

## t24\_altcat\_4

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Let  $v2\_struct\_0 : \iota \Rightarrow o$  be given. Let  $v2\_altcat\_1 : \iota \Rightarrow o$  be given. Let  $v11\_altcat\_1 : \iota \Rightarrow o$  be given. Let  $v12\_altcat\_1 : \iota \Rightarrow o$  be given. Let  $l2\_altcat\_1 : \iota \Rightarrow o$  be given. Let  $v16\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  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  $v3\_altcat\_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k1\_xboole\_0 : \iota$  be given. Let  $k8\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k3\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v1\_altcat\_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v2\_altcat\_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  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  $v11\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v8\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v14\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v12\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Assume the following.

$$\begin{aligned} & \forall X0. ((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v11\_altcat\_1 \\ & X0) \wedge ((v12\_altcat\_1 X0) \wedge (l2\_altcat\_1 X0)))))) \Rightarrow (\forall X1. (m1\_subset\_1 \\ & X1 (u1\_struct\_0 X0)) \Rightarrow (\forall X2. (m1\_subset\_1 X2 (u1\_struct\_0 \\ & X0)) \Rightarrow (\neg (k1\_altcat\_1 X0 X1 X2 \neq k1\_xboole\_0) \wedge ((k1\_altcat\_1 X0 X2 \\ & X1 \neq k1\_xboole\_0) \wedge (\neg \forall X3. (m1\_subset\_1 X3 (k1\_altcat\_1 X0 \\ & X1 X2)) \Rightarrow ((v3\_altcat\_3 X3 X0 X1 X2) \Leftrightarrow ((v1\_altcat\_3 X3 X0 X1 X2) \wedge (v2\_altcat\_3 \\ & X3 X0 X1 X2)))))))))) \end{aligned} \tag{1}$$

Assume the following.

$$\begin{aligned} & \forall X0. ((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v12\_altcat\_1 \\ & X0) \wedge (l2\_altcat\_1 X0)))) \Rightarrow (\forall X1. ((\neg v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 \\ & X1) \wedge ((v12\_altcat\_1 X1) \wedge (l2\_altcat\_1 X1)))) \Rightarrow (\forall X2. ((v16\_functor0 \\ & X2 X0 X1) \wedge (m2\_functor0 X2 X0 X1)) \Rightarrow (\forall X3. (m1\_subset\_1 X3 ( \\ & u1\_struct\_0 X0)) \Rightarrow (\forall X4. (m1\_subset\_1 X4 (u1\_struct\_0 X0)) \Rightarrow \\ & (\forall X5. (m1\_subset\_1 X5 (k1\_altcat\_1 X0 X3 X4)) \Rightarrow ((v2\_altcat\_3 \\ & X5 X0 X3 X4) \Rightarrow ((k1\_altcat\_1 X0 X3 X4 = k1\_xboole\_0) \vee ((k1\_altcat\_1 \\ & X0 X4 X3 = k1\_xboole\_0) \vee (v1\_altcat\_3 (k8\_functor0 X0 X1 X2 X3 X4 X5) \\ & X1 (k3\_functor0 X0 X1 X2 X4) (k3\_functor0 X0 X1 X2 X3)))))))))) \end{aligned} \tag{2}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v12\_altcat\_1 \\
& X0) \wedge (l2\_altcat\_1 X0)))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 \\
& X1) \wedge ((v12\_altcat\_1 X1) \wedge (l2\_altcat\_1 X1)))) \Rightarrow (\forall X2.((v16\_functor0 \\
& X2 X0 X1) \wedge (m2\_functor0 X2 X0 X1)) \Rightarrow (\forall X3.(m1\_subset\_1 X3 ( \\
& u1\_struct\_0 X0)) \Rightarrow (\forall X4.(m1\_subset\_1 X4 (u1\_struct\_0 X0)) \Rightarrow \\
& (\forall X5.(m1\_subset\_1 X5 (k1\_altcat\_1 X0 X3 X4)) \Rightarrow ((v1\_altcat\_3 \\
& X5 X0 X3 X4) \Rightarrow ((k1\_altcat\_1 X0 X3 X4 = k1\_xboole\_0) \vee ((k1\_altcat\_1 \\
& X0 X4 X3 = k1\_xboole\_0) \vee (v2\_altcat\_3 (k8\_functor0 X0 X1 X2 X3 X4 X5) \\
& X1 (k3\_functor0 X0 X1 X2 X4) (k3\_functor0 X0 X1 X2 X3)))))))))) \\
& \tag{3}
\end{aligned}$$

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. (((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge \\
& ((v12\_altcat\_1 X0) \wedge (l2\_altcat\_1 X0)))) \wedge ((\neg v2\_struct\_0 X1) \wedge \\
& ((v12\_altcat\_1 X1) \wedge (l2\_altcat\_1 X1)))) \Rightarrow (\forall X2.(m2\_functor0 \\
& X2 X0 X1) \Rightarrow (l2\_functor0 X2 X0 X1)) \\
& \tag{4}
\end{aligned}$$

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. ((l1\_altcat\_1 X0) \wedge (l1\_altcat\_1 X1)) \Rightarrow ( \\
& \forall X2.(l2\_functor0 X2 X0 X1) \Rightarrow (l1\_functor0 X2 X0 X1)) \\
& \tag{5}
\end{aligned}$$

Assume the following.

$$\forall X0.(l2\_altcat\_1 X0) \Rightarrow (l1\_altcat\_1 X0) \tag{6}$$

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. \forall X2. \forall X3. \forall X4. \forall X5. \\
& (((\neg v2\_struct\_0 X0) \wedge (l1\_altcat\_1 X0)) \wedge (((\neg v2\_struct\_0 X1) \wedge \\
& (l1\_altcat\_1 X1)) \wedge ((v11\_functor0 X2 X0 X1) \wedge (l2\_functor0 X2 X0 \\
& X1)) \wedge ((m1\_subset\_1 X3 (u1\_struct\_0 X0)) \wedge ((m1\_subset\_1 X4 (u1\_struct\_0 \\
& X0)) \wedge (m1\_subset\_1 X5 (k1\_altcat\_1 X0 X3 X4)))))) \Rightarrow (m1\_subset\_1 \\
& (k8\_functor0 X0 X1 X2 X3 X4 X5) (k1\_altcat\_1 X1 (k3\_functor0 X0 X1 \\
& X2 X4) (k3\_functor0 X0 X1 X2 X3))) \\
& \tag{7}
\end{aligned}$$

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. \forall X2. \forall X3. (((\neg v2\_struct\_0 \\
& X0) \wedge (l1\_altcat\_1 X0)) \wedge (((\neg v2\_struct\_0 X1) \wedge (l1\_altcat\_1 X1)) \wedge \\
& ((l1\_functor0 X2 X0 X1) \wedge (m1\_subset\_1 X3 (u1\_struct\_0 X0)))) \Rightarrow \\
& (m1\_subset\_1 (k3\_functor0 X0 X1 X2 X3) (u1\_struct\_0 X1)) \\
& \tag{8}
\end{aligned}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge (l1\_altcat\_1 X0)) \Rightarrow (\forall X1. \\
& ((\neg v2\_struct\_0 X1) \wedge (l1\_altcat\_1 X1)) \Rightarrow (\forall X2.((v11\_functor0 \\
& X2 X0 X1) \wedge (l2\_functor0 X2 X0 X1)) \Rightarrow ((v8\_functor0 X2 X0 X1) \Leftrightarrow (\forall X3. \\
& (m1\_subset\_1 X3 (u1\_struct\_0 X0)) \Rightarrow (\forall X4.(m1\_subset\_1 X4 \\
& (u1\_struct\_0 X0)) \Rightarrow (\neg(k1\_altcat\_1 X0 X3 X4 \neq k1\_xboole\_0) \wedge (k1\_altcat\_1 \\
& X1 (k3\_functor0 X0 X1 X2 X4) (k3\_functor0 X0 X1 X2 X3) = k1\_xboole\_0))))))))) \\
& \tag{9}
\end{aligned}$$

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. (((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge \\
& ((v12\_altcat\_1 X0) \wedge (l2\_altcat\_1 X0)))) \wedge ((\neg v2\_struct\_0 X1) \wedge \\
& ((v12\_altcat\_1 X1) \wedge (l2\_altcat\_1 X1)))) \Rightarrow (\forall X2.(m2\_functor0 \\
& X2 X0 X1) \Rightarrow ((v16\_functor0 X2 X0 X1) \Rightarrow ((v11\_functor0 X2 X0 X1) \wedge (v14\_functor0 \\
& X2 X0 X1)))) \\
& \tag{10}
\end{aligned}$$

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. (((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge \\
& ((v12\_altcat\_1 X0) \wedge (l2\_altcat\_1 X0)))) \wedge ((\neg v2\_struct\_0 X1) \wedge \\
& ((v12\_altcat\_1 X1) \wedge (l2\_altcat\_1 X1)))) \Rightarrow (\forall X2.(m2\_functor0 \\
& X2 X0 X1) \Rightarrow ((v8\_functor0 X2 X0 X1) \wedge (v12\_functor0 X2 X0 X1))) \\
& \tag{11}
\end{aligned}$$

**Theorem 1**

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v11\_altcat\_1 \\
& X0) \wedge ((v12\_altcat\_1 X0) \wedge (l2\_altcat\_1 X0)))))) \Rightarrow (\forall X1.(( \\
& \neg v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 X1) \wedge ((v11\_altcat\_1 X1) \wedge ((v12\_altcat\_1 \\
& X1) \wedge (l2\_altcat\_1 X1)))))) \Rightarrow (\forall X2.((v16\_functor0 X2 X0 X1) \wedge \\
& (m2\_functor0 X2 X0 X1)) \Rightarrow (\forall X3.(m1\_subset\_1 X3 (u1\_struct\_0 \\
& X0)) \Rightarrow (\forall X4.(m1\_subset\_1 X4 (u1\_struct\_0 X0)) \Rightarrow (\forall X5. \\
& (m1\_subset\_1 X5 (k1\_altcat\_1 X0 X3 X4)) \Rightarrow ((v3\_altcat\_3 X5 X0 X3 X4) \Rightarrow \\
& ((k1\_altcat\_1 X0 X3 X4 = k1\_xboole\_0) \vee ((k1\_altcat\_1 X0 X4 X3 = k1\_xboole\_0) \vee \\
& (v3\_altcat\_3 (k8\_functor0 X0 X1 X2 X3 X4 X5) X1 (k3\_functor0 X0 X1 \\
& X2 X4) (k3\_functor0 X0 X1 X2 X3))))))))))))) \\
& \tag{11}
\end{aligned}$$