

# t21\_altcat\_1 (TMXWXe- VUtrqS55LTrphk2NShr78enGA2wXK)

October 27, 2020

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  $l2\_altcat\_1 : \iota \Rightarrow o$  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  $k1\_xboole\_0 : \iota$  be given. Let  $k5\_altcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v1\_xboole\_0 : \iota \Rightarrow o$  be given. Let  $l1\_struct\_0 : \iota \Rightarrow o$  be given. Let  $m2\_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $u2\_altcat\_1 : \iota \Rightarrow \iota$  be given. Let  $k3\_zfmisc\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k3\_altcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $u1\_altcat\_1 : \iota \Rightarrow \iota$  be given. Let  $k2\_altcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $l1\_altcat\_1 : \iota \Rightarrow o$  be given. Let  $v1\_relat\_1 : \iota \Rightarrow o$  be given. Let  $v4\_relat\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k2\_zfmisc\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v1\_funct\_1 : \iota \Rightarrow o$  be given. Let  $v1\_partfun1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k1\_binop\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k4\_altcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v3\_altcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Assume the following.

$$\forall X0.(v1\_xboole\_0 X0) \Rightarrow (X0 = k1\_xboole\_0) \quad (1)$$

Assume the following.

$$\forall X0.\forall X1.(m1\_subset\_1 X0 X1) \Rightarrow ((v1\_xboole\_0 X1) \vee (X0 \in X1)) \quad (2)$$

Assume the following.

$$\forall X0.((\neg v2\_struct\_0 X0) \wedge (l1\_struct\_0 X0)) \Rightarrow (\neg v1\_xboole\_0 (u1\_struct\_0 X0)) \quad (3)$$

Assume the following.

$$\forall X0.(l2\_altcat\_1 X0) \Rightarrow (m2\_pboole (u2\_altcat\_1 X0) (k3\_zfmisc\_1 (u1\_struct\_0 X0) (u1\_struct\_0 X0) (u1\_struct\_0 X0)) (k3\_altcat\_1 (u1\_struct\_0 X0) (u1\_altcat\_1 X0) (u1\_altcat\_1 X0)) (k2\_altcat\_1 (u1\_struct\_0 X0) (u1\_altcat\_1 X0))) \quad (4)$$

Assume the following.

$$\begin{aligned} \forall X0.(l1\_altcat\_1 X0) \Rightarrow & ((v1\_relat\_1 (u1\_altcat\_1 X0)) \wedge \\ & ((v4\_relat\_1 (u1\_altcat\_1 X0) (k2\_zfmisc\_1 (u1\_struct\_0 X0) ( \\ & u1\_struct\_0 X0))) \wedge ((v1\_funct\_1 (u1\_altcat\_1 X0)) \wedge (v1\_partfun1 \\ & (u1\_altcat\_1 X0) (k2\_zfmisc\_1 (u1\_struct\_0 X0) (u1\_struct\_0 X0)))))) \end{aligned} \quad (5)$$

Assume the following.

$$\forall X0.(l2\_altcat\_1 X0) \Rightarrow (l1\_altcat\_1 X0) \quad (6)$$

Assume the following.

$$\forall X0.(l1\_altcat\_1 X0) \Rightarrow (l1\_struct\_0 X0) \quad (7)$$

Assume the following.

$$\begin{aligned} \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.\forall X5. \\ (((\neg v2\_struct\_0 X0) \wedge (l2\_altcat\_1 X0)) \wedge ((m1\_subset\_1 X1 (u1\_struct\_0 \\ X0)) \wedge ((m1\_subset\_1 X2 (u1\_struct\_0 X0)) \wedge ((m1\_subset\_1 X3 (u1\_struct\_0 \\ X0)) \wedge ((m1\_subset\_1 X4 (k1\_altcat\_1 X0 X1 X2)) \wedge (m1\_subset\_1 X5 \\ (k1\_altcat\_1 X0 X2 X3)))))) \Rightarrow (m1\_subset\_1 (k5\_altcat\_1 X0 X1 X2 \\ X3 X4 X5) (k1\_altcat\_1 X0 X1 X3)) \end{aligned} \quad (8)$$

Assume the following.

$$\begin{aligned} \forall X0.((\neg v2\_struct\_0 X0) \wedge (l2\_altcat\_1 X0)) \Rightarrow & (\forall X1. \\ & (m1\_subset\_1 X1 (u1\_struct\_0 X0)) \Rightarrow (\forall X2.(m1\_subset\_1 X2 \\ & (u1\_struct\_0 X0)) \Rightarrow (\forall X3.(m1\_subset\_1 X3 (u1\_struct\_0 X0)) \Rightarrow \\ & (\neg(k1\_altcat\_1 X0 X1 X2 \neq k1\_xboole\_0) \wedge ((k1\_altcat\_1 X0 X2 X3 \neq k1\_xboole\_0) \wedge \\ & (\neg \forall X4.(m1\_subset\_1 X4 (k1\_altcat\_1 X0 X1 X2)) \Rightarrow (\forall X5. \\ & (m1\_subset\_1 X5 (k1\_altcat\_1 X0 X2 X3)) \Rightarrow (k5\_altcat\_1 X0 X1 X2 X3 \\ & X4 X5 = k1\_binop\_1 (k4\_altcat\_1 (u1\_struct\_0 X0) (u1\_altcat\_1 X0) \\ & (u2\_altcat\_1 X0) X1 X2 X3) X5 X4)))))) \end{aligned} \quad (9)$$

Assume the following.

$$\begin{aligned} \forall X0.(\neg v1\_xboole\_0 X0) \Rightarrow & (\forall X1.((v1\_relat\_1 X1) \wedge ( \\ & (v4\_relat\_1 X1 (k2\_zfmisc\_1 X0 X0)) \wedge ((v1\_funct\_1 X1) \wedge (v1\_partfun1 \\ & X1 (k2\_zfmisc\_1 X0 X0)))) \Rightarrow (\forall X2.(m2\_pboole X2 (k3\_zfmisc\_1 \\ & X0 X0 X0) (k3\_altcat\_1 X0 X1 X1) (k2\_altcat\_1 X0 X1)) \Rightarrow ((v3\_altcat\_1 \\ & X2 X0 X1) \Leftrightarrow (\forall X3.(m1\_subset\_1 X3 X0) \Rightarrow (\forall X4.(m1\_subset\_1 \\ & X4 X0) \Rightarrow (\forall X5.(m1\_subset\_1 X5 X0) \Rightarrow (\forall X6.(m1\_subset\_1 \\ & X6 X0) \Rightarrow (\forall X7.\forall X8.\forall X9.((X7 \in k1\_binop\_1 X1 X3 \\ & X4) \wedge ((X8 \in k1\_binop\_1 X1 X4 X5) \wedge (X9 \in k1\_binop\_1 X1 X5 X6)) \Rightarrow (k1\_binop\_1 \\ & (k4\_altcat\_1 X0 X1 X2 X3 X5 X6) X9 (k1\_binop\_1 (k4\_altcat\_1 X0 X1 X2 \\ & X3 X4 X5) X8 X7) = k1\_binop\_1 (k4\_altcat\_1 X0 X1 X2 X3 X4 X6) (k1\_binop\_1 \\ & (k4\_altcat\_1 X0 X1 X2 X4 X5 X6) X9 X8) X7)))))) \end{aligned} \quad (10)$$

Assume the following.

$$\begin{aligned} \forall X0.(l1\_altcat\_1 X0) \Rightarrow ((v2\_altcat\_1 X0) \Leftrightarrow (\forall X1.( \\ m1\_subset\_1 X1 (u1\_struct\_0 X0)) \Rightarrow (\forall X2.(m1\_subset\_1 X2 \\ (u1\_struct\_0 X0)) \Rightarrow (\forall X3.(m1\_subset\_1 X3 (u1\_struct\_0 X0)) \Rightarrow \\ (\neg(k1\_altcat\_1 X0 X1 X2 \neq k1\_xboole\_0) \wedge ((k1\_altcat\_1 X0 X2 X3 \neq k1\_xboole\_0) \wedge \\ (k1\_altcat\_1 X0 X1 X3 = k1\_xboole\_0))))))))) \end{aligned} \quad (11)$$

Assume the following.

$$\begin{aligned} \forall X0.(l1\_altcat\_1 X0) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (u1\_struct\_0 \\ X0)) \Rightarrow (\forall X2.(m1\_subset\_1 X2 (u1\_struct\_0 X0)) \Rightarrow (k1\_altcat\_1 \\ X0 X1 X2 = k1\_binop\_1 (u1\_altcat\_1 X0) X1 X2))) \end{aligned} \quad (12)$$

Assume the following.

$$\begin{aligned} \forall X0.((\neg v2\_struct\_0 X0) \wedge (l2\_altcat\_1 X0)) \Rightarrow ((v11\_altcat\_1 \\ X0) \Leftrightarrow (v3\_altcat\_1 (u2\_altcat\_1 X0) (u1\_struct\_0 X0) (u1\_altcat\_1 \\ X0))) \end{aligned} \quad (13)$$

**Theorem 1**

$$\begin{aligned} \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v11\_altcat\_1 \\ X0) \wedge (l2\_altcat\_1 X0)))) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (u1\_struct\_0 \\ X0)) \Rightarrow (\forall X2.(m1\_subset\_1 X2 (u1\_struct\_0 X0)) \Rightarrow (\forall X3. \\ (m1\_subset\_1 X3 (u1\_struct\_0 X0)) \Rightarrow (\forall X4.(m1\_subset\_1 X4 \\ (u1\_struct\_0 X0)) \Rightarrow (\neg(k1\_altcat\_1 X0 X1 X2 \neq k1\_xboole\_0) \wedge ((k1\_altcat\_1 \\ X0 X2 X3 \neq k1\_xboole\_0) \wedge ((k1\_altcat\_1 X0 X3 X4 \neq k1\_xboole\_0) \wedge (\neg \\ \forall X5.(m1\_subset\_1 X5 (k1\_altcat\_1 X0 X1 X2)) \Rightarrow (\forall X6. \\ (m1\_subset\_1 X6 (k1\_altcat\_1 X0 X2 X3)) \Rightarrow (\forall X7.(m1\_subset\_1 \\ X7 (k1\_altcat\_1 X0 X3 X4)) \Rightarrow (k5\_altcat\_1 X0 X1 X3 X4 (k5\_altcat\_1 \\ X0 X1 X2 X3 X5 X6) X7 = k5\_altcat\_1 X0 X1 X2 X4 X5 (k5\_altcat\_1 X0 X2 X3 \\ X4 X6 X7))))))))))))) \end{aligned}$$