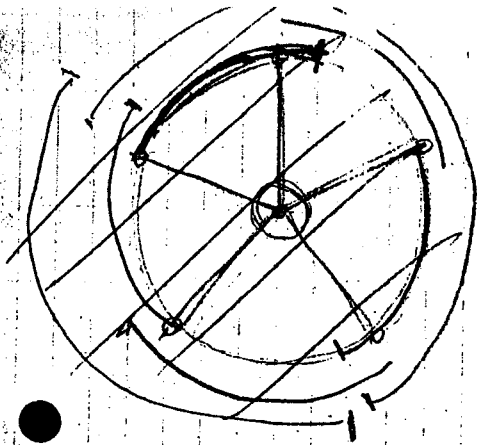
$$\cancel{R_G = \frac{V}{\frac{V}{R_1} + \frac{V}{R_2}}} \quad \cancel{R_G = \frac{R_1 \cdot R_2}{R_1 + R_2}}$$

$$\cancel{\left(\frac{1}{R_1} + \frac{1}{R_2} \right) \cdot R_G = 1}$$

$$R_G = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2}}$$

$$= \frac{R_1 \cdot R_2}{R_1 + R_2}$$

$$\lim_{R_2 \rightarrow \infty} \left(\frac{R_1 \cdot R_2}{R_1 + R_2} \right) = R_1$$



$K_{0,3}(x)$

$x \in \mathbb{R}^n$

~~$K_{0,3}(x)$~~

$K_1(x) = \xi, K_2(x) = \eta$

... ξ, η ...
 ... ξ, η ...
 ... ξ, η ...
 ... ξ, η ...
 ... ξ, η ...

2. $\frac{1}{2} \log 2$

~~Est~~ Agr. (x) p (w)
 $x = 0.81$ Agr. ~ (w)

W) (w): Agr. yes 5x, 8x, 16x
yes 5x, 8x, 16x
Agr (x) 1/0.81 x p v
(w)

$$\text{Agr}(x) \quad p \quad n \times 2 \times (4d + 23d) \\ = n \times 20d.$$

1.6 ~ 1.6) Agr 1.6
work.

K Agr(x) ~ Agr.

K Agr(x) = a. a full l ~ w
(w)

$$\underline{K1(a)} = \underline{K01 Agr(x)} =$$

$$\underline{(\xi = 000) \vee (\xi = 001)} = \underline{01 (\xi = (000 \vee 001))}$$

1st: 1/2 1/2 1/2 1/2 1/2
 2nd: 1/2 1/2 1/2 1/2 1/2
 3rd: 1/2 1/2 1/2 1/2 1/2
 4th: 1/2 1/2 1/2 1/2 1/2
 5th: 1/2 1/2 1/2 1/2 1/2



1st: 1/2 1/2 1/2 1/2 1/2
 2nd: 1/2 1/2 1/2 1/2 1/2
 3rd: 1/2 1/2 1/2 1/2 1/2
 4th: 1/2 1/2 1/2 1/2 1/2
 5th: 1/2 1/2 1/2 1/2 1/2

$$K_1(X) = \dots$$

Figure 1: ξ, η

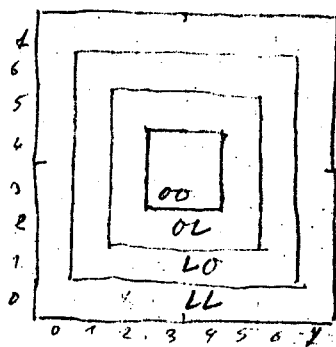


Figure 1: ξ, η

for $\xi - \eta$: $\xi_2, \xi_1, \xi_0, \eta_2, \eta_1, \eta_0$

for 00: ($\xi = 00 \vee 100$) \wedge ($\eta = 00 \vee 100$)

for 0L: ($\xi = 000 \vee 1001 \vee 1010 \vee 1011 \vee 1100 \vee 1101 \vee 1110 \vee 1111$)
 \vee ($\eta = 000 \vee 100 \vee 101 \vee 110 \vee 111 \vee 100 \vee 110 \vee 111$)

for LO: ($\xi = 000 \vee 100 \vee 101 \vee 110 \vee 111$)
 \vee ($\eta = 000 \vee 100 \vee 101 \vee 110 \vee 111$)

for LL: ($\xi = 1000 \vee 111$) \vee ($\eta = 000 \vee 111$)

$$(Z_{on}(x) = 00) \sim (\xi = 011 \vee 110) \wedge (\eta = 011 \vee 100).$$

$$(Z_{on}(x) = 01) \sim \left[(\xi = 010 \vee 101) \wedge (\eta = 000 \vee 001 \vee 010 \vee 011) \right] \\ \vee \left[(\eta = 010 \vee 101) \wedge (\xi = 000 \vee 001 \vee 010 \vee 011) \right]$$

$$(Z_{on}(x) = 10) \sim \left[(\xi = 001 \vee 110) \wedge (\eta = 000 \vee 111) \right] \\ \vee \left[(\eta = 001 \vee 110) \wedge (\xi = 000 \vee 111) \right]$$

$$(Z_{on}(x) = 11) \sim (\xi = 000 \vee 111) \vee (\eta = 000 \vee 111).$$

2. $\eta, \sqrt{\eta}$:

~~4. 4~~ $Z_{on}(x)$ $\eta, \sqrt{\eta}$ $Z_{on}(x)$.

1) $\eta, \sqrt{\eta}$ \sim η : $Quadr.(x)$.

01	11
00	10

$$(Quadr.(x) = 00) \sim (\xi_2 = 0 \wedge \eta_2 = 0)$$

$$(Quadr.(x) = 01) \sim (\xi_2 = 0 \wedge \eta_2 = 1)$$

$$(Quadr.(x) = 10) \sim (\xi_2 = 1 \wedge \eta_2 = 0)$$

$$(Quadr.(x) = 11) \sim (\xi_2 = 1 \wedge \eta_2 = 1)$$

$$K_1(Quadr.(x)) = \eta_1 \neq \eta_1$$

$$K_2(Quadr.(x)) = \eta_2 \neq \eta_2.$$

$$\eta_1 \sim \xi_2, \eta_2 \sim \eta_2.$$

$$Quadr.(x) \sim (\xi_2, \eta_2)$$

$$\text{Pos}(x, y) \quad x \text{ and } y$$

$$y = (\text{Quadr}(x) = 00) \rightarrow (y = 00, 00)$$

$$(\text{Quadr}(x) = 01) \rightarrow (y = 00, 100)$$

$$(\text{Quadr}(x) = 10) \rightarrow (y = 100, 00)$$

$$(\text{Quadr}(x) = 11) \rightarrow (y = 100, 100)$$

$$\text{Quadr}(x) = \xi_2, \eta_2$$

$$k(\xi_2) \rightarrow (u = 0) \rightarrow k(u) = 00$$

$$(u = 1) \rightarrow k(u) = 100$$

$$y(\text{Quadr}(x)) = (\xi_2 \bar{\xi}_2 \bar{\xi}_2, \eta_2 \bar{\eta}_2 \bar{\eta}_2)$$

$$(2 \text{ bits } \xi_2 \text{ and } \eta_2 \text{ are } 0 \text{ or } 1, \dots)$$

$$\text{Pos}(x, y) = \varphi(\Delta \xi(x, y), \Delta \eta(x, y))$$

$$\Delta \xi(x, y) = \xi(x) - \xi(y)$$

$$\Delta \eta(x, y) = \eta(x) - \eta(y)$$

$$\xi(x) = a \quad \left| \begin{array}{l} a \text{ 1 3D} \\ b \text{ 1 3D} \end{array} \right| \quad a - b: a_2 a_1 a_0$$

$$\xi(y) = b$$

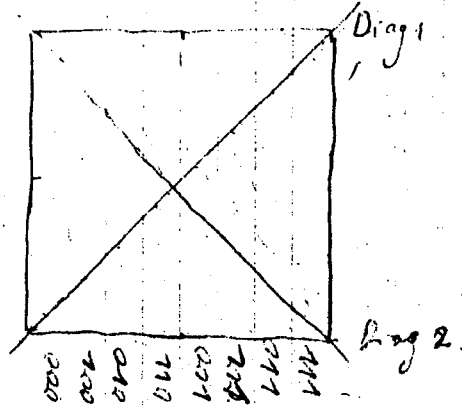
$$a - b: 1 \quad 1 + 3D \quad \left[\sqrt{2} - \log_2 \right]$$

$$Zon(x) =$$

$$|\Delta \xi(x, y)| > |\Delta \eta(x, y)| \rightarrow Zon(x) = |\Delta \xi(x, y)|$$

$$|\Delta \eta(x, y)| > |\Delta \xi(x, y)| \rightarrow Zon(x) = |\Delta \eta(x, y)|$$

Ex 01:



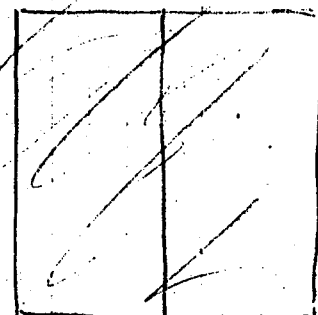
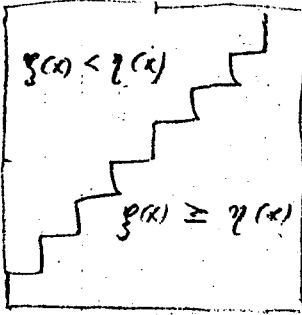
step 1: $\xi = \eta$

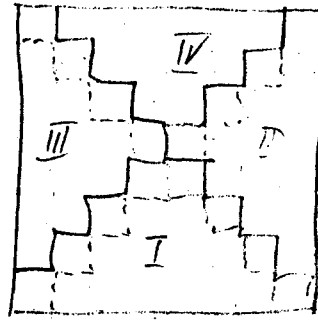
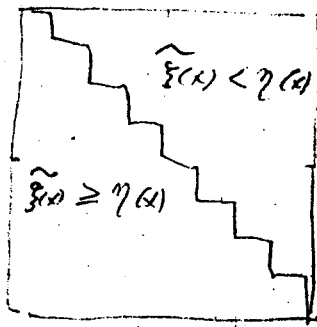
step 2: $\xi = \text{Supl}(\eta)$

~~Supl~~ \rightarrow

$$(s = \text{Supl}(\eta)) \rightarrow (s_i, \eta_i) (s_i \sim \eta_i)$$

$$\text{Supl}(\eta) = \text{Af } \tilde{\eta}$$

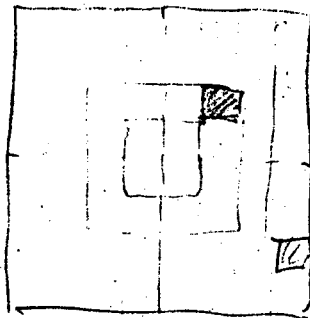




- I. $(f(x) \geq \eta(x)) / (\tilde{f}(x) \geq \eta(x))$
- II.
- III.
- IV.

2.1) \dots

2.2) \dots



- 1.) \dots
- 2.) \dots
- 3.) \dots
- 4.) \dots

80
8x 6th 10

~~$\text{Pos}(x, y) = \text{Orth.}$~~

*K 6Kp: A. P. 3 x 2 x 3 D.

$$K_2(A) = C \cdot \sqrt{d} \cdot x_2$$

1.) $Z_{\text{on}}(x_1) = 0\%$

2.) $f_{\text{an}}(x_2) = 16$

3.) $\text{Orth}(x_1, x_2)$

~~4. $\left(\frac{1}{5}(x_2) = \frac{1}{5}(x_3) \right) \vee \left(\frac{1}{7}(x_2) = \frac{1}{7}(x_3) \right)$~~

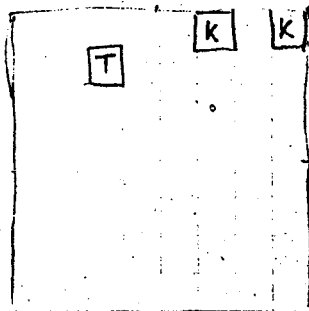
$$\text{Orth}(x_2, x_3) \perp \overline{\text{Orth}(x_1, x_3)}$$

5.) Bem (X_2, X_3) .

2/10

$$(\text{form}(x_1) = \alpha) \wedge (\text{form}(x_2) = LL) \wedge \text{Orth}(x_1, x_2) \\ \wedge \text{Orth}(x_2, x_3) \wedge \overline{\text{Orth}(x_1, x_3)} \wedge \overline{\text{Ben}(x_2, x_3)}$$

4/10
0/51

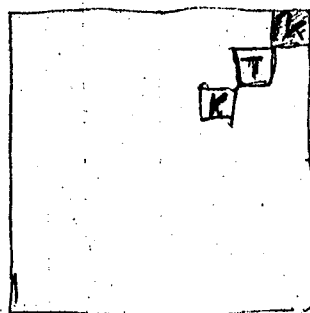


$$\text{Eck}(x_2) \wedge \text{Orth}(x_1, x_2) \wedge (\text{Dist.}(x_1, x_2) = L0)$$

$$\text{Eck}(x_2) \wedge (\Delta \rho(x_1, x_2) = 0 \wedge \Delta \eta(x_1, x_2) = 0) \wedge$$

$$(\Delta \rho(x_1, x_3) = L) \vee (\Delta \eta(x_1, x_2) = 0 \wedge \Delta \rho(x_1, x_2) = L0 \\ \wedge \Delta \eta(x_1, x_3) = L) \wedge \overline{\text{Orth}(x_2, x_3)}$$

P (4/51)



$$\text{Eck}(x_2) \wedge \text{Dra}(x_1, x_2, x_3) \wedge$$

$$\text{Ben}(x_1, x_2) \wedge \text{Ben}(x_2, x_3)$$

$$\text{xy} / \text{R} \rightarrow \text{R} \text{ Cuv} :$$

$$\overline{\text{E}(x)} (\text{Ben}(x_2, z) \wedge$$

$$\bullet (z) (\text{Ben}(x_2, z) \wedge (\text{Ben}(x_1, z) \vee \text{Orth}(x_3, z)) \wedge (\text{Ben}(x_2, x_3) \rightarrow \text{Ben}(x_1, x_3)))$$

$$\text{xy} \text{ Cuv } \text{C} \text{ orth } \text{R} :$$

$$\text{Cuv} : \text{M} \rightarrow \text{K} \rightarrow \text{N} \rightarrow \text{L}$$

$$\text{C} \rightarrow \text{J} \rightarrow \text{S} \rightarrow \text{P}$$

$$\text{Ger}(x, y, z) \quad \text{xy} \text{ Ger } x = z$$

$$\bullet (x, y, z) \sim (\text{Orth}(x, y, z) \vee \text{Dra}(x, y, z))$$

$$(x, y, z) \sim [\xi(x) = \xi(y) = \xi(z) \wedge (\eta(x) < \eta(y) < \eta(z) \vee \eta(x) > \eta(y) > \eta(z))] \vee \dots$$

$$(x, y, z) \sim \text{Ger}(x, y, z) \wedge \neq(x, y, z) \wedge \text{Ger}(x, y, z)$$

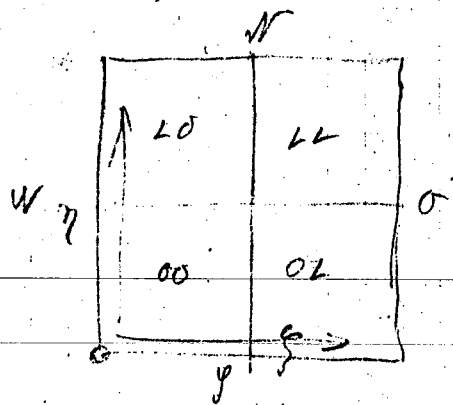
$$\text{Ger}(\xi(x), \xi(y), \xi(z)) \wedge \text{Ger}(\eta(x), \eta(y), \eta(z))$$

$$(x, y, z) \sim \text{Orth}(x) \vee \text{Dra}(x)$$

$x, y, z \in \{0, 1\}$
 $W(x, y, z) = \{x, y, z\}$

$Quad(x) = \{x, y\} \quad 2 \times 3 D.$

1.) $W(x, y, z) = \{x, y, z\}$



$\{x, y\}$
 $\{x, y\}$

2.) $W(x, y, z) = \{x, y, z\}$

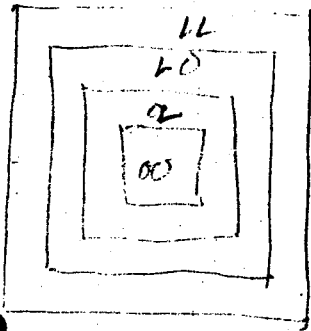
$Quad(x) = \{x, y\}$

$Quad(x) = \{x, y\}$

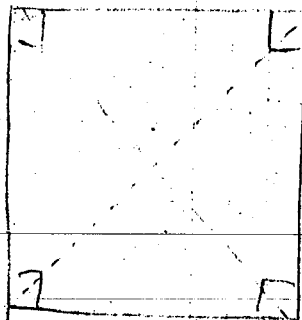
$Quad(x) = \{x, y\}$

$Quad(x) = \{x, y\}$

$Quad(x) = \{x, y\}$
 $Quad(x) = \{x, y\}$
 $Quad(x) = \{x, y\}$
 $Quad(x) = \{x, y\}$



$$Zon(x) = \begin{matrix} 00 \\ 0L \\ 0O \\ LL \end{matrix}$$



$$\text{Heliag}(x) \sim \xi(x) = \eta(x)$$

$$\text{Hdiag}(x) \sim \tilde{\xi}(x) = \eta(x)$$

$$\text{Hdiag}(x) \sim \text{Hdiag} \vee \text{Hdiag}(x)$$

$$\text{Eck}(x) \sim \text{Zon}(x) = VL \wedge \text{Hdiag}(x).$$

$$\text{Farb}(x) = + \quad x \cdot \text{CS}$$

$$" \quad = - \quad x \cdot \text{ZY}.$$

2) \mathbb{R}^2 ist U-ord.

$\text{Gelb.}(x,y) \quad x \sim y \text{ ist Gelb.}$

$\text{Nord}(x,y) \quad x \sim y \text{ ist Nord}$

$\text{Süd}(x,y)$

$\text{Ost}(x,y)$

$\text{West}(x,y)$

$\text{Gelb.}(x,y) \quad x \sim y \text{ ist Gelb.}$

$\text{Süd}(x,y)$

$\text{Ost}(x,y)$

$\text{West}(x,y)$

$\text{NO}(x,y)$

$\text{SO}(x,y)$

$\text{NO}(x,y)$

$\text{NO}(x,y)$

$\text{NO}(x,y)$

$\text{NO}(x,y)$

$\text{NO}(x,y)$

$\text{NO}(x,y)$

$\text{Zon}(x) > \text{Zon}(y) \quad x \sim y \text{ ist Zon}$

$\text{Nochmal}(\text{Zon}) \quad x \sim y \text{ ist Zon}$

$\text{Zon}(\text{Zon}(x)) > \text{Zon}(\text{Zon}(y))$

$\text{Zon}(\text{Zon}(x)) = \text{Zon}(x)$

$\text{Orth}(x, y, z, \dots) \wedge y, z \text{ in } S \wedge L \wedge$
 $\text{Dag}(x, y, z, \dots) \wedge x, y, z \text{ in } S \wedge C?$

$$\text{Orth}_\xi(x, y) \sim \xi(x) = \xi(y)$$

$$\text{Orth}_\eta(x, y) \sim \eta(x) = \eta(y)$$

$$\text{Dag}_\xi^+(x, y) \sim \Delta_\xi^+(x, y) = \Delta_\eta(x, y)$$

$$\text{Dag}_\eta^+(x, y) \sim \Delta_\eta^+(x, y) = \Delta_\xi(x, y)$$

$$\text{Gen}(x, y) \sim \text{Orth}(x, y) \vee \text{Dag}(x, y).$$

$$\text{Gen}(x, y, z) \wedge x \neq y \wedge x \neq z.$$

$$\text{Spec}(x, y) \wedge x \neq y \wedge \text{in } S \wedge L \wedge$$

$$\text{Ben}(x, y) \wedge x \neq y \wedge \text{in } S \wedge L \wedge$$

$$\text{Wbst}(x, y) \sim \text{Ben}(x, y) \wedge \text{Good}(y, x)$$

$$\text{Ybst}(x, y) \sim \text{Ben}(x, y) \wedge \text{Good}(y, x)$$

$$\text{Wbst.}(x, y) \sim \text{Ben}(x, y) \wedge \text{Dag}(x, y) \wedge \text{Good}(y, x)$$

$$\text{Ybst.}(x, y) \sim \text{Ben}(x, y) \wedge \text{Dag}(x, y) \wedge \text{Good}(y, x).$$

$$\vdash (a \rightarrow c \wedge b \rightarrow c) \rightarrow (a \vee b \rightarrow c)$$

$$a \wedge b \rightarrow a \vee b$$

$$(a \rightarrow c \wedge b \rightarrow c) \rightarrow (a \wedge b \rightarrow c)$$

$$a \wedge b \rightarrow a \vee b$$

$$u.c.: a \rightarrow b \sim \bar{a} \vee b$$

$$\overline{a \wedge b} \vee a \vee b$$

$$\bar{a} \vee \bar{b} \vee a \vee b \sim a \vee \bar{a} \vee b \vee \bar{b} \sim + \vee + \sim +$$

$$a \rightarrow c \wedge b \rightarrow c$$

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

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

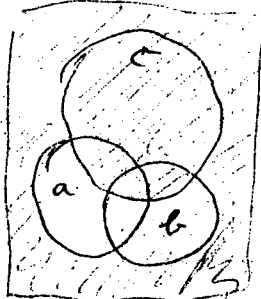
$$\cancel{a \wedge c} \vee \cancel{\bar{a} \wedge c} \vee \cancel{\bar{a} \wedge \bar{b}} \vee \cancel{b \wedge c} \vee \cancel{\bar{b} \wedge c} \vee \cancel{\bar{b} \wedge \bar{c}}$$

$$c \vee (\bar{a} \wedge \bar{b}) \sim (a \vee b) \rightarrow c$$

$$\vdash (a \rightarrow c) \wedge (b \rightarrow c) \sim a \vee b \rightarrow c$$

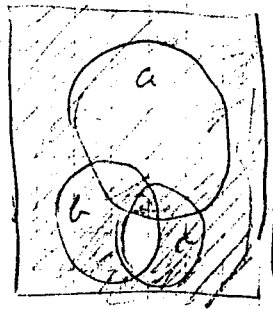
$$\cancel{a \rightarrow c}$$

$$\cancel{b \rightarrow c}$$



a	b	c	F ₁	F ₂
-	-	-	+	+
-	-	+	+	+
-	+	-	-	-
-	+	+	+	+
+	-	-	-	-
+	-	+	+	+
+	+	-	-	-
+	+	+	+	+

$$(a \vee b) \rightarrow c$$



a b c			F ₁ F ₂	
-	-	-	+	+
-	-	+	+	+
-	+	-	+	+
-	+	+	+	+
+	-	-	+	+
+	-	+	+	+
+	+	-	-	-
+	+	+	+	+

$$[(a \vee b) \rightarrow c] \rightarrow [(a \wedge b) \rightarrow c]$$

$$(\overline{a \vee b \vee c}) \rightarrow (\overline{a \wedge b \vee c})$$

$$\overline{a \vee b \vee c} \vee \overline{a \wedge b \vee c}$$

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

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

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

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

(11)
 (11) 5. Let x be
 a variable. The \forall of x
 is the 2nd one to the left.

It has a \forall binding
 the x in the \forall of x .

$$a + b = c.$$

$$a \vee b \rightarrow c.$$

$$(x) \{ \text{Ban}(x, y) \wedge \text{Tag}(x, y) \} \rightarrow a.$$

1. x is a \forall with D as

2. x is a \forall with C as the \forall of x .

Let

$$A \rightarrow \text{For}(x) = \text{ll}.$$

e.g. (11) is C/A (11)

for \forall is ll .