

## t40\_isocat\_1

(TMMcVoU75H9KSZ8NCNxsG5k4X8t3trGy9iW)

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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  $m2\_nattr\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $r2\_nattr\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  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  $k5\_isocat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k6\_isocat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k6\_nattr\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k4\_isocat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k9\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k7\_nattr\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v1\_funct\_1 : \iota \Rightarrow o$  be given. Let  $v1\_funct\_2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k1\_zfmisc\_1 : \iota \Rightarrow \iota$  be given. Let  $k2\_zfmisc\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k3\_relat\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k3\_nattr\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $m1\_nattr\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Assume the following.

$$\begin{aligned}
 & \forall X0. ((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
 & X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
 & X0) \wedge (l1\_cat\_1 X0))))))) \Rightarrow (\forall X1. ((\neg v2\_struct\_0 X1) \wedge ((\neg \\
 & v11\_struct\_0 X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 X1) \wedge ((v4\_cat\_1 \\
 & X1) \wedge ((v5\_cat\_1 X1) \wedge ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 X1))))))) \Rightarrow (\forall X2. \\
 & ((\neg v2\_struct\_0 X2) \wedge ((\neg v11\_struct\_0 X2) \wedge ((v2\_cat\_1 X2) \wedge ((v3\_cat\_1 \\
 & X2) \wedge ((v4\_cat\_1 X2) \wedge ((v5\_cat\_1 X2) \wedge ((v6\_cat\_1 X2) \wedge (l1\_cat\_1 \\
 & X2))))))) \Rightarrow (\forall X3. (m2\_cat\_1 X3 X0 X1) \Rightarrow (\forall X4. (m2\_cat\_1 \\
 & X4 X1 X2) \Rightarrow (r2\_funct\_2 (u1\_struct\_0 X0) (u4\_struct\_0 X2) (k4\_isocat\_1 \\
 & X0 X1 X2 X3 X3 (k6\_nattr\_1 X0 X1 X3) X4) (k6\_nattr\_1 X0 X2 (k9\_cat\_1 \\
 & X0 X1 X2 X3 X4))))))
 \end{aligned}
 \tag{1}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
& X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
& X0) \wedge (l1\_cat\_1 X0))))))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge ((\neg \\
& v11\_struct\_0 X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 X1) \wedge ((v4\_cat\_1 \\
& X1) \wedge ((v5\_cat\_1 X1) \wedge ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 X1))))))) \Rightarrow (\forall X2. \\
& (m2\_cat\_1 X2 X0 X1) \Rightarrow (\forall X3.(m2\_cat\_1 X3 X0 X1) \Rightarrow ((r2\_nattra\_1 \\
& X0 X1 X2 X3) \Rightarrow (\forall X4.(m2\_nattra\_1 X4 X0 X1 X2 X3) \Rightarrow ((r2\_funct\_2 \\
& (u1\_struct\_0 X0) (u4\_struct\_0 X1) (k7\_nattra\_1 X0 X1 X2 X3 X3 X4 ( \\
& k6\_nattra\_1 X0 X1 X3)) X4) \wedge (r2\_funct\_2 (u1\_struct\_0 X0) (u4\_struct\_0 \\
& X1) (k7\_nattra\_1 X0 X1 X2 X2 X3 (k6\_nattra\_1 X0 X1 X2) X4) X4))))))))) \\
& \tag{2}
\end{aligned}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
& X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
& X0) \wedge (l1\_cat\_1 X0))))))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge ((\neg \\
& v11\_struct\_0 X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 X1) \wedge ((v4\_cat\_1 \\
& X1) \wedge ((v5\_cat\_1 X1) \wedge ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 X1))))))) \Rightarrow (\forall X2. \\
& ((\neg v2\_struct\_0 X2) \wedge ((\neg v11\_struct\_0 X2) \wedge ((v2\_cat\_1 X2) \wedge ((v3\_cat\_1 \\
& X2) \wedge ((v4\_cat\_1 X2) \wedge ((v5\_cat\_1 X2) \wedge ((v6\_cat\_1 X2) \wedge (l1\_cat\_1 \\
& X2))))))) \Rightarrow (\forall X3.(m2\_cat\_1 X3 X0 X1) \Rightarrow (\forall X4.(m2\_cat\_1 \\
& X4 X0 X1) \Rightarrow (\forall X5.(m2\_cat\_1 X5 X1 X2) \Rightarrow (\forall X6.(m2\_cat\_1 \\
& X6 X1 X2) \Rightarrow (((r2\_nattra\_1 X0 X1 X3 X4) \wedge (r2\_nattra\_1 X1 X2 X5 X6)) \Rightarrow \\
& (r2\_nattra\_1 X0 X2 (k9\_cat\_1 X0 X1 X2 X3 X5) (k9\_cat\_1 X0 X1 X2 X4 X6))))))))) \\
& \tag{3}
\end{aligned}$$

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. \forall X2. \forall X3. (((\neg v2\_struct\_0 \\
& X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 \\
& X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 X0) \wedge (l1\_cat\_1 X0))))))) \wedge (((\neg \\
& v2\_struct\_0 X1) \wedge ((\neg v11\_struct\_0 X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 \\
& X1) \wedge ((v4\_cat\_1 X1) \wedge ((v5\_cat\_1 X1) \wedge ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 \\
& X1))))))) \wedge ((m2\_cat\_1 X2 X0 X1) \wedge (m2\_cat\_1 X3 X0 X1))) \Rightarrow (r2\_nattra\_1 \\
& X0 X1 X2 X2) \\
& \tag{4}
\end{aligned}$$

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. \forall X2. \forall X3. (((v1\_funct\_1 X2) \wedge \\
& ((v1\_funct\_2 X2 X0 X1) \wedge (m1\_subset\_1 X2 (k1\_zfmisc\_1 (k2\_zfmisc\_1 \\
& X0 X1)))) \wedge ((v1\_funct\_1 X3) \wedge ((v1\_funct\_2 X3 X0 X1) \wedge (m1\_subset\_1 \\
& X3 (k1\_zfmisc\_1 (k2\_zfmisc\_1 X0 X1)))))) \Rightarrow ((r2\_funct\_2 X0 X1 X2 \\
& X3) \Leftrightarrow (X2 = X3)) \\
& \tag{5}
\end{aligned}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.(((\neg v2\_struct\_0 \\
& X0)\wedge((\neg v11\_struct\_0 X0)\wedge((v2\_cat\_1 X0)\wedge((v3\_cat\_1 X0)\wedge((v4\_cat\_1 \\
& X0)\wedge((v5\_cat\_1 X0)\wedge((v6\_cat\_1 X0)\wedge(l1\_cat\_1 X0))))))))\wedge((( \\
& \neg v2\_struct\_0 X1)\wedge((\neg v11\_struct\_0 X1)\wedge((v2\_cat\_1 X1)\wedge((v3\_cat\_1 \\
& X1)\wedge((v4\_cat\_1 X1)\wedge((v5\_cat\_1 X1)\wedge((v6\_cat\_1 X1)\wedge(l1\_cat\_1 \\
& X1))))))))\wedge(((\neg v2\_struct\_0 X2)\wedge((\neg v11\_struct\_0 X2)\wedge((v2\_cat\_1 \\
& X2)\wedge((v3\_cat\_1 X2)\wedge((v4\_cat\_1 X2)\wedge((v5\_cat\_1 X2)\wedge((v6\_cat\_1 \\
& X2)\wedge(l1\_cat\_1 X2))))))))\wedge((m2\_cat\_1 X3 X0 X1)\wedge(m2\_cat\_1 X4 X1 \\
& X2))))\Rightarrow(k9\_cat\_1 X0 X1 X2 X3 X4 = k3\_relat\_1 X3 X4)
\end{aligned} \tag{6}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.(((\neg v2\_struct\_0 X0)\wedge((\neg v11\_struct\_0 \\
& X0)\wedge((v2\_cat\_1 X0)\wedge((v3\_cat\_1 X0)\wedge((v4\_cat\_1 X0)\wedge((v5\_cat\_1 \\
& X0)\wedge((v6\_cat\_1 X0)\wedge(l1\_cat\_1 X0))))))))\wedge(((\neg v2\_struct\_0 X1)\wedge \\
& ((\neg v11\_struct\_0 X1)\wedge((v2\_cat\_1 X1)\wedge((v3\_cat\_1 X1)\wedge((v4\_cat\_1 \\
& X1)\wedge((v5\_cat\_1 X1)\wedge((v6\_cat\_1 X1)\wedge(l1\_cat\_1 X1))))))))\wedge(m2\_cat\_1 \\
& X2 X0 X1))\Rightarrow(k6\_nattra\_1 X0 X1 X2 = k3\_nattra\_1 X0 X1 X2)
\end{aligned} \tag{7}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.\forall X3.(((\neg v2\_struct\_0 \\
& X0)\wedge((\neg v11\_struct\_0 X0)\wedge((v2\_cat\_1 X0)\wedge((v3\_cat\_1 X0)\wedge((v4\_cat\_1 \\
& X0)\wedge((v5\_cat\_1 X0)\wedge((v6\_cat\_1 X0)\wedge(l1\_cat\_1 X0))))))))\wedge((( \\
& \neg v2\_struct\_0 X1)\wedge((\neg v11\_struct\_0 X1)\wedge((v2\_cat\_1 X1)\wedge((v3\_cat\_1 \\
& X1)\wedge((v4\_cat\_1 X1)\wedge((v5\_cat\_1 X1)\wedge((v6\_cat\_1 X1)\wedge(l1\_cat\_1 \\
& X1))))))))\wedge((m2\_cat\_1 X2 X0 X1)\wedge(m2\_cat\_1 X3 X0 X1)))\Rightarrow(\forall X4. \\
& (m2\_nattra\_1 X4 X0 X1 X2 X3)\Rightarrow(m1\_nattra\_1 X4 X0 X1 X2 X3))
\end{aligned} \tag{8}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.\forall X3.(((\neg v2\_struct\_0 \\
& X0)\wedge((\neg v11\_struct\_0 X0)\wedge((v2\_cat\_1 X0)\wedge((v3\_cat\_1 X0)\wedge((v4\_cat\_1 \\
& X0)\wedge((v5\_cat\_1 X0)\wedge((v6\_cat\_1 X0)\wedge(l1\_cat\_1 X0))))))))\wedge((( \\
& \neg v2\_struct\_0 X1)\wedge((\neg v11\_struct\_0 X1)\wedge((v2\_cat\_1 X1)\wedge((v3\_cat\_1 \\
& X1)\wedge((v4\_cat\_1 X1)\wedge((v5\_cat\_1 X1)\wedge((v6\_cat\_1 X1)\wedge(l1\_cat\_1 \\
& X1))))))))\wedge((m2\_cat\_1 X2 X0 X1)\wedge(m2\_cat\_1 X3 X0 X1)))\Rightarrow(\forall X4. \\
& (m1\_nattra\_1 X4 X0 X1 X2 X3)\Rightarrow((v1\_funct\_1 X4)\wedge((v1\_funct\_2 X4 ( \\
& u1\_struct\_0 X0) (u4\_struct\_0 X1))\wedge(m1\_subset\_1 X4 (k1\_zfmisc\_1 \\
& (k2\_zfmisc\_1 (u1\_struct\_0 X0) (u4\_struct\_0 X1))))))
\end{aligned} \tag{9}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.(((\neg v2\_struct\_0 \\
& X0)\wedge((\neg v11\_struct\_0 X0)\wedge((v2\_cat\_1 X0)\wedge((v3\_cat\_1 X0)\wedge((v4\_cat\_1 \\
& X0)\wedge((v5\_cat\_1 X0)\wedge((v6\_cat\_1 X0)\wedge(l1\_cat\_1 X0))))))))\wedge((( \\
& \neg v2\_struct\_0 X1)\wedge((\neg v11\_struct\_0 X1)\wedge((v2\_cat\_1 X1)\wedge((v3\_cat\_1 \\
& X1)\wedge((v4\_cat\_1 X1)\wedge((v5\_cat\_1 X1)\wedge((v6\_cat\_1 X1)\wedge(l1\_cat\_1 \\
& X1))))))))\wedge(((\neg v2\_struct\_0 X2)\wedge((\neg v11\_struct\_0 X2)\wedge((v2\_cat\_1 \\
& X2)\wedge((v3\_cat\_1 X2)\wedge((v4\_cat\_1 X2)\wedge((v5\_cat\_1 X2)\wedge((v6\_cat\_1 \\
& X2)\wedge(l1\_cat\_1 X2))))))))\wedge((m2\_cat\_1 X3 X0 X1)\wedge(m2\_cat\_1 X4 X1 \\
& X2))))\Rightarrow(m2\_cat\_1 (k9\_cat\_1 X0 X1 X2 X3 X4) X0 X2)
\end{aligned} \tag{10}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.(((\neg v2\_struct\_0 X0)\wedge((\neg v11\_struct\_0 \\
& X0)\wedge((v2\_cat\_1 X0)\wedge((v3\_cat\_1 X0)\wedge((v4\_cat\_1 X0)\wedge((v5\_cat\_1 \\
& X0)\wedge((v6\_cat\_1 X0)\wedge(l1\_cat\_1 X0))))))))\wedge(((\neg v2\_struct\_0 X1)\wedge \\
& ((\neg v11\_struct\_0 X1)\wedge((v2\_cat\_1 X1)\wedge((v3\_cat\_1 X1)\wedge((v4\_cat\_1 \\
& X1)\wedge((v5\_cat\_1 X1)\wedge((v6\_cat\_1 X1)\wedge(l1\_cat\_1 X1))))))))\wedge(m2\_cat\_1 \\
& X2 X0 X1)))\Rightarrow(m2\_nattr\_1 (k6\_nattr\_1 X0 X1 X2) X0 X1 X2 X2)
\end{aligned} \tag{11}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.\forall X5. \\
& \forall X6.\forall X7.\forall X8.(((\neg v2\_struct\_0 X0)\wedge((\neg v11\_struct\_0 \\
& X0)\wedge((v2\_cat\_1 X0)\wedge((v3\_cat\_1 X0)\wedge((v4\_cat\_1 X0)\wedge((v5\_cat\_1 \\
& X0)\wedge((v6\_cat\_1 X0)\wedge(l1\_cat\_1 X0))))))))\wedge(((\neg v2\_struct\_0 X1)\wedge \\
& ((\neg v11\_struct\_0 X1)\wedge((v2\_cat\_1 X1)\wedge((v3\_cat\_1 X1)\wedge((v4\_cat\_1 \\
& X1)\wedge((v5\_cat\_1 X1)\wedge((v6\_cat\_1 X1)\wedge(l1\_cat\_1 X1))))))))\wedge((( \\
& \neg v2\_struct\_0 X2)\wedge((\neg v11\_struct\_0 X2)\wedge((v2\_cat\_1 X2)\wedge((v3\_cat\_1 \\
& X2)\wedge((v4\_cat\_1 X2)\wedge((v5\_cat\_1 X2)\wedge((v6\_cat\_1 X2)\wedge(l1\_cat\_1 \\
& X2))))))))\wedge((m2\_cat\_1 X3 X0 X1)\wedge((m2\_cat\_1 X4 X0 X1)\wedge((m2\_cat\_1 \\
& X5 X1 X2)\wedge((m2\_cat\_1 X6 X1 X2)\wedge((m2\_nattr\_1 X7 X0 X1 X3 X4)\wedge(m2\_nattr\_1 \\
& X8 X1 X2 X5 X6))))))))\Rightarrow(m2\_nattr\_1 (k6\_isocat\_1 X0 X1 X2 X3 X4 X5 \\
& X6 X7 X8) X0 X2 (k9\_cat\_1 X0 X1 X2 X3 X5) (k9\_cat\_1 X0 X1 X2 X4 X6))
\end{aligned} \tag{12}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.\forall X5. \\
& \forall X6.(((\neg v2\_struct\_0 X0)\wedge((\neg v11\_struct\_0 X0)\wedge((v2\_cat\_1 \\
& X0)\wedge((v3\_cat\_1 X0)\wedge((v4\_cat\_1 X0)\wedge((v5\_cat\_1 X0)\wedge((v6\_cat\_1 \\
& X0)\wedge(l1\_cat\_1 X0))))))))\wedge(((\neg v2\_struct\_0 X1)\wedge((\neg v11\_struct\_0 \\
& X1)\wedge((v2\_cat\_1 X1)\wedge((v3\_cat\_1 X1)\wedge((v4\_cat\_1 X1)\wedge((v5\_cat\_1 \\
& X1)\wedge((v6\_cat\_1 X1)\wedge(l1\_cat\_1 X1))))))))\wedge(((\neg v2\_struct\_0 X2)\wedge \\
& ((\neg v11\_struct\_0 X2)\wedge((v2\_cat\_1 X2)\wedge((v3\_cat\_1 X2)\wedge((v4\_cat\_1 \\
& X2)\wedge((v5\_cat\_1 X2)\wedge((v6\_cat\_1 X2)\wedge(l1\_cat\_1 X2))))))))\wedge((m2\_cat\_1 \\
& X3 X1 X2)\wedge((m2\_cat\_1 X4 X1 X2)\wedge((m2\_cat\_1 X5 X0 X1)\wedge(m2\_nattrra\_1 \\
& X6 X1 X2 X3 X4))))))\Rightarrow(m2\_nattrra\_1 (k5\_isocat\_1 X0 X1 X2 X3 X4 X5 X6) \\
& X0 X2 (k9\_cat\_1 X0 X1 X2 X5 X3) (k9\_cat\_1 X0 X1 X2 X5 X4))
\end{aligned} \tag{13}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.\forall X5. \\
& \forall X6.(((\neg v2\_struct\_0 X0)\wedge((\neg v11\_struct\_0 X0)\wedge((v2\_cat\_1 \\
& X0)\wedge((v3\_cat\_1 X0)\wedge((v4\_cat\_1 X0)\wedge((v5\_cat\_1 X0)\wedge((v6\_cat\_1 \\
& X0)\wedge(l1\_cat\_1 X0))))))))\wedge(((\neg v2\_struct\_0 X1)\wedge((\neg v11\_struct\_0 \\
& X1)\wedge((v2\_cat\_1 X1)\wedge((v3\_cat\_1 X1)\wedge((v4\_cat\_1 X1)\wedge((v5\_cat\_1 \\
& X1)\wedge((v6\_cat\_1 X1)\wedge(l1\_cat\_1 X1))))))))\wedge(((\neg v2\_struct\_0 X2)\wedge \\
& ((\neg v11\_struct\_0 X2)\wedge((v2\_cat\_1 X2)\wedge((v3\_cat\_1 X2)\wedge((v4\_cat\_1 \\
& X2)\wedge((v5\_cat\_1 X2)\wedge((v6\_cat\_1 X2)\wedge(l1\_cat\_1 X2))))))))\wedge((m2\_cat\_1 \\
& X3 X0 X1)\wedge((m2\_cat\_1 X4 X0 X1)\wedge((m2\_nattrra\_1 X5 X0 X1 X3 X4)\wedge(m2\_cat\_1 \\
& X6 X1 X2))))))\Rightarrow(m2\_nattrra\_1 (k4\_isocat\_1 X0 X1 X2 X3 X4 X5 X6) X0 \\
& X2 (k9\_cat\_1 X0 X1 X2 X3 X6) (k9\_cat\_1 X0 X1 X2 X4 X6))
\end{aligned} \tag{14}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.(((\neg v2\_struct\_0 X0)\wedge((\neg v11\_struct\_0 \\
& X0)\wedge((v2\_cat\_1 X0)\wedge((v3\_cat\_1 X0)\wedge((v4\_cat\_1 X0)\wedge((v5\_cat\_1 \\
& X0)\wedge((v6\_cat\_1 X0)\wedge(l1\_cat\_1 X0))))))))\wedge(((\neg v2\_struct\_0 X1)\wedge \\
& ((\neg v11\_struct\_0 X1)\wedge((v2\_cat\_1 X1)\wedge((v3\_cat\_1 X1)\wedge((v4\_cat\_1 \\
& X1)\wedge((v5\_cat\_1 X1)\wedge((v6\_cat\_1 X1)\wedge(l1\_cat\_1 X1))))))))\wedge(m2\_cat\_1 \\
& X2 X0 X1))\Rightarrow(m1\_nattrra\_1 (k3\_nattrra\_1 X0 X1 X2) X0 X1 X2 X2)
\end{aligned} \tag{15}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
& X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
& X0) \wedge (l1\_cat\_1 X0))))))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge ((\neg \\
& v11\_struct\_0 X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 X1) \wedge ((v4\_cat\_1 \\
& X1) \wedge ((v5\_cat\_1 X1) \wedge ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 X1))))))) \Rightarrow (\forall X2. \\
& ((\neg v2\_struct\_0 X2) \wedge ((\neg v11\_struct\_0 X2) \wedge ((v2\_cat\_1 X2) \wedge ((v3\_cat\_1 \\
& X2) \wedge ((v4\_cat\_1 X2) \wedge ((v5\_cat\_1 X2) \wedge ((v6\_cat\_1 X2) \wedge (l1\_cat\_1 \\
& X2))))))) \Rightarrow (\forall X3.(m2\_cat\_1 X3 X0 X1) \Rightarrow (\forall X4.(m2\_cat\_1 \\
& X4 X0 X1) \Rightarrow (\forall X5.(m2\_cat\_1 X5 X1 X2) \Rightarrow (\forall X6.(m2\_cat\_1 \\
& X6 X1 X2) \Rightarrow (\forall X7.(m2\_nattrra\_1 X7 X0 X1 X3 X4) \Rightarrow (\forall X8.( \\
& m2\_nattrra\_1 X8 X1 X2 X5 X6) \Rightarrow (k6\_isocat\_1 X0 X1 X2 X3 X4 X5 X6 X7 X8 = k7\_nattrra\_1 \\
& X0 X2 (k9\_cat\_1 X0 X1 X2 X3 X5) (k9\_cat\_1 X0 X1 X2 X4 X5) (k9\_cat\_1 X0 \\
& X1 X2 X4 X6) (k4\_isocat\_1 X0 X1 X2 X3 X4 X7 X5) (k5\_isocat\_1 X0 X1 X2 X5 \\
& X6 X4 X8))))))))))
\end{aligned} \tag{16}$$

**Theorem 1**

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
& X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
& X0) \wedge (l1\_cat\_1 X0))))))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge ((\neg \\
& v11\_struct\_0 X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 X1) \wedge ((v4\_cat\_1 \\
& X1) \wedge ((v5\_cat\_1 X1) \wedge ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 X1))))))) \Rightarrow (\forall X2. \\
& ((\neg v2\_struct\_0 X2) \wedge ((\neg v11\_struct\_0 X2) \wedge ((v2\_cat\_1 X2) \wedge ((v3\_cat\_1 \\
& X2) \wedge ((v4\_cat\_1 X2) \wedge ((v5\_cat\_1 X2) \wedge ((v6\_cat\_1 X2) \wedge (l1\_cat\_1 \\
& X2))))))) \Rightarrow (\forall X3.(m2\_cat\_1 X3 X0 X1) \Rightarrow (\forall X4.(m2\_cat\_1 \\
& X4 X1 X2) \Rightarrow (\forall X5.(m2\_cat\_1 X5 X1 X2) \Rightarrow (\forall X6.(m2\_nattrra\_1 \\
& X6 X1 X2 X4 X5) \Rightarrow ((r2\_nattrra\_1 X1 X2 X4 X5) \Rightarrow (r2\_funct\_2 (u1\_struct\_0 \\
& X0) (u4\_struct\_0 X2) (k5\_isocat\_1 X0 X1 X2 X4 X5 X3 X6) (k6\_isocat\_1 \\
& X0 X1 X2 X3 X3 X4 X5 (k6\_nattrra\_1 X0 X1 X3) X6))))))))))
\end{aligned}$$