

## t18\_altcat\_4

(TMc6iAFsE2iwoiUkY9yESfK2ZUZAYs3x5e3)

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Let  $v2\_struct\_0 : \iota \Rightarrow o$  be given. Let  $v2\_altcat\_1 : \iota \Rightarrow o$  be given. Let  $v12\_altcat\_1 : \iota \Rightarrow o$  be given. Let  $l2\_altcat\_1 : \iota \Rightarrow o$  be given. Let  $v15\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $m2\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $u1\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $k1\_altcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v1\_altcat\_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k1\_xboole\_0 : \iota$  be given. Let  $k6\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k3\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k8\_altcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $l2\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $l1\_altcat\_1 : \iota \Rightarrow o$  be given. Let  $l1\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v10\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $r1\_altcat\_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v1\_altcat\_2 : \iota \Rightarrow o$  be given. Let  $v8\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v13\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k5\_altcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v12\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Assume the following.

$$\begin{aligned} \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v12\_altcat\_1 \\ X0) \wedge (l2\_altcat\_1 X0)))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 \\ X1) \wedge ((v12\_altcat\_1 X1) \wedge (l2\_altcat\_1 X1)))) \Rightarrow (\forall X2.((v15\_functor0 \\ X2 X0 X1) \wedge (m2\_functor0 X2 X0 X1)) \Rightarrow (\forall X3.(m1\_subset\_1 X3 ( \\ u1\_struct\_0 X0)) \Rightarrow (k6\_functor0 X0 X1 X2 X3 X3 (k8\_altcat\_1 X0 X3) = \\ k8\_altcat\_1 X1 (k3\_functor0 X0 X1 X2 X3)))))) \end{aligned} \tag{1}$$

Assume the following.

$$\begin{aligned} \forall X0. \forall X1. (((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge \\ ((v12\_altcat\_1 X0) \wedge (l2\_altcat\_1 X0)))) \wedge ((\neg v2\_struct\_0 X1) \wedge \\ ((v12\_altcat\_1 X1) \wedge (l2\_altcat\_1 X1)))) \Rightarrow (\forall X2.(m2\_functor0 \\ X2 X0 X1) \Rightarrow (l2\_functor0 X2 X0 X1)) \end{aligned} \tag{2}$$

Assume the following.

$$\begin{aligned} \forall X0. \forall X1. ((l1\_altcat\_1 X0) \wedge (l1\_altcat\_1 X1)) \Rightarrow ( \\ \forall X2.(l2\_functor0 X2 X0 X1) \Rightarrow (l1\_functor0 X2 X0 X1)) \end{aligned} \tag{3}$$

Assume the following.

$$\forall X0.(l2\_altcat\_1 X0) \Rightarrow (l1\_altcat\_1 X0) \tag{4}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.\forall X5. \\
& (((\neg v2\_struct\_0 X0)\wedge(l1\_altcat\_1 X0))\wedge((\neg v2\_struct\_0 X1)\wedge \\
& (l1\_altcat\_1 X1))\wedge((v10\_functor0 X2 X0 X1)\wedge(l2\_functor0 X2 X0 \\
& X1))\wedge((m1\_subset\_1 X3 (u1\_struct\_0 X0))\wedge((m1\_subset\_1 X4 (u1\_struct\_0 \\
& X0))\wedge(m1\_subset\_1 X5 (k1\_altcat\_1 X0 X3 X4))))))\Rightarrow(m1\_subset\_1 \\
& (k6\_functor0 X0 X1 X2 X3 X4 X5) (k1\_altcat\_1 X1 (k3\_functor0 X0 X1 \\
& X2 X3) (k3\_functor0 X0 X1 X2 X4)))
\end{aligned} \tag{5}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.\forall X3.((\neg v2\_struct\_0 \\
& X0)\wedge(l1\_altcat\_1 X0))\wedge((\neg v2\_struct\_0 X1)\wedge(l1\_altcat\_1 X1))\wedge \\
& ((l1\_functor0 X2 X0 X1)\wedge(m1\_subset\_1 X3 (u1\_struct\_0 X0)))\Rightarrow \\
& (m1\_subset\_1 (k3\_functor0 X0 X1 X2 X3) (u1\_struct\_0 X1))
\end{aligned} \tag{6}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0)\wedge((v12\_altcat\_1 X0)\wedge(l2\_altcat\_1 \\
& X0)))\Rightarrow(\forall X1.(m1\_subset\_1 X1 (u1\_struct\_0 X0))\Rightarrow(\forall X2. \\
& (m1\_subset\_1 X2 (u1\_struct\_0 X0))\Rightarrow(\forall X3.(m1\_subset\_1 X3 \\
& (k1\_altcat\_1 X0 X1 X2))\Rightarrow((v1\_altcat\_3 X3 X0 X1 X2)\Leftrightarrow(\exists X4. \\
& (m1\_subset\_1 X4 (k1\_altcat\_1 X0 X2 X1))\wedge(r1\_altcat\_3 X0 X1 X2 X3 \\
& X4))))))
\end{aligned} \tag{7}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0)\wedge((v2\_altcat\_1 X0)\wedge(l2\_altcat\_1 \\
& X0)))\Rightarrow(\forall X1.((\neg v2\_struct\_0 X1)\wedge((v1\_altcat\_2 X1)\wedge(l2\_altcat\_1 \\
& X1)))\Rightarrow(\forall X2.((v8\_functor0 X2 X0 X1)\wedge((v10\_functor0 X2 X0 \\
& X1)\wedge(l2\_functor0 X2 X0 X1)))\Rightarrow((v13\_functor0 X2 X0 X1)\Leftrightarrow(\forall X3. \\
& (m1\_subset\_1 X3 (u1\_struct\_0 X0))\Rightarrow(\forall X4.(m1\_subset\_1 X4 \\
& (u1\_struct\_0 X0))\Rightarrow(\forall X5.(m1\_subset\_1 X5 (u1\_struct\_0 X0))\Rightarrow \\
& (\neg(k1\_altcat\_1 X0 X3 X4\neq k1\_xboole\_0)\wedge((k1\_altcat\_1 X0 X4 X5\neq k1\_xboole\_0)\wedge \\
& (\neg\forall X6.(m1\_subset\_1 X6 (k1\_altcat\_1 X0 X3 X4))\Rightarrow(\forall X7. \\
& (m1\_subset\_1 X7 (k1\_altcat\_1 X0 X4 X5))\Rightarrow(k6\_functor0 X0 X1 X2 X3 \\
& X5 (k5\_altcat\_1 X0 X3 X4 X5 X6 X7) = k5\_altcat\_1 X1 (k3\_functor0 X0 \\
& X1 X2 X3) (k3\_functor0 X0 X1 X2 X4) (k3\_functor0 X0 X1 X2 X5) (k6\_functor0 \\
& X0 X1 X2 X3 X4 X6) (k6\_functor0 X0 X1 X2 X4 X5 X7))))))))))
\end{aligned} \tag{8}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v12\_altcat\_1 X0) \wedge (l2\_altcat\_1 \\
& X0))) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (u1\_struct\_0 X0)) \Rightarrow (\forall X2. \\
& (m1\_subset\_1 X2 (u1\_struct\_0 X0)) \Rightarrow (\forall X3.(m1\_subset\_1 X3 \\
& (k1\_altcat\_1 X0 X1 X2)) \Rightarrow (\forall X4.(m1\_subset\_1 X4 (k1\_altcat\_1 \\
& X0 X2 X1)) \Rightarrow ((r1\_altcat\_3 X0 X1 X2 X3 X4) \Leftrightarrow (k5\_altcat\_1 X0 X2 X1 X2 X4 \\
& X3 = k8\_altcat\_1 X0 X2))))))
\end{aligned} \tag{9}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.(((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge \\
& ((v12\_altcat\_1 X0) \wedge (l2\_altcat\_1 X0)))) \wedge ((\neg v2\_struct\_0 X1) \wedge \\
& ((v12\_altcat\_1 X1) \wedge (l2\_altcat\_1 X1)))) \Rightarrow (\forall X2.(m2\_functor0 \\
& X2 X0 X1) \Rightarrow ((v15\_functor0 X2 X0 X1) \Rightarrow ((v10\_functor0 X2 X0 X1) \wedge (v13\_functor0 \\
& X2 X0 X1))))
\end{aligned} \tag{10}$$

Assume the following.

$$\begin{aligned}
& \forall X0.(l2\_altcat\_1 X0) \Rightarrow (((\neg v2\_struct\_0 X0) \wedge (v12\_altcat\_1 \\
& X0)) \Rightarrow ((\neg v2\_struct\_0 X0) \wedge (v1\_altcat\_2 X0)))
\end{aligned} \tag{11}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.(((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge \\
& ((v12\_altcat\_1 X0) \wedge (l2\_altcat\_1 X0)))) \wedge ((\neg v2\_struct\_0 X1) \wedge \\
& ((v12\_altcat\_1 X1) \wedge (l2\_altcat\_1 X1)))) \Rightarrow (\forall X2.(m2\_functor0 \\
& X2 X0 X1) \Rightarrow ((v8\_functor0 X2 X0 X1) \wedge (v12\_functor0 X2 X0 X1)))
\end{aligned} \tag{12}$$

**Theorem 1**

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v12\_altcat\_1 \\
& X0) \wedge (l2\_altcat\_1 X0)))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 \\
& X1) \wedge ((v12\_altcat\_1 X1) \wedge (l2\_altcat\_1 X1)))) \Rightarrow (\forall X2.((v15\_functor0 \\
& X2 X0 X1) \wedge (m2\_functor0 X2 X0 X1)) \Rightarrow (\forall X3.(m1\_subset\_1 X3 ( \\
& u1\_struct\_0 X0)) \Rightarrow (\forall X4.(m1\_subset\_1 X4 (u1\_struct\_0 X0)) \Rightarrow \\
& (\forall X5.(m1\_subset\_1 X5 (k1\_altcat\_1 X0 X3 X4)) \Rightarrow ((v1\_altcat\_3 \\
& X5 X0 X3 X4) \Rightarrow ((k1\_altcat\_1 X0 X3 X4 = k1\_xboole\_0) \vee ((k1\_altcat\_1 \\
& X0 X4 X3 = k1\_xboole\_0) \vee (v1\_altcat\_3 (k6\_functor0 X0 X1 X2 X3 X4 X5) \\
& X1 (k3\_functor0 X0 X1 X2 X3) (k3\_functor0 X0 X1 X2 X4))))))))))
\end{aligned}$$