

# l31\_nattra\_1

(TMSv6zeFJVMcaZu4Ef2HEpPAkoeE7QeMa5s)

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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  $m2\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $r1\_nattra\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $m1\_nattra\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $u1\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $k2\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_xboole\_0 : \iota$  be given. Let  $m1\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k5\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k8\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k9\_cat\_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k4\_nattra\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k5\_nattra\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Assume the following.

$$\begin{aligned}
 & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
 & X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
 & X0) \wedge (l1\_cat\_1 X0))))))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge ((\neg \\
 & v11\_struct\_0 X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 X1) \wedge ((v4\_cat\_1 \\
 & X1) \wedge ((v5\_cat\_1 X1) \wedge ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 X1))))))) \Rightarrow (\forall X2. \\
 & (m2\_cat\_1 X2 X0 X1) \Rightarrow (\forall X3.(m1\_subset\_1 X3 (u1\_struct\_0 X0)) \Rightarrow \\
 & (\forall X4.(m1\_subset\_1 X4 (u1\_struct\_0 X0)) \Rightarrow (\neg (k2\_cat\_1 X0 \\
 & X3 X4 \neq k1\_xboole\_0) \wedge (k2\_cat\_1 X1 (k8\_cat\_1 X0 X1 X2 X3) (k8\_cat\_1 \\
 & X0 X1 X2 X4) = k1\_xboole\_0))))))
 \end{aligned} \tag{1}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
& X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
& X0) \wedge (l1\_cat\_1 X0))))))) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (u1\_struct\_0 \\
& X0)) \Rightarrow (\forall X2.(m1\_subset\_1 X2 (u1\_struct\_0 X0)) \Rightarrow (\forall X3. \\
& (m1\_subset\_1 X3 (u1\_struct\_0 X0)) \Rightarrow (\forall X4.(m1\_subset\_1 X4 \\
& (u1\_struct\_0 X0)) \Rightarrow (\forall X5.(m1\_cat\_1 X5 X0 X1 X2) \Rightarrow (\forall X6. \\
& (m1\_cat\_1 X6 X0 X2 X3) \Rightarrow (\forall X7.(m1\_cat\_1 X7 X0 X3 X4) \Rightarrow (\neg (k2\_cat\_1 \\
& X0 X1 X2 \neq k1\_xboole\_0) \wedge ((k2\_cat\_1 X0 X2 X3 \neq k1\_xboole\_0) \wedge ((k2\_cat\_1 \\
& X0 X3 X4 \neq k1\_xboole\_0) \wedge (k5\_cat\_1 X0 X1 X2 X4 X5 (k5\_cat\_1 X0 X2 X3 X4 \\
& X6 X7) \neq k5\_cat\_1 X0 X1 X3 X4 (k5\_cat\_1 X0 X1 X2 X3 X5 X6) X7))))))))))))) \\
& \tag{2}
\end{aligned}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.\forall X5. \\
& (((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 X0) \wedge ((v3\_cat\_1 \\
& X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 X0) \wedge (l1\_cat\_1 \\
& X0))))))) \wedge ((m1\_subset\_1 X1 (u1\_struct\_0 X0)) \wedge ((m1\_subset\_1 \\
& X2 (u1\_struct\_0 X0)) \wedge ((\neg v2\_struct\_0 X3) \wedge ((\neg v11\_struct\_0 X3) \wedge \\
& ((v2\_cat\_1 X3) \wedge ((v3\_cat\_1 X3) \wedge ((v4\_cat\_1 X3) \wedge ((v5\_cat\_1 X3) \wedge \\
& ((v6\_cat\_1 X3) \wedge (l1\_cat\_1 X3))))))) \wedge ((m2\_cat\_1 X4 X0 X3) \wedge (m1\_cat\_1 \\
& X5 X0 X1 X2)))))) \Rightarrow (m1\_cat\_1 (k9\_cat\_3 X0 X1 X2 X3 X4 X5) X3 (k8\_cat\_1 \\
& X0 X3 X4 X1) (k8\_cat\_1 X0 X3 X4 X2)) \\
& \tag{3}
\end{aligned}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.\forall X3.(((\neg v2\_struct\_0 \\
& X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 \\
& X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 X0) \wedge (l1\_cat\_1 X0))))))) \wedge ((( \\
& \neg v2\_struct\_0 X1) \wedge ((\neg v11\_struct\_0 X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 \\
& X1) \wedge ((v4\_cat\_1 X1) \wedge ((v5\_cat\_1 X1) \wedge ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 \\
& X1))))))) \wedge ((m2\_cat\_1 X2 X0 X1) \wedge (m1\_subset\_1 X3 (u1\_struct\_0 \\
& X0)))))) \Rightarrow (m1\_subset\_1 (k8\_cat\_1 X0 X1 X2 X3) (u1\_struct\_0 X1)) \\
& \tag{4}
\end{aligned}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.\forall X5. \\
& \forall X6.(((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
& X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
& X0) \wedge (l1\_cat\_1 X0))))))) \wedge (((\neg v2\_struct\_0 X1) \wedge ((\neg v11\_struct\_0 \\
& X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 X1) \wedge ((v4\_cat\_1 X1) \wedge ((v5\_cat\_1 \\
& X1) \wedge ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 X1))))))) \wedge ((m2\_cat\_1 X2 X0 X1) \wedge \\
& ((m2\_cat\_1 X3 X0 X1) \wedge ((m2\_cat\_1 X4 X0 X1) \wedge ((m1\_nattr\_1 X5 X0 X1 \\
& X2 X3) \wedge (m1\_nattr\_1 X6 X0 X1 X3 X4)))))) \Rightarrow (m1\_nattr\_1 (k5\_nattr\_1 \\
& X0 X1 X2 X3 X4 X5 X6) X0 X1 X2 X4) \\
& \tag{5}
\end{aligned}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.\forall X5. \\
& (((\neg v2\_struct\_0 X0)\wedge((\neg v11\_struct\_0 X0)\wedge((v2\_cat\_1 X0)\wedge((v3\_cat\_1 \\
& X0)\wedge((v4\_cat\_1 X0)\wedge((v5\_cat\_1 X0)\wedge((v6\_cat\_1 X0)\wedge(l1\_cat\_1 \\
& X0))))))))\wedge(((\neg v2\_struct\_0 X1)\wedge((\neg v11\_struct\_0 X1)\wedge((v2\_cat\_1 \\
& X1)\wedge((v3\_cat\_1 X1)\wedge((v4\_cat\_1 X1)\wedge((v5\_cat\_1 X1)\wedge((v6\_cat\_1 \\
& X1)\wedge(l1\_cat\_1 X1))))))))\wedge((m2\_cat\_1 X2 X0 X1)\wedge((m2\_cat\_1 X3 X0 \\
& X1)\wedge((m1\_nattr\_1 X4 X0 X1 X2 X3)\wedge(m1\_subset\_1 X5 (u1\_struct\_0 \\
& X0))))))\Rightarrow(m1\_cat\_1 (k4\_nattr\_1 X0 X1 X2 X3 X4 X5) X1 (k8\_cat\_1 \\
& X0 X1 X2 X5) (k8\_cat\_1 X0 X1 X3 X5))
\end{aligned} \tag{6}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0)\wedge((\neg v11\_struct\_0 X0)\wedge((v2\_cat\_1 \\
& X0)\wedge((v3\_cat\_1 X0)\wedge((v4\_cat\_1 X0)\wedge((v5\_cat\_1 X0)\wedge((v6\_cat\_1 \\
& X0)\wedge(l1\_cat\_1 X0))))))))\Rightarrow(\forall X1.((\neg v2\_struct\_0 X1)\wedge(( \\
& \neg v11\_struct\_0 X1)\wedge((v2\_cat\_1 X1)\wedge((v3\_cat\_1 X1)\wedge((v4\_cat\_1 \\
& X1)\wedge((v5\_cat\_1 X1)\wedge((v6\_cat\_1 X1)\wedge(l1\_cat\_1 X1))))))))\Rightarrow(\forall X2. \\
& (m2\_cat\_1 X2 X0 X1)\Rightarrow(\forall X3.(m2\_cat\_1 X3 X0 X1)\Rightarrow(\forall X4. \\
& (m2\_cat\_1 X4 X0 X1)\Rightarrow(((r1\_nattr\_1 X0 X1 X2 X3)\wedge(r1\_nattr\_1 X0 \\
& X1 X3 X4))\Rightarrow(\forall X5.(m1\_nattr\_1 X5 X0 X1 X2 X3)\Rightarrow(\forall X6. \\
& (m1\_nattr\_1 X6 X0 X1 X3 X4)\Rightarrow(\forall X7.(m1\_nattr\_1 X7 X0 X1 X2 \\
& X4)\Rightarrow((X7 = k5\_nattr\_1 X0 X1 X2 X3 X4 X5 X6)\Leftrightarrow(\forall X8.(m1\_subset\_1 \\
& X8 (u1\_struct\_0 X0))\Rightarrow(k4\_nattr\_1 X0 X1 X2 X4 X7 X8 = k5\_cat\_1 X1 ( \\
& k8\_cat\_1 X0 X1 X2 X8) (k8\_cat\_1 X0 X1 X3 X8) (k8\_cat\_1 X0 X1 X4 X8) (k4\_nattr\_1 \\
& X0 X1 X2 X3 X5 X8) (k4\_nattr\_1 X0 X1 X3 X4 X6 X8))))))))))
\end{aligned} \tag{7}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0)\wedge((\neg v11\_struct\_0 X0)\wedge((v2\_cat\_1 \\
& X0)\wedge((v3\_cat\_1 X0)\wedge((v4\_cat\_1 X0)\wedge((v5\_cat\_1 X0)\wedge((v6\_cat\_1 \\
& X0)\wedge(l1\_cat\_1 X0))))))))\Rightarrow(\forall X1.((\neg v2\_struct\_0 X1)\wedge(( \\
& \neg v11\_struct\_0 X1)\wedge((v2\_cat\_1 X1)\wedge((v3\_cat\_1 X1)\wedge((v4\_cat\_1 \\
& X1)\wedge((v5\_cat\_1 X1)\wedge((v6\_cat\_1 X1)\wedge(l1\_cat\_1 X1))))))))\Rightarrow(\forall X2. \\
& (m2\_cat\_1 X2 X0 X1)\Rightarrow(\forall X3.(m2\_cat\_1 X3 X0 X1)\Rightarrow((r1\_nattr\_1 \\
& X0 X1 X2 X3)\Leftrightarrow(\forall X4.(m1\_subset\_1 X4 (u1\_struct\_0 X0))\Rightarrow(k2\_cat\_1 \\
& X1 (k8\_cat\_1 X0 X1 X2 X4) (k8\_cat\_1 X0 X1 X3 X4)\neq k1\_xboole_0))))))
\end{aligned} \tag{8}$$

**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. \\
& (m2\_cat\_1 X2 X1 X0) \Rightarrow (\forall X3.(m2\_cat\_1 X3 X1 X0) \Rightarrow (\forall X4. \\
& (m2\_cat\_1 X4 X1 X0) \Rightarrow (((r1\_nattr\_1 X1 X0 X2 X3) \wedge (r1\_nattr\_1 X1 \\
& X0 X3 X4)) \Rightarrow (\forall X5.(m1\_nattr\_1 X5 X1 X0 X2 X3) \Rightarrow ((\forall X6. \\
& (m1\_subset\_1 X6 (u1\_struct\_0 X1)) \Rightarrow (\forall X7.(m1\_subset\_1 X7 \\
& (u1\_struct\_0 X1)) \Rightarrow ((k2\_cat\_1 X1 X6 X7 \neq k1\_xboole\_0) \Rightarrow (\forall X8. \\
& (m1\_cat\_1 X8 X1 X6 X7) \Rightarrow (k5\_cat\_1 X0 (k8\_cat\_1 X1 X0 X2 X6) (k8\_cat\_1 \\
& X1 X0 X2 X7) (k8\_cat\_1 X1 X0 X3 X7) (k9\_cat\_3 X1 X6 X7 X0 X2 X8) (k4\_nattr\_1 \\
& X1 X0 X2 X3 X5 X7) = k5\_cat\_1 X0 (k8\_cat\_1 X1 X0 X2 X6) (k8\_cat\_1 X1 X0 \\
& X3 X6) (k8\_cat\_1 X1 X0 X3 X7) (k4\_nattr\_1 X1 X0 X2 X3 X5 X6) (k9\_cat\_3 \\
& X1 X6 X7 X0 X3 X8)))))) \Rightarrow (\forall X6.(m1\_nattr\_1 X6 X1 X0 X3 X4) \Rightarrow ( \\
& (\forall X7.(m1\_subset\_1 X7 (u1\_struct\_0 X1)) \Rightarrow (\forall X8.(m1\_subset\_1 \\
& X8 (u1\_struct\_0 X1)) \Rightarrow ((k2\_cat\_1 X1 X7 X8 \neq k1\_xboole\_0) \Rightarrow (\forall X9. \\
& (m1\_cat\_1 X9 X1 X7 X8) \Rightarrow (k5\_cat\_1 X0 (k8\_cat\_1 X1 X0 X3 X7) (k8\_cat\_1 \\
& X1 X0 X3 X8) (k8\_cat\_1 X1 X0 X4 X8) (k9\_cat\_3 X1 X7 X8 X0 X3 X9) (k4\_nattr\_1 \\
& X1 X0 X3 X4 X6 X8) = k5\_cat\_1 X0 (k8\_cat\_1 X1 X0 X3 X7) (k8\_cat\_1 X1 X0 \\
& X4 X7) (k8\_cat\_1 X1 X0 X4 X8) (k4\_nattr\_1 X1 X0 X3 X4 X6 X7) (k9\_cat\_3 \\
& X1 X7 X8 X0 X4 X9)))))) \Rightarrow (\forall X7.(m1\_subset\_1 X7 (u1\_struct\_0 \\
& X1)) \Rightarrow (\forall X8.(m1\_subset\_1 X8 (u1\_struct\_0 X1)) \Rightarrow ((k2\_cat\_1 \\
& X1 X7 X8 \neq k1\_xboole\_0) \Rightarrow (\forall X9.(m1\_cat\_1 X9 X1 X7 X8) \Rightarrow (k5\_cat\_1 \\
& X0 (k8\_cat\_1 X1 X0 X2 X7) (k8\_cat\_1 X1 X0 X2 X8) (k8\_cat\_1 X1 X0 X4 X8) \\
& (k9\_cat\_3 X1 X7 X8 X0 X2 X9) (k4\_nattr\_1 X1 X0 X2 X4 (k5\_nattr\_1 X1 \\
& X0 X2 X3 X4 X5 X6) X8) = k5\_cat\_1 X0 (k8\_cat\_1 X1 X0 X2 X7) (k8\_cat\_1 X1 \\
& X0 X4 X7) (k8\_cat\_1 X1 X0 X4 X8) (k4\_nattr\_1 X1 X0 X2 X4 (k5\_nattr\_1 \\
& X1 X0 X2 X3 X4 X5 X6) X7) (k9\_cat\_3 X1 X7 X8 X0 X4 X9))))))))))
\end{aligned}$$