

# l43\_nattra\_1

(TMM6dMH9qWKvHqLbwu1T6VPaUmMJgRTJp6F)

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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  $m2\_nattra\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $r2\_nattra\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v1\_nattra\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $u1\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $k2\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_xboole\_0 : \iota$  be given. Let  $m1\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  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  $k9\_cat\_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k4\_nattra\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k8\_nattra\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $m1\_nattra\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $r1\_nattra\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 X0) \wedge (l1\_cat\_1 X0)))))))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge ((\neg v11\_struct\_0 X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 X1) \wedge ((v4\_cat\_1 X1) \wedge ((v5\_cat\_1 X1) \wedge ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 X1)))))))) \Rightarrow (\forall X2. \\
& (m2\_cat\_1 X2 X0 X1) \Rightarrow (\forall X3.(m2\_cat\_1 X3 X0 X1) \Rightarrow (\forall X4. \\
& (m2\_nattra\_1 X4 X0 X1 X2 X3) \Rightarrow (((r2\_nattra\_1 X0 X1 X2 X3) \wedge (v1\_nattra\_1 X4 X0 X1 X2 X3)) \Rightarrow (\forall X5.(m1\_subset\_1 X5 (u1\_struct\_0 X0)) \Rightarrow \\
& (\forall X6.(m1\_subset\_1 X6 (u1\_struct\_0 X0)) \Rightarrow ((k2\_cat\_1 X0 X5 X6 \neq k1\_xboole\_0) \Rightarrow (\forall X7.(m1\_cat\_1 X7 X0 X5 X6) \Rightarrow (k5\_cat\_1 X1 (k8\_cat\_1 X0 X1 X3 X5) (k8\_cat\_1 X0 X1 X3 X6) (k8\_cat\_1 X0 X1 X2 X6) \\
& (k9\_cat\_3 X0 X5 X6 X1 X3 X7) (k4\_nattra\_1 X0 X1 X3 X2 (k8\_nattra\_1 X0 X1 X2 X3 X4) X6) = k5\_cat\_1 X1 (k8\_cat\_1 X0 X1 X3 X5) (k8\_cat\_1 X0 X1 X2 X5) (k8\_cat\_1 X0 X1 X2 X6) (k4\_nattra\_1 X0 X1 X3 X2 (k8\_nattra\_1 X0 X1 X2 X3 X4) X5) (k9\_cat\_3 X0 X5 X6 X1 X2 X7))))))))))
\end{aligned} \tag{1}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
& X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
& X0) \wedge (l1\_cat\_1 X0))))))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge ((\neg \\
& v11\_struct\_0 X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 X1) \wedge ((v4\_cat\_1 \\
& X1) \wedge ((v5\_cat\_1 X1) \wedge ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 X1))))))) \Rightarrow (\forall X2. \\
& (m2\_cat\_1 X2 X0 X1) \Rightarrow (\forall X3.(m2\_cat\_1 X3 X0 X1) \Rightarrow (\forall X4. \\
& (m1\_nattra\_1 X4 X0 X1 X2 X3) \Rightarrow (((r1\_nattra\_1 X0 X1 X2 X3) \wedge (v1\_nattra\_1 \\
& X4 X0 X1 X2 X3)) \Rightarrow (r1\_nattra\_1 X0 X1 X3 X2))))))
\end{aligned} \tag{2}$$

Assume the following.

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

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.(((\neg v2\_struct\_0 \\
& X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 \\
& X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 X0) \wedge (l1\_cat\_1 X0))))))) \wedge (((\neg \\
& v2\_struct\_0 X1) \wedge ((\neg v11\_struct\_0 X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 \\
& X1) \wedge ((v4\_cat\_1 X1) \wedge ((v5\_cat\_1 X1) \wedge ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 \\
& X1))))))) \wedge ((m2\_cat\_1 X2 X0 X1) \wedge ((m2\_cat\_1 X3 X0 X1) \wedge (m1\_nattra\_1 \\
& X4 X0 X1 X2 X3)))) \Rightarrow (m1\_nattra\_1 (k8\_nattra\_1 X0 X1 X2 X3 X4) X0 X1 \\
& X3 X2)
\end{aligned} \tag{4}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
& X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
& X0) \wedge (l1\_cat\_1 X0))))))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge (( \\
& \neg v11\_struct\_0 X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 X1) \wedge ((v4\_cat\_1 \\
& X1) \wedge ((v5\_cat\_1 X1) \wedge ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 X1))))))) \Rightarrow (\forall X2. \\
& (m2\_cat\_1 X2 X0 X1) \Rightarrow (\forall X3.(m2\_cat\_1 X3 X0 X1) \Rightarrow ((r2\_nattra\_1 \\
& X0 X1 X2 X3) \Leftrightarrow ((r1\_nattra\_1 X0 X1 X2 X3) \wedge (\exists X4.(m1\_nattra\_1 \\
& X4 X0 X1 X2 X3) \wedge (\forall X5.(m1\_subset\_1 X5 (u1\_struct\_0 X0)) \Rightarrow ( \\
& \forall X6.(m1\_subset\_1 X6 (u1\_struct\_0 X0)) \Rightarrow ((k2\_cat\_1 X0 X5 \\
& X6 \neq k1\_xboole\_0) \Rightarrow (\forall X7.(m1\_cat\_1 X7 X0 X5 X6) \Rightarrow (k5\_cat\_1 \\
& X1 (k8\_cat\_1 X0 X1 X2 X5) (k8\_cat\_1 X0 X1 X2 X6) (k8\_cat\_1 X0 X1 X3 X6) \\
& (k9\_cat\_3 X0 X5 X6 X1 X2 X7) (k4\_nattra\_1 X0 X1 X2 X3 X4 X6) = k5\_cat\_1 \\
& X1 (k8\_cat\_1 X0 X1 X2 X5) (k8\_cat\_1 X0 X1 X3 X5) (k8\_cat\_1 X0 X1 X3 X6) \\
& (k4\_nattra\_1 X0 X1 X2 X3 X4 X5) (k9\_cat\_3 X0 X5 X6 X1 X3 X7)))))))))) \\
& \tag{5}
\end{aligned}$$

**Theorem 1**

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
& X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
& X0) \wedge (l1\_cat\_1 X0))))))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge (( \\
& \neg v11\_struct\_0 X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 X1) \wedge ((v4\_cat\_1 \\
& X1) \wedge ((v5\_cat\_1 X1) \wedge ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 X1))))))) \Rightarrow (\forall X2. \\
& (m2\_cat\_1 X2 X0 X1) \Rightarrow (\forall X3.(m2\_cat\_1 X3 X0 X1) \Rightarrow (\forall X4. \\
& (m2\_nattra\_1 X4 X0 X1 X2 X3) \Rightarrow (((r2\_nattra\_1 X0 X1 X2 X3) \wedge (v1\_nattra\_1 \\
& X4 X0 X1 X2 X3)) \Rightarrow (r2\_nattra\_1 X0 X1 X3 X2))))))
\end{aligned}$$