

## t21\_nattra\_1

(TMJwxsizmCz7twGziJzJc8M6FKc1sp1FSyj)

October 27, 2020

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  $r2\_funct\_2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $u1\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $u4\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $k5\_nattra\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k3\_nattra\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $m1\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k2\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_xboole\_0 : \iota$  be given. Let  $k5\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k4\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k4\_nattra\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k8\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Assume the following.

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\ & X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\ & X0) \wedge (l1\_cat\_1 X0))))))) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (u1\_struct\_0 \\ & X0)) \Rightarrow (\forall X2.(m1\_subset\_1 X2 (u1\_struct\_0 X0)) \Rightarrow (\forall X3. \\ & (m1\_cat\_1 X3 X0 X1 X2) \Rightarrow ((k2\_cat\_1 X0 X1 X2 \neq k1\_xboole\_0) \Rightarrow (k5\_cat\_1 \\ & X0 X1 X1 X2 (k4\_cat\_1 X0 X1) X3 = X3)))))) \end{aligned} \tag{1}$$

Assume the following.

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\ & X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\ & X0) \wedge (l1\_cat\_1 X0))))))) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (u1\_struct\_0 \\ & X0)) \Rightarrow (\forall X2.(m1\_subset\_1 X2 (u1\_struct\_0 X0)) \Rightarrow (\forall X3. \\ & (m1\_cat\_1 X3 X0 X1 X2) \Rightarrow ((k2\_cat\_1 X0 X1 X2 \neq k1\_xboole\_0) \Rightarrow (k5\_cat\_1 \\ & X0 X1 X2 X2 X3 (k4\_cat\_1 X0 X2) = X3)))))) \end{aligned} \tag{2}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
& X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
& X0) \wedge (l1\_cat\_1 X0))))))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge (( \\
& \neg v11\_struct\_0 X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 X1) \wedge ((v4\_cat\_1 \\
& X1) \wedge ((v5\_cat\_1 X1) \wedge ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 X1))))))) \Rightarrow (\forall X2. \\
& (m2\_cat\_1 X2 X1 X0) \Rightarrow (\forall X3.(m1\_subset\_1 X3 (u1\_struct\_0 X1)) \Rightarrow \\
& (k4\_nattr\_1 X1 X0 X2 X2 (k3\_nattr\_1 X1 X0 X2) X3 = k4\_cat\_1 X0 (k8\_cat\_1 \\
& X1 X0 X2 X3))))))
\end{aligned} \tag{3}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
& X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
& X0) \wedge (l1\_cat\_1 X0))))))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge (( \\
& \neg v11\_struct\_0 X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 X1) \wedge ((v4\_cat\_1 \\
& X1) \wedge ((v5\_cat\_1 X1) \wedge ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 X1))))))) \Rightarrow (\forall X2. \\
& (m2\_cat\_1 X2 X1 X0) \Rightarrow (\forall X3.(m2\_cat\_1 X3 X1 X0) \Rightarrow ((r1\_nattr\_1 \\
& X1 X0 X2 X3) \Rightarrow (\forall X4.(m1\_nattr\_1 X4 X1 X0 X2 X3) \Rightarrow (\forall X5. \\
& (m1\_nattr\_1 X5 X1 X0 X2 X3) \Rightarrow ((\forall X6.(m1\_subset\_1 X6 (u1\_struct\_0 \\
& X1)) \Rightarrow (k4\_nattr\_1 X1 X0 X2 X3 X4 X6 = k4\_nattr\_1 X1 X0 X2 X3 X5 X6)) \Rightarrow \\
& (r2\_funct\_2 (u1\_struct\_0 X1) (u4\_struct\_0 X0) X4 X5))))))
\end{aligned} \tag{4}$$

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. \forall X2. \forall X3. (((\neg v2\_struct\_0 \\
& X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 \\
& X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 X0) \wedge (l1\_cat\_1 X0))))))) \wedge ((( \\
& \neg v2\_struct\_0 X1) \wedge ((\neg v11\_struct\_0 X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 \\
& X1) \wedge ((v4\_cat\_1 X1) \wedge ((v5\_cat\_1 X1) \wedge ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 \\
& X1))))))) \wedge ((m2\_cat\_1 X2 X0 X1) \wedge (m2\_cat\_1 X3 X0 X1))) \Rightarrow (r1\_nattr\_1 \\
& X0 X1 X2 X2)
\end{aligned} \tag{5}$$

Assume the following.

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

Assume the following.

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

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.(((\neg v2\_struct\_0 X0)\wedge(\neg v11\_struct\_0 \\
& X0)\wedge((v2\_cat\_1 X0)\wedge((v3\_cat\_1 X0)\wedge((v4\_cat\_1 X0)\wedge((v5\_cat\_1 \\
& X0)\wedge((v6\_cat\_1 X0)\wedge(l1\_cat\_1 X0))))))\wedge(((\neg v2\_struct\_0 X1)\wedge \\
& ((\neg v11\_struct\_0 X1)\wedge((v2\_cat\_1 X1)\wedge((v3\_cat\_1 X1)\wedge((v4\_cat\_1 \\
& X1)\wedge((v5\_cat\_1 X1)\wedge((v6\_cat\_1 X1)\wedge(l1\_cat\_1 X1))))))\wedge(m2\_cat\_1 \\
& X2 X0 X1))\Rightarrow(m1\_nattra\_1 (k3\_nattra\_1 X0 X1 X2) X0 X1 X2 X2)
\end{aligned} \tag{8}$$

Assume the following.

$$\begin{aligned}
& \forall X0.(((\neg v2\_struct\_0 X0)\wedge(\neg v11\_struct\_0 X0)\wedge((v2\_cat\_1 \\
& X0)\wedge((v3\_cat\_1 X0)\wedge((v4\_cat\_1 X0)\wedge((v5\_cat\_1 X0)\wedge((v6\_cat\_1 \\
& X0)\wedge(l1\_cat\_1 X0))))))\Rightarrow(\forall X1.(((\neg v2\_struct\_0 X1)\wedge((\neg \\
& v11\_struct\_0 X1)\wedge((v2\_cat\_1 X1)\wedge((v3\_cat\_1 X1)\wedge((v4\_cat\_1 \\
& X1)\wedge((v5\_cat\_1 X1)\wedge((v6\_cat\_1 X1)\wedge(l1\_cat\_1 X1))))))\Rightarrow(\forall X2. \\
& (m2\_cat\_1 X2 X0 X1)\Rightarrow(\forall X3.(m2\_cat\_1 X3 X0 X1)\Rightarrow(\forall X4. \\
& (m2\_cat\_1 X4 X0 X1)\Rightarrow(((r1\_nattra\_1 X0 X1 X2 X3)\wedge(r1\_nattra\_1 X0 \\
& X1 X3 X4))\Rightarrow(\forall X5.(m1\_nattra\_1 X5 X0 X1 X2 X3)\Rightarrow(\forall X6. \\
& (m1\_nattra\_1 X6 X0 X1 X3 X4)\Rightarrow(\forall X7.(m1\_nattra\_1 X7 X0 X1 X2 \\
& X4)\Rightarrow((X7 = k5\_nattra\_1 X0 X1 X2 X3 X4 X5 X6)\Leftrightarrow(\forall X8.(m1\_subset\_1 \\
& X8 (u1\_struct\_0 X0))\Rightarrow(k4\_nattra\_1 X0 X1 X2 X4 X7 X8 = k5\_cat\_1 X1 ( \\
& k8\_cat\_1 X0 X1 X2 X8) (k8\_cat\_1 X0 X1 X3 X8) (k8\_cat\_1 X0 X1 X4 X8) (k4\_nattra\_1 \\
& X0 X1 X2 X3 X5 X8) (k4\_nattra\_1 X0 X1 X3 X4 X6 X8))))))))))
\end{aligned} \tag{9}$$

Assume the following.

$$\begin{aligned}
& \forall X0.(((\neg v2\_struct\_0 X0)\wedge(\neg v11\_struct\_0 X0)\wedge((v2\_cat\_1 \\
& X0)\wedge((v3\_cat\_1 X0)\wedge((v4\_cat\_1 X0)\wedge((v5\_cat\_1 X0)\wedge((v6\_cat\_1 \\
& X0)\wedge(l1\_cat\_1 X0))))))\Rightarrow(\forall X1.(((\neg v2\_struct\_0 X1)\wedge((\neg \\
& v11\_struct\_0 X1)\wedge((v2\_cat\_1 X1)\wedge((v3\_cat\_1 X1)\wedge((v4\_cat\_1 \\
& X1)\wedge((v5\_cat\_1 X1)\wedge((v6\_cat\_1 X1)\wedge(l1\_cat\_1 X1))))))\Rightarrow(\forall X2. \\
& (m2\_cat\_1 X2 X0 X1)\Rightarrow(\forall X3.(m2\_cat\_1 X3 X0 X1)\Rightarrow(((r1\_nattra\_1 \\
& X0 X1 X2 X3)\Leftrightarrow(\forall X4.(m1\_subset\_1 X4 (u1\_struct\_0 X0))\Rightarrow(k2\_cat\_1 \\
& X1 (k8\_cat\_1 X0 X1 X2 X4) (k8\_cat\_1 X0 X1 X3 X4)\neq k1\_xboole\_0))))))
\end{aligned} \tag{10}$$

**Theorem 1**

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\ & X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\ & X0) \wedge (l1\_cat\_1 X0)))))))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge (( \\ & \neg v11\_struct\_0 X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 X1) \wedge ((v4\_cat\_1 \\ & X1) \wedge ((v5\_cat\_1 X1) \wedge ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 X1)))))))) \Rightarrow (\forall X2. \\ & (m2\_cat\_1 X2 X0 X1) \Rightarrow (\forall X3.(m2\_cat\_1 X3 X0 X1) \Rightarrow ((r1\_nattr\_1 \\ & X0 X1 X2 X3) \Rightarrow (\forall X4.(m1\_nattr\_1 X4 X0 X1 X2 X3) \Rightarrow ((r2\_funct\_2 \\ & (u1\_struct\_0 X0) (u4\_struct\_0 X1) (k5\_nattr\_1 X0 X1 X2 X3 X3 X4 ( \\ & k3\_nattr\_1 X0 X1 X3)) X4) \wedge (r2\_funct\_2 (u1\_struct\_0 X0) (u4\_struct\_0 \\ & X1) (k5\_nattr\_1 X0 X1 X2 X2 X3 (k3\_nattr\_1 X0 X1 X2) X4) X4)))))) \end{aligned}$$