

## t34\_nattra\_1

(TMcZ4xQGUEfTQLv3HJXmFG3W7oAaHu7LEM9)

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Let  $v2\_struct\_0 : \iota \Rightarrow o$  be given. Let  $v11\_struct\_0 : \iota \Rightarrow o$  be given. Let  $v2\_cat\_1 : \iota \Rightarrow o$  be given. Let  $v3\_cat\_1 : \iota \Rightarrow o$  be given. Let  $v4\_cat\_1 : \iota \Rightarrow o$  be given. Let  $v5\_cat\_1 : \iota \Rightarrow o$  be given. Let  $v6\_cat\_1 : \iota \Rightarrow o$  be given. Let  $l1\_cat\_1 : \iota \Rightarrow o$  be given. Let  $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $u1\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $k11\_nattra\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $m1\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k2\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_xboole\_0 : \iota$  be given. Let  $m2\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $m2\_nattra\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k4\_tarski : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k3\_graph\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k4\_graph\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $u4\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $v1\_xboole\_0 : \iota \Rightarrow o$  be given. Let  $l5\_struct\_0 : \iota \Rightarrow o$  be given. Let  $l1\_graph\_1 : \iota \Rightarrow o$  be given. Let  $v1\_cat\_1 : \iota \Rightarrow o$  be given. Let  $m4\_nattra\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k10\_nattra\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k4\_cat\_2 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_xtuple\_0 : \iota \Rightarrow \iota$  be given. Let  $k2\_xtuple\_0 : \iota \Rightarrow \iota$  be given. Let  $k10\_cat\_2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k9\_xtuple\_0 : \iota \Rightarrow \iota$  be given. Let  $u1\_cat\_1 : \iota \Rightarrow \iota$  be given. Let  $k1\_funct\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k7\_nattra\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k4\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k6\_nattra\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $r2\_nattra\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Assume the following.

$$\begin{aligned}
 & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge (l1\_cat\_1 \\
 & X0))) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (u1\_struct\_0 X0)) \Rightarrow (\forall X2. \\
 & (m1\_subset\_1 X2 (u1\_struct\_0 X0)) \Rightarrow (\forall X3.(m1\_cat\_1 X3 X0 \\
 & X1 X2) \Rightarrow ((k2\_cat\_1 X0 X1 X2 \neq k1\_xboole\_0) \Rightarrow ((k3\_graph\_1 X0 X3 = X1) \wedge \\
 & (k4\_graph\_1 X0 X3 = X2))))))
 \end{aligned} \tag{1}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
& X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
& X0) \wedge (l1\_cat\_1 X0))))))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge ((\neg \\
& v11\_struct\_0 X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 X1) \wedge ((v4\_cat\_1 \\
& X1) \wedge ((v5\_cat\_1 X1) \wedge ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 X1))))))) \Rightarrow (\forall X2. \\
& (m2\_cat\_1 X2 X0 X1) \Rightarrow (\forall X3.(m2\_cat\_1 X3 X0 X1) \Rightarrow (\forall X4. \\
& (m2\_nattra\_1 X4 X0 X1 X2 X3) \Rightarrow (\forall X5.(m1\_subset\_1 X5 (u4\_struct\_0 \\
& (k11\_nattra\_1 X0 X1))) \Rightarrow ((X5 = k4\_tarski (k4\_tarski X2 X3) X4) \Rightarrow ( \\
& (k3\_graph\_1 (k11\_nattra\_1 X0 X1) X5 = X2) \wedge (k4\_graph\_1 (k11\_nattra\_1 \\
& X0 X1) X5 = X3)))))))))
\end{aligned} \tag{2}$$

Assume the following.

$$\forall X0. \forall X1. (m1\_subset\_1 X0 X1) \Rightarrow ((v1\_xboole\_0 X1) \vee (X0 \in X1)) \tag{3}$$

Assume the following.

$$\forall X0. ((\neg v11\_struct\_0 X0) \wedge (l5\_struct\_0 X0)) \Rightarrow (\neg v1\_xboole\_0 (u4\_struct\_0 X0)) \tag{4}$$

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. \forall X2. (((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 \\
& X0) \wedge (l1\_cat\_1 X0))) \wedge ((m1\_subset\_1 X1 (u1\_struct\_0 X0)) \wedge (m1\_subset\_1 \\
& X2 (u1\_struct\_0 X0)))) \Rightarrow (\forall X3.(m1\_cat\_1 X3 X0 X1 X2) \Rightarrow (m1\_subset\_1 \\
& X3 (u4\_struct\_0 X0)))
\end{aligned} \tag{5}$$

Assume the following.

$$\forall X0. (l1\_graph\_1 X0) \Rightarrow (l5\_struct\_0 X0) \tag{6}$$

Assume the following.

$$\forall X0. (l1\_cat\_1 X0) \Rightarrow (l1\_graph\_1 X0) \tag{7}$$

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. (((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge \\
& ((v2\_cat\_1 X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge \\
& ((v6\_cat\_1 X0) \wedge (l1\_cat\_1 X0))))))) \wedge ((\neg v2\_struct\_0 X1) \wedge ((\neg \\
& v11\_struct\_0 X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 X1) \wedge ((v4\_cat\_1 X1) \wedge \\
& ((v5\_cat\_1 X1) \wedge ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 X1))))))) \Rightarrow ((\neg v2\_struct\_0 \\
& (k11\_nattra\_1 X0 X1)) \wedge ((\neg v11\_struct\_0 (k11\_nattra\_1 X0 X1)) \wedge \\
& ((v1\_cat\_1 (k11\_nattra\_1 X0 X1)) \wedge ((v2\_cat\_1 (k11\_nattra\_1 X0 \\
& X1)) \wedge ((v3\_cat\_1 (k11\_nattra\_1 X0 X1)) \wedge ((v4\_cat\_1 (k11\_nattra\_1 \\
& X0 X1)) \wedge ((v5\_cat\_1 (k11\_nattra\_1 X0 X1)) \wedge ((v6\_cat\_1 (k11\_nattra\_1 \\
& X0 X1)) \wedge (l1\_cat\_1 (k11\_nattra\_1 X0 X1))))))))))
\end{aligned} \tag{8}$$

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. (((\neg v2\_struct\_0 X0) \wedge (\neg v11\_struct\_0 X0) \wedge \\
& ((v2\_cat\_1 X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge \\
& ((v6\_cat\_1 X0) \wedge (l1\_cat\_1 X0)))))) \wedge (\neg v2\_struct\_0 X1) \wedge (\neg \\
& v11\_struct\_0 X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 X1) \wedge ((v4\_cat\_1 X1) \wedge \\
& ((v5\_cat\_1 X1) \wedge ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 X1)))))) \Rightarrow (m4\_nattrra\_1 \\
& (k10\_nattrra\_1 X0 X1) X0 X1)
\end{aligned} \tag{9}$$

Assume the following.

$$\begin{aligned}
& \forall X0. ((\neg v2\_struct\_0 X0) \wedge (\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
& X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
& X0) \wedge (l1\_cat\_1 X0)))))) \Rightarrow (\forall X1. ((\neg v2\_struct\_0 X1) \wedge ((\neg \\
& v11\_struct\_0 X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 X1) \wedge ((v4\_cat\_1 \\
& X1) \wedge ((v5\_cat\_1 X1) \wedge ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 X1)))))) \Rightarrow (\forall X2. \\
& ((\neg v2\_struct\_0 X2) \wedge (\neg v11\_struct\_0 X2) \wedge ((v1\_cat\_1 X2) \wedge ((v2\_cat\_1 \\
& X2) \wedge ((v3\_cat\_1 X2) \wedge ((v4\_cat\_1 X2) \wedge ((v5\_cat\_1 X2) \wedge ((v6\_cat\_1 \\
& X2) \wedge (l1\_cat\_1 X2)))))) \Rightarrow ((X2 = k11\_nattrra\_1 X0 X1) \Leftrightarrow ((u1\_struct\_0 \\
& X2 = k4\_cat\_2 X0 X1) \wedge ((u4\_struct\_0 X2 = k10\_nattrra\_1 X0 X1) \wedge ((\forall X3. \\
& (m1\_subset\_1 X3 (u4\_struct\_0 X2)) \Rightarrow ((k3\_graph\_1 X2 X3 = k1\_xtuple\_0 \\
& (k1\_xtuple\_0 X3)) \wedge (k4\_graph\_1 X2 X3 = k2\_xtuple\_0 (k1\_xtuple\_0 \\
& X3)))) \wedge ((\forall X3. (m1\_subset\_1 X3 (u4\_struct\_0 X2)) \Rightarrow (\forall X4. \\
& (m1\_subset\_1 X4 (u4\_struct\_0 X2)) \Rightarrow ((k3\_graph\_1 X2 X4 = k4\_graph\_1 \\
& X2 X3) \Rightarrow (k10\_cat\_2 X2 X2 X4 X3 \in k9\_xtuple\_0 (u1\_cat\_1 X2)))))) \wedge (( \\
& \forall X3. (m1\_subset\_1 X3 (u4\_struct\_0 X2)) \Rightarrow (\forall X4. (m1\_subset\_1 \\
& X4 (u4\_struct\_0 X2)) \Rightarrow (\neg (k10\_cat\_2 X2 X2 X4 X3 \in k9\_xtuple\_0 (u1\_cat\_1 \\
& X2)) \wedge (\forall X5. (m2\_cat\_1 X5 X0 X1) \Rightarrow (\forall X6. (m2\_cat\_1 X6 \\
& X0 X1) \Rightarrow (\forall X7. (m2\_cat\_1 X7 X0 X1) \Rightarrow (\forall X8. (m2\_nattrra\_1 \\
& X8 X0 X1 X5 X6) \Rightarrow (\forall X9. (m2\_nattrra\_1 X9 X0 X1 X6 X7) \Rightarrow (\neg (X3 = k4\_tarski \\
& (k4\_tarski X5 X6) X8) \wedge ((X4 = k4\_tarski (k4\_tarski X6 X7) X9) \wedge (k1\_funct\_1 \\
& (u1\_cat\_1 X2) (k10\_cat\_2 X2 X2 X4 X3) = k4\_tarski (k4\_tarski X5 X7) \\
& (k7\_nattrra\_1 X0 X1 X5 X6 X7 X8 X9)))))) \wedge (\forall X3. (m1\_subset\_1 \\
& X3 (u1\_struct\_0 X2)) \Rightarrow (\forall X4. (m2\_cat\_1 X4 X0 X1) \Rightarrow ((X4 = X3) \Rightarrow \\
& (k4\_cat\_1 X2 X3 = k4\_tarski (k4\_tarski X4 X4) (k6\_nattrra\_1 X0 X1 X4)))))))))
\end{aligned} \tag{10}$$

Assume the following.

$$\begin{aligned}
& \forall X0. ((\neg v2\_struct\_0 X0) \wedge (\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
& X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
& X0) \wedge (l1\_cat\_1 X0)))))) \Rightarrow (\forall X1. ((\neg v2\_struct\_0 X1) \wedge ((\neg \\
& v11\_struct\_0 X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 X1) \wedge ((v4\_cat\_1 \\
& X1) \wedge ((v5\_cat\_1 X1) \wedge ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 X1)))))) \Rightarrow (\forall X2. \\
& (\neg v1\_xboole\_0 X2) \Rightarrow ((m4\_nattrra\_1 X2 X0 X1) \Leftrightarrow (\forall X3. \neg (X3 \in X2) \wedge \\
& (\forall X4. (m2\_cat\_1 X4 X0 X1) \Rightarrow (\forall X5. (m2\_cat\_1 X5 X0 X1) \Rightarrow \\
& (\forall X6. (m2\_nattrra\_1 X6 X0 X1 X4 X5) \Rightarrow (\neg (X3 = k4\_tarski (k4\_tarski \\
& X4 X5) X6) \wedge (r2\_nattrra\_1 X0 X1 X4 X5)))))))))
\end{aligned} \tag{11}$$

**Theorem 1**

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\ & X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\ & X0) \wedge (l1\_cat\_1 X0)))))))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge (( \\ & \neg v11\_struct\_0 X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 X1) \wedge ((v4\_cat\_1 \\ & X1) \wedge ((v5\_cat\_1 X1) \wedge ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 X1)))))))) \Rightarrow (\forall X2. \\ & (m1\_subset\_1 X2 (u1\_struct\_0 (k11\_nattr\_1 X0 X1))) \Rightarrow (\forall X3. \\ & (m1\_subset\_1 X3 (u1\_struct\_0 (k11\_nattr\_1 X0 X1))) \Rightarrow (\forall X4. \\ & (m1\_cat\_1 X4 (k11\_nattr\_1 X0 X1) X2 X3) \Rightarrow (\neg(k2\_cat\_1 (k11\_nattr\_1 \\ & X0 X1) X2 X3 \neq k1\_xboole\_0) \wedge (\forall X5.(m2\_cat\_1 X5 X0 X1) \Rightarrow (\forall X6. \\ & (m2\_cat\_1 X6 X0 X1) \Rightarrow (\forall X7.(m2\_nattr\_1 X7 X0 X1 X5 X6) \Rightarrow (\neg( \\ & X2 = X5) \wedge ((X3 = X6) \wedge (X4 = k4\_tarski (k4\_tarski X5 X6) X7)))))))))) \end{aligned}$$