

$$\begin{array}{l} \{p_i|i \in N\} \\ F_{\neg}(\alpha) = (\neg\alpha) \\ \vee, \wedge, \rightarrow F_{\Box}(\alpha, \beta) = (\alpha \Box \beta) \end{array}$$

$$\begin{array}{l} (T,F \\ p_0 \vee p_2 \\ T \ F \\ T \\ F \ F \\ F \end{array}$$

$$\begin{array}{l} V : \{p_i|i \in N\} \rightarrow \{T, F\} \\ \hat{V} \\ \hat{V} : WFF \rightarrow \{T, F\} \\ \hat{V} \end{array}$$

$$\hat{V}(p_i) = v(p)$$

$$\begin{array}{l} \alpha = (\neg\beta) \\ TT_{\neg} : \{T, F\} \rightarrow \{T, F\} \\ \text{truth table} \\ TT_{\neg}(T) = F \\ TT_{\neg}(F) = T \\ \begin{array}{|c|c|} \hline \beta & \neg\beta \\ \hline T & F \\ \hline F & T \\ \hline \end{array} \\ \hat{V} \end{array}$$

$$\hat{V}(\neg(\alpha)) = TT_{\neg}(\hat{V}(\alpha))$$

$$\begin{array}{l} \alpha = (\beta \vee \gamma) \\ \hat{V}(\alpha) = TT_{\vee}(\hat{V}(\beta), \hat{V}(\gamma)) \\ TT_{\vee}(T, T) = T \\ TT_{\vee}(T, F) = T \\ TT_{\vee}(F, T) = T \\ TT_{\vee}(F, F) = F \\ \begin{array}{|c|c|c|} \hline \alpha & \beta & \alpha \vee \beta \\ \hline T & & T \\ \hline T & & T \\ \hline F & & T \\ \hline F & & F \\ \hline \end{array} \end{array}$$

$$\widehat{V}(\alpha) = TT_{\wedge}(\underbrace{\widehat{V}(\beta)}_{\text{truth of sub}}, \underbrace{\widehat{V}(\gamma)}_{\text{truth of sub}})$$

$$TT_{\wedge}(T, T) = T$$

$$TT_{\wedge}(\frac{T}{F}, \frac{F}{F}) = F$$

$\alpha$	$\beta$	$\alpha \wedge \beta$
T		T
T	F	F
F	T	F
F	F	F

$$\alpha = (\beta \rightarrow \gamma)$$

$$\widehat{V}((\beta \rightarrow \gamma)) = TT_{\rightarrow}(\widehat{V}(\beta), \widehat{V}(\gamma))$$

$\beta$	$\gamma$	$\beta \rightarrow \gamma$
T		T
T		F
F		T
F		T

$$\begin{array}{l} A \rightarrow B \\ \text{F T} \end{array}$$

$$V : \{p_i | i \in \mathbb{N}\} \rightarrow \{T, F\}$$

$$\widehat{V} : WFFF \rightarrow \{T, F\}$$

$$\widehat{V}(\alpha) = V(\alpha)\alpha = p_i$$

$$\widehat{V}(\alpha) = TT_{\neg}(\widehat{V}(\beta))\alpha = (\neg\beta)$$

$$\widehat{V}(\alpha) = TT_{\Box}(\widehat{V}(\beta), \widehat{V}(\gamma))\alpha = (\beta\Box\gamma)$$

$$\widehat{V}(\alpha)\overset{v}{\alpha}$$

$$\text{“}\mathbf{v}\text{“}\alpha$$

$$(TT_{\Box})$$

$$v \bullet$$

$$TT_{\Box} \bullet$$

$$\neg \bullet$$

$$\leftrightarrow, \wedge, \vee \bullet$$

$$\rightarrow \bullet$$

$$\begin{aligned} & ((\neg p_0) \vee p_1) \neg p_0 \vee p_1 \\ & \alpha \vee \widehat{V}(\alpha) = T \\ & v| = \alpha \\ & T\alpha \\ & \neg\alpha \vee \alpha \neg p_o \vee p_o \end{aligned}$$

$$T$$

$P_0$	$\neg p_0$	$\neg p_0 \vee p_0$
T	F	T
F	T	T

$$\begin{aligned} & \alpha \vee \neg\alpha \\ \widehat{V}(\alpha \vee \neg\alpha) &= TT_{\vee}(\widehat{V}(\alpha), \widehat{V}(\neg\alpha)) = \\ & TT_{\vee}(\widehat{V}(\alpha), TT_{\neg}(\widehat{V}(\alpha))) \end{aligned}$$

$$TT_{\vee}(T, F) = T \Leftarrow TT_{\neg}(\widehat{V}(\alpha)) = F \Leftarrow V(\alpha) = T$$

$$\begin{aligned} TT_{\vee}(F, T) &= T \Leftarrow TT_{\neg}(\widehat{V}(\alpha)) = T \Leftarrow V(\alpha) = F \\ &| = \alpha \vee \neg\alpha \end{aligned}$$

$$(\alpha \rightarrow \beta) \rightarrow (\neg\beta \rightarrow \neg\alpha)$$

$$\begin{aligned} & T \\ & \alpha \in WFF \end{aligned}$$

$$\begin{aligned} & v_2, v_1 \\ v_1(p_i) &= v_2(p_i)\alpha \\ \widehat{V}_1(\alpha) &= \widehat{V}_2(\alpha) \end{aligned}$$

$\alpha, \beta$	$\neg\beta\neg\alpha$	$\alpha \rightarrow \beta$	$\neg\beta \rightarrow \neg\gamma$	$(\alpha \rightarrow \beta) \rightarrow (\neg\beta \rightarrow \neg\gamma)$
T,T	F,F	T	T	T
T,F	T,F	F	F	T
F,T	F,T	T	T	T
F,F	T,T	T	T	T

$$\begin{aligned} & (\alpha \rightarrow \beta) \rightarrow (\neg\beta \rightarrow \neg\alpha) \\ & \mathbf{v} \end{aligned}$$

$$\begin{aligned} &\widehat{V}() \\ &\Rightarrow \\ &\widehat{V}(\alpha \rightarrow \beta) = T \\ &\widehat{V}(\neg \beta \rightarrow \neg \alpha) = F \\ &TT_{\neg}(\widehat{V}(\beta)) = \widehat{V}(\neg \beta) = T \\ &TT_{\neg}(\widehat{V}(\alpha)) = \widehat{V}(\neg \alpha) = F \\ &\Rightarrow \\ &\widehat{V}(\beta) = F, \widehat{V}(\alpha) = T \\ &\widehat{V}(\alpha \rightarrow \beta) = F \end{aligned}$$

$$\begin{array}{c} \text{Fv} \\ \alpha \vee \neg \gamma \\ \neg(\alpha \wedge \neg \alpha) \end{array}$$

$$\begin{aligned} ((\alpha \vee (\beta \wedge \gamma)) \leftrightarrow ((\alpha \vee \beta) \wedge (\alpha \vee \gamma))) \\ (\alpha \wedge (\beta \vee \gamma)) \leftrightarrow (\alpha \wedge \beta) \vee (\alpha \wedge \gamma) \end{aligned}$$

$$\begin{aligned} \neg(\alpha \vee \beta) &\leftrightarrow (\neg \alpha \wedge \neg \beta) \\ \neg(\alpha \wedge \beta) &\leftrightarrow (\neg \alpha \vee \neg \beta) \end{aligned}$$

$$\begin{array}{c} \text{F} \\ \alpha \wedge \neg \alpha \end{array}$$

$$\widehat{V}((\neg \alpha)) = TT_{\neg}(\widehat{V}(\alpha)) = TT_{\neg}(T) = F$$

$$\begin{array}{c} \alpha \\ p_0 \\ \neg \alpha \Leftrightarrow \alpha \\ \alpha \Leftrightarrow \neg \alpha \end{array}$$

$$\begin{array}{c} X \\ X \\ v \models \alpha, \forall \alpha \in X, \Leftrightarrow v \models X \\ v \models \bigwedge_{\alpha \in X} \alpha \\ X \end{array}$$

$$\beta\alpha$$

$$\alpha\beta$$

$$\beta|\,=\,\alpha$$

$$“\subseteq”$$

$$\mathrm{Error\ 404\ "white\ board\ erased"}$$

$$\models \alpha \rightarrow \beta \alpha \models \beta$$

$$\models \alpha \rightarrow \beta$$

$$\alpha\models\beta“$$

$$v\models\alpha$$

$$v\models\beta$$

$$\widehat{V}(\alpha)=T$$

$$\widehat{V}(\beta)=F$$

$$\widehat{V}(\alpha\rightarrow\beta)=F$$

$$TT_{\rightarrow}(T,F)=F$$

$$\alpha\rightarrow\beta$$

$$x\in A/(B/C)\Leftrightarrow$$

$$x\in A\wedge x\notin (B/C)\Leftrightarrow$$

$$x\in A\wedge x\notin B\wedge x\in C\Leftrightarrow$$

$$x\in (A/B)\cup x\in A\cap C$$