

## t3\_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  $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$  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  $k1\_altcat\_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  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  $k5\_altcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k8\_altcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Assume the following.

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

Assume the following.

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v11\_altcat\_1 \\ & X0) \wedge ((v12\_altcat\_1 X0) \wedge (l2\_altcat\_1 X0)))))) \Rightarrow (\forall X1.(m1\_subset\_1 \\ & X1 (u1\_struct\_0 X0)) \Rightarrow (\forall X2.(m1\_subset\_1 X2 (u1\_struct\_0 \\ & X0)) \Rightarrow (\neg(k1\_altcat\_1 X0 X1 X2 \neq k1\_xboole\_0) \wedge ((k1\_altcat\_1 X0 X2 \\ & X1 \neq k1\_xboole\_0) \wedge (\exists X3.(m1\_subset\_1 X3 (k1\_altcat\_1 X0 \\ & X1 X2)) \wedge ((v1\_altcat\_3 X3 X0 X1 X2) \wedge ((v2\_altcat\_3 X3 X0 X1 X2) \wedge (k1\_altcat\_3 \\ & X0 X2 X1 (k1\_altcat\_3 X0 X1 X2 X3) \neq X3)))))))) \end{aligned} \quad (2)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. \forall X2. \forall X3. (((\neg v2\_struct\_0 \\ & X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v11\_altcat\_1 X0) \wedge ((v12\_altcat\_1 X0) \wedge \\ & (l2\_altcat\_1 X0)))))) \wedge ((m1\_subset\_1 X1 (u1\_struct\_0 X0)) \wedge ((m1\_subset\_1 \\ & X2 (u1\_struct\_0 X0)) \wedge (m1\_subset\_1 X3 (k1\_altcat\_1 X0 X1 X2)))))) \Rightarrow \\ & (m1\_subset\_1 (k1\_altcat\_3 X0 X1 X2 X3) (k1\_altcat\_1 X0 X2 X1)) \end{aligned} \quad (3)$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v11\_altcat\_1 \\
& X0) \wedge ((v12\_altcat\_1 X0) \wedge (l2\_altcat\_1 X0)))))) \Rightarrow (\forall X1.(m1\_subset\_1 \\
& X1 (u1\_struct\_0 X0)) \Rightarrow (\forall X2.(m1\_subset\_1 X2 (u1\_struct\_0 \\
& X0)) \Rightarrow (\forall X3.(m1\_subset\_1 X3 (k1\_altcat\_1 X0 X1 X2)) \Rightarrow ((v3\_altcat\_3 \\
& X3 X0 X1 X2) \Leftrightarrow ((k5\_altcat\_1 X0 X2 X1 X2 (k1\_altcat\_3 X0 X1 X2 X3) X3 = \\
& k8\_altcat\_1 X0 X2) \wedge (k5\_altcat\_1 X0 X1 X2 X1 X3 (k1\_altcat\_3 X0 X1 \\
& X2 X3) = k8\_altcat\_1 X0 X1))))))
\end{aligned} \tag{4}$$

**Theorem 1**

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