$\forall$

$$\frac{\begin{array}{c}[x]\\ \vdots\\ A(x)\end{array}}{\forall x, A(x)}$$

$$\frac{\forall x, A(x)}{A[x/t]} \quad t : U$$

$[x/t]$

$x \to t$

$\exists$

$$\frac{A[x/t]}{\exists x, A(x)}$$

$$\frac{\boxed{\exists x, A(x)} \qquad \begin{array}{c}[x, A(x)]\\ \vdots\\ C\end{array}}{C}$$

$$\exists x \forall y\, A(x,y) \to \forall y \exists x A(x,y)$$

$$\exists x \forall y\, A(x,y) \vdash \forall y \exists x\, A(x,y)$$

$[x]\,;\,[\forall y\, A(x,y)]$

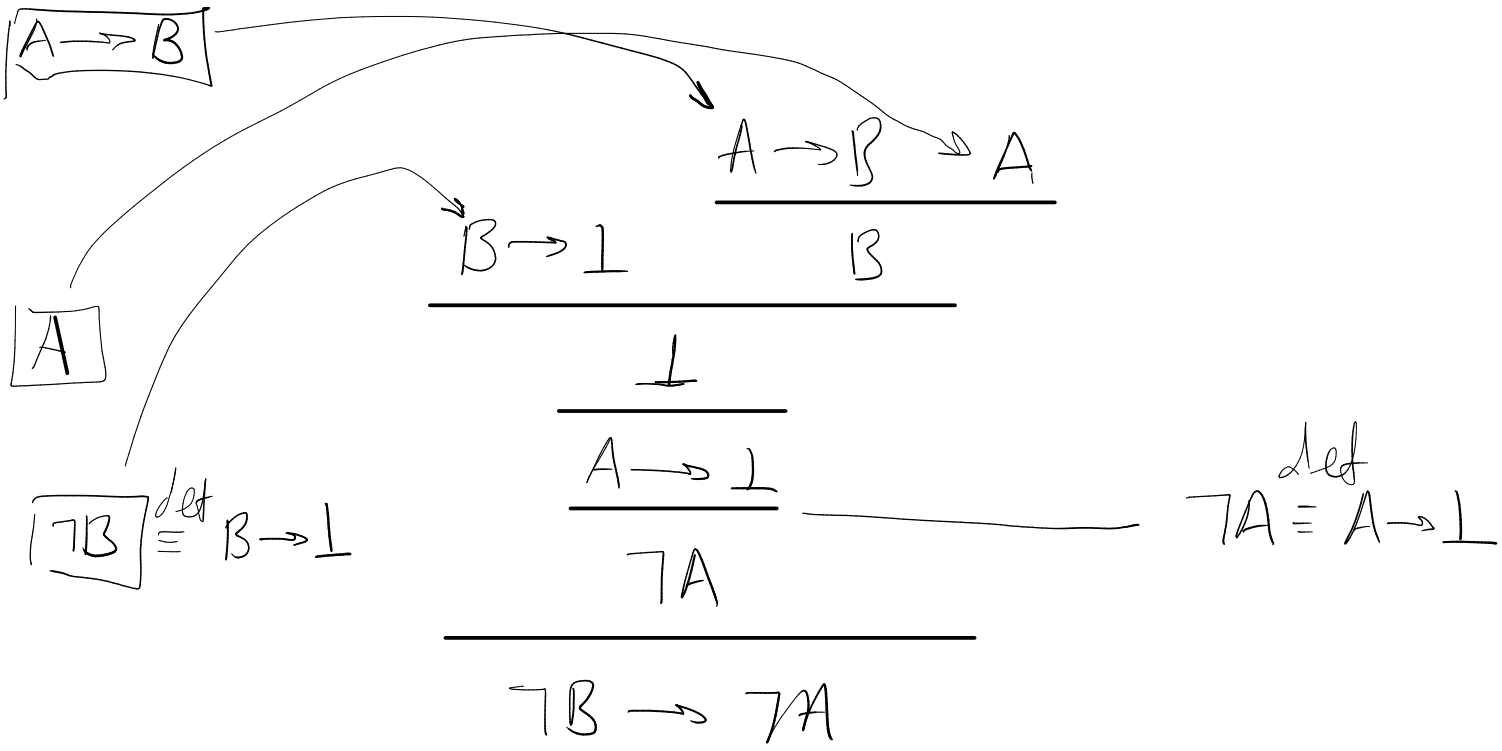
$$\frac{\forall y\, A(x,y)}{A(x,y)}$$

$$\frac{\boxed{\exists x \forall y A(x,y)} \qquad \exists x\, A(x,y)}{\exists x\, A(x,y)}$$

$[y]$

$$\forall y \exists x\, A(x,y)$$

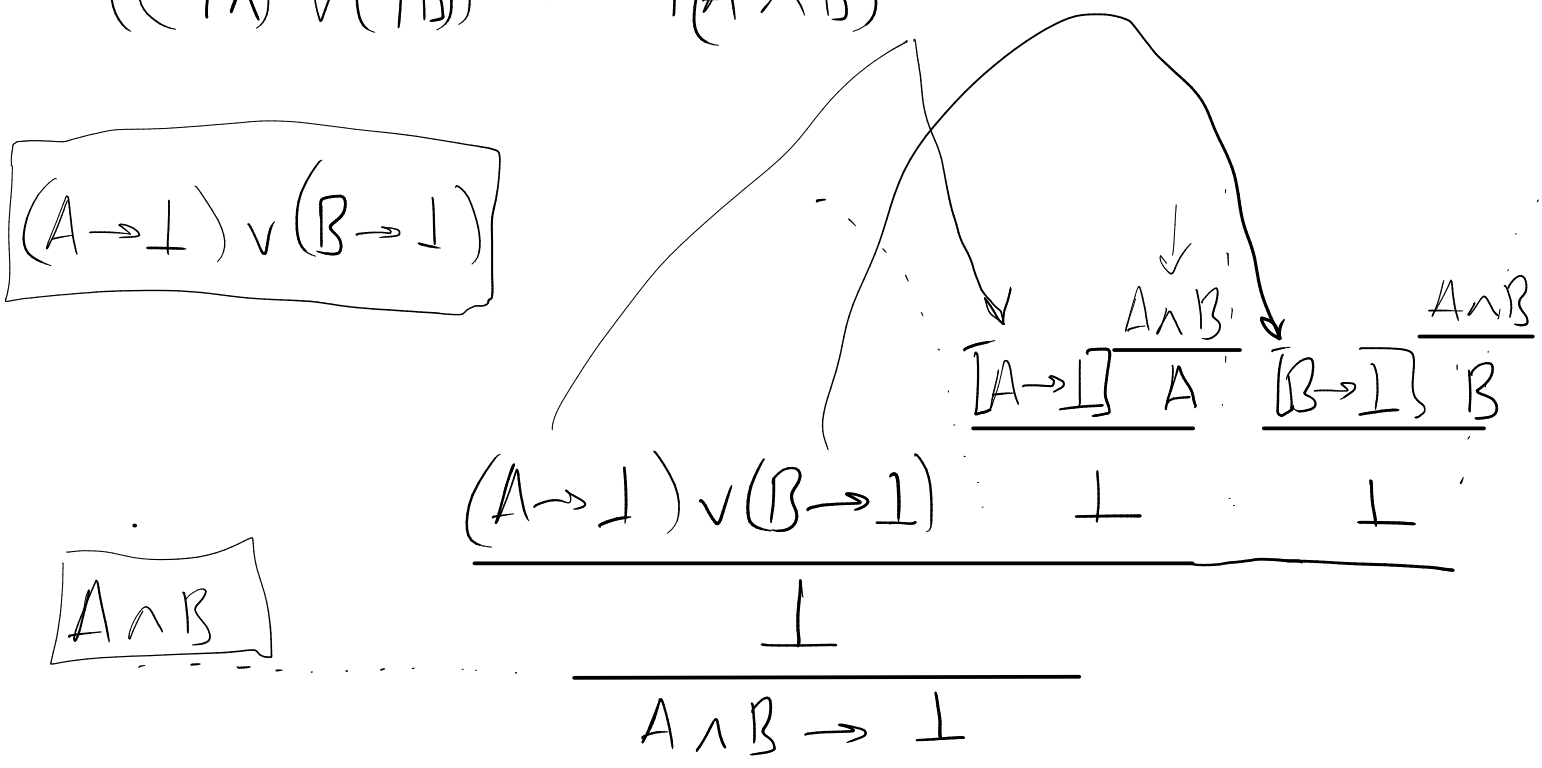
(2) $(A \to B) \to (\neg B \to \neg A)$

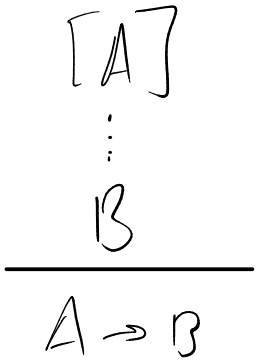


$(A \to B) \to ((B \to C) \to (A \to C))$

(3)

$((\neg A) \vee (\neg B)) \to \neg(A \wedge B)$




[A]
B
A → B