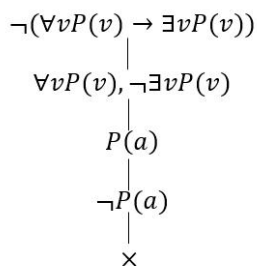
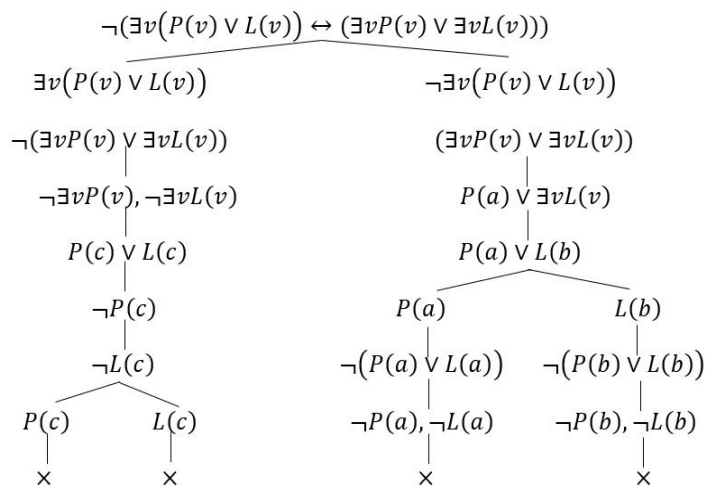


- 1 (1) $\exists x(P(x) \wedge L(x))$;
 (2) $\neg \exists x(P(x) \wedge V(x,x))$;
 (3) $\forall x(P(x) \rightarrow \exists y(L(y) \wedge V(x,y)))$;
 (4) $\forall x(L(x) \rightarrow \exists y(P(y) \wedge V(y,x))$;
 或 $\forall y(L(y) \rightarrow \exists x(P(x) \wedge V(x,y)))$ 。

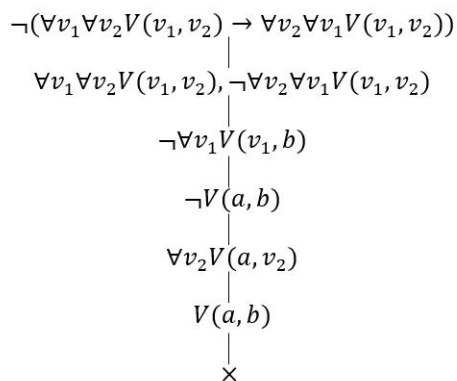
2 (1) $\forall vP(v) \rightarrow \exists vP(v)$ 是有效式。



(2) $\exists v(P(v) \vee L(v)) \leftrightarrow (\exists vP(v) \vee \exists vL(v))$ 是有效式。



(3) $\forall v_1 \forall v_2 V(v_1, v_2) \rightarrow \forall v_2 \forall v_1 V(v_1, v_2)$ 是有效式。



(4) $\forall v_1(P(v_1) \rightarrow \exists v_2 P(v_2))$ 是有效式。

$$\neg \forall v_1(P(v_1) \rightarrow \exists v_2 P(v_2))$$

$$\neg(P(a) \rightarrow \exists v_2 P(v_2))$$

$$P(a), \neg \exists v_2 P(v_2)$$

$$\neg P(a)$$

x