

# t10\_index\_1

(TMXG6BLxtCrxmqwjkn4gWW9azFKcWFYUoj)

October 27, 2020

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  $m5\_index\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $u1\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $u4\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $u2\_graph\_1 : \iota \Rightarrow \iota$  be given. Let  $u1\_graph\_1 : \iota \Rightarrow \iota$  be given. Let  $k1\_oppcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $u1\_cat\_1 : \iota \Rightarrow \iota$  be given. Let  $k7\_isocat\_1 : \iota \Rightarrow \iota$  be given. Let  $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v1\_xboole\_0 : \iota \Rightarrow o$  be given. Let  $k2\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $m1\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $m2\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k7\_index\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k3\_relat\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_xtuple\_0 : \iota \Rightarrow \iota$  be given. Let  $k8\_index\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k2\_index\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k2\_oppcat\_1 : \iota \Rightarrow \iota$  be given. Let  $k3\_graph\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k4\_graph\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_xboole\_0 : \iota$  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  $k1\_zfmisc\_1 : \iota \Rightarrow \iota$  be given. Let  $k2\_zfmisc\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $g1\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v1\_cat\_1 : \iota \Rightarrow o$  be given. Let  $l1\_graph\_1 : \iota \Rightarrow o$  be given. Let  $k3\_funct\_2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Assume the following.

$$\begin{aligned} & \forall X0. ((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\ & X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\ & X0) \wedge (l1\_cat\_1 X0)))))))) \Rightarrow (\forall X1. (m5\_index\_1 X1 (u1\_struct\_0 \\ & X0) (u4\_struct\_0 X0) (u1\_graph\_1 X0) (u2\_graph\_1 X0) (u1\_cat\_1 \\ & X0) (k7\_isocat\_1 X0)) \Rightarrow (\forall X2. (m1\_subset\_1 X2 (u1\_struct\_0 \\ & X0)) \Rightarrow (\forall X3. (m1\_subset\_1 X3 (u1\_struct\_0 X0)) \Rightarrow ((\neg v1\_xboole\_0 \\ & (k2\_cat\_1 X0 X2 X3)) \Rightarrow (\forall X4. (m1\_cat\_1 X4 X0 X2 X3) \Rightarrow (m2\_cat\_1 \\ & (k7\_index\_1 (u4\_struct\_0 X0) (k3\_relat\_1 (u1\_graph\_1 X0) (k1\_xtuple\_0 \\ & X1)) (k3\_relat\_1 (u2\_graph\_1 X0) (k1\_xtuple\_0 X1)) (k8\_index\_1 \\ & (u1\_struct\_0 X0) (u4\_struct\_0 X0) (u1\_graph\_1 X0) (u2\_graph\_1 \\ & X0) X1) X4) (k2\_index\_1 (u1\_struct\_0 X0) (k1\_xtuple\_0 X1) X2) (k2\_index\_1 \\ & (u1\_struct\_0 X0) (k1\_xtuple\_0 X1) X3))))))))) \end{aligned}$$

(1)

Assume the following.

$$\begin{aligned} \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\ X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\ X0) \wedge (l1\_cat\_1 X0)))))))) \Rightarrow (\forall X1.(m5\_index\_1 X1 (u1\_struct\_0 \\ X0) (u4\_struct\_0 X0) (u2\_graph\_1 X0) (u1\_graph\_1 X0) (k1\_oppcat\_1 \\ (u4\_struct\_0 X0) (u4\_struct\_0 X0) (u4\_struct\_0 X0) (u1\_cat\_1 X0)) \\ (k7\_isocat\_1 X0)) \Leftrightarrow (m5\_index\_1 X1 (u1\_struct\_0 (k2\_oppcat\_1 X0)) \\ (u4\_struct\_0 (k2\_oppcat\_1 X0)) (u1\_graph\_1 (k2\_oppcat\_1 X0)) \\ (u2\_graph\_1 (k2\_oppcat\_1 X0)) (u1\_cat\_1 (k2\_oppcat\_1 X0)) (k7\_isocat\_1 \\ (k2\_oppcat\_1 X0)))) \end{aligned} \quad (2)$$

Assume the following.

$$\forall X0. \forall X1. \neg (X0 \in X1) \wedge (v1\_xboole\_0 X1) \quad (3)$$

Assume the following.

$$\begin{aligned} \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge (l1\_cat\_1 \\ X0))) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (u4\_struct\_0 X0)) \Rightarrow (m1\_cat\_1 \\ X1 X0 (k3\_graph\_1 X0 X1) (k4\_graph\_1 X0 X1))) \end{aligned} \quad (4)$$

Assume the following.

$$\begin{aligned} \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge (l1\_cat\_1 \\ X0))) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (u4\_struct\_0 X0)) \Rightarrow (k2\_cat\_1 \\ X0 (k3\_graph\_1 X0 X1) (k4\_graph\_1 X0 X1) \neq k1\_xboole\_0)) \end{aligned} \quad (5)$$

Assume the following.

$$\begin{aligned} \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge (l1\_cat\_1 \\ X0))) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (u4\_struct\_0 X0)) \Rightarrow (\forall X2. \\ (m1\_subset\_1 X2 (u1\_struct\_0 X0)) \Rightarrow (\forall X3.(m1\_subset\_1 X3 \\ (u1\_struct\_0 X0)) \Rightarrow ((X1 \in k2\_cat\_1 X0 X2 X3) \Leftrightarrow ((k3\_graph\_1 X0 X1 = \\ X2) \wedge (k4\_graph\_1 X0 X1 = X3)))))) \end{aligned} \quad (6)$$

Assume the following.

$$\begin{aligned} \forall X0. \forall X1. \forall X2. \forall X3. \forall X4. (((v1\_funct\_1 \\ X2) \wedge ((v1\_funct\_2 X2 X1 X0) \wedge (m1\_subset\_1 X2 (k1\_zfmisc\_1 (k2\_zfmisc\_1 \\ X1 X0)))))) \wedge (((v1\_funct\_1 X3) \wedge ((v1\_funct\_2 X3 X1 X0) \wedge (m1\_subset\_1 \\ X3 (k1\_zfmisc\_1 (k2\_zfmisc\_1 X1 X0)))))) \wedge ((v1\_funct\_1 X4) \wedge (m1\_subset\_1 \\ X4 (k1\_zfmisc\_1 (k2\_zfmisc\_1 (k2\_zfmisc\_1 X1 X1) X1)))))) \Rightarrow (\forall X5. \\ \forall X6. \forall X7. \forall X8. \forall X9. (g1\_cat\_1 X0 X1 X2 \\ X3 X4 = g1\_cat\_1 X5 X6 X7 X8 X9) \Rightarrow ((X0 = X5) \wedge ((X1 = X6) \wedge ((X2 = X7) \wedge ((X3 = \\ X8) \wedge (X4 = X9)))))) \end{aligned} \quad (7)$$

Assume the following.

$$v1\_xboole\_0 k1\_xboole\_0 \quad (8)$$

Assume the following.

$$\begin{aligned} \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\ X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\ X0) \wedge (l1\_cat\_1 X0)))))))) \Rightarrow ((\neg v2\_struct\_0 (k2\_oppcat\_1 X0)) \wedge \\ ((\neg v11\_struct\_0 (k2\_oppcat\_1 X0)) \wedge ((v1\_cat\_1 (k2\_oppcat\_1 X0)) \wedge \\ ((v2\_cat\_1 (k2\_oppcat\_1 X0)) \wedge ((v3\_cat\_1 (k2\_oppcat\_1 X0)) \wedge ( \\ (v4\_cat\_1 (k2\_oppcat\_1 X0)) \wedge ((v5\_cat\_1 (k2\_oppcat\_1 X0)) \wedge (v6\_cat\_1 \\ (k2\_oppcat\_1 X0)))))))))) \end{aligned} \quad (9)$$

Assume the following.

$$\begin{aligned} \forall X0.(l1\_graph\_1 X0) \Rightarrow ((v1\_funct\_1 (u2\_graph\_1 X0)) \wedge (( \\ v1\_funct\_2 (u2\_graph\_1 X0) (u4\_struct\_0 X0) (u1\_struct\_0 X0)) \wedge \\ (m1\_subset\_1 (u2\_graph\_1 X0) (k1\_zfmisc\_1 (k2\_zfmisc\_1 (u4\_struct\_0 \\ X0) (u1\_struct\_0 X0)))))) \end{aligned} \quad (10)$$

Assume the following.

$$\begin{aligned} \forall X0.(l1\_graph\_1 X0) \Rightarrow ((v1\_funct\_1 (u1\_graph\_1 X0)) \wedge (( \\ v1\_funct\_2 (u1\_graph\_1 X0) (u4\_struct\_0 X0) (u1\_struct\_0 X0)) \wedge \\ (m1\_subset\_1 (u1\_graph\_1 X0) (k1\_zfmisc\_1 (k2\_zfmisc\_1 (u4\_struct\_0 \\ X0) (u1\_struct\_0 X0)))))) \end{aligned} \quad (11)$$

Assume the following.

$$\begin{aligned} \forall X0.(l1\_cat\_1 X0) \Rightarrow ((v1\_funct\_1 (u1\_cat\_1 X0)) \wedge (m1\_subset\_1 \\ (u1\_cat\_1 X0) (k1\_zfmisc\_1 (k2\_zfmisc\_1 (k2\_zfmisc\_1 (u4\_struct\_0 \\ X0) (u4\_struct\_0 X0)) (u4\_struct\_0 X0)))))) \end{aligned} \quad (12)$$

Assume the following.

$$\begin{aligned} \forall X0.\forall X1.\forall X2.(((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 \\ X0) \wedge (l1\_cat\_1 X0))) \wedge ((m1\_subset\_1 X1 (u1\_struct\_0 X0)) \wedge (m1\_subset\_1 \\ X2 (u1\_struct\_0 X0)))) \Rightarrow (\forall X3.(m1\_cat\_1 X3 X0 X1 X2) \Rightarrow (m1\_subset\_1 \\ X3 (u4\_struct\_0 X0))) \end{aligned} \quad (13)$$

Assume the following.

$$\forall X0.(l1\_cat\_1 X0) \Rightarrow (l1\_graph\_1 X0) \quad (14)$$

Assume the following.

$$\begin{aligned} \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\ X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\ X0) \wedge (l1\_cat\_1 X0)))))))) \Rightarrow ((\neg v2\_struct\_0 (k2\_oppcat\_1 X0)) \wedge \\ ((\neg v11\_struct\_0 (k2\_oppcat\_1 X0)) \wedge ((v1\_cat\_1 (k2\_oppcat\_1 X0)) \wedge \\ (l1\_cat\_1 (k2\_oppcat\_1 X0)))))) \end{aligned} \quad (15)$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge (l1\_cat\_1 \\
& X0))) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (u1\_struct\_0 X0)) \Rightarrow (\forall X2. \\
& (m1\_subset\_1 X2 (u1\_struct\_0 X0)) \Rightarrow ((k2\_cat\_1 X0 X1 X2 \neq k1\_xboole\_0) \Rightarrow \\
& (\forall X3.(m1\_subset\_1 X3 (u4\_struct\_0 X0)) \Rightarrow ((m1\_cat\_1 X3 X0 \\
& X1 X2) \Leftrightarrow (X3 \in k2\_cat\_1 X0 X1 X2))))))
\end{aligned} \tag{16}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge (l1\_graph\_1 \\
& X0))) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (u4\_struct\_0 X0)) \Rightarrow (k4\_graph\_1 \\
& X0 X1 = k3\_funct\_2 (u4\_struct\_0 X0) (u1\_struct\_0 X0) (u2\_graph\_1 \\
& X0) X1))
\end{aligned} \tag{17}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge (l1\_graph\_1 \\
& X0))) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (u4\_struct\_0 X0)) \Rightarrow (k3\_graph\_1 \\
& X0 X1 = k3\_funct\_2 (u4\_struct\_0 X0) (u1\_struct\_0 X0) (u1\_graph\_1 \\
& X0) X1))
\end{aligned} \tag{18}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
& X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
& X0) \wedge (l1\_cat\_1 X0)))))))) \Rightarrow (k2\_oppcat\_1 X0 = g1\_cat\_1 (u1\_struct\_0 \\
& X0) (u4\_struct\_0 X0) (u2\_graph\_1 X0) (u1\_graph\_1 X0) (k1\_oppcat\_1 \\
& (u4\_struct\_0 X0) (u4\_struct\_0 X0) (u4\_struct\_0 X0) (u1\_cat\_1 X0)))
\end{aligned} \tag{19}$$

Assume the following.

$$\begin{aligned}
& \forall X0.(l1\_cat\_1 X0) \Rightarrow ((v1\_cat\_1 X0) \Rightarrow (X0 = g1\_cat\_1 (u1\_struct\_0 \\
& X0) (u4\_struct\_0 X0) (u1\_graph\_1 X0) (u2\_graph\_1 X0) (u1\_cat\_1 \\
& X0)))
\end{aligned} \tag{20}$$

**Theorem 1**

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\ & X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\ & X0) \wedge (l1\_cat\_1 X0)))))))) \Rightarrow (\forall X1.(m5\_index\_1 X1 (u1\_struct\_0 \\ & X0) (u4\_struct\_0 X0) (u2\_graph\_1 X0) (u1\_graph\_1 X0) (k1\_oppcat\_1 \\ & (u4\_struct\_0 X0) (u4\_struct\_0 X0) (u4\_struct\_0 X0) (u1\_cat\_1 X0)) \\ & (k7\_isocat\_1 X0)) \Rightarrow (\forall X2.(m1\_subset\_1 X2 (u1\_struct\_0 X0)) \Rightarrow \\ & (\forall X3.(m1\_subset\_1 X3 (u1\_struct\_0 X0)) \Rightarrow ((\neg v1\_xboole\_0 \\ & (k2\_cat\_1 X0 X2 X3)) \Rightarrow (\forall X4.(m1\_cat\_1 X4 X0 X2 X3) \Rightarrow (m2\_cat\_1 \\ & (k7\_index\_1 (u4\_struct\_0 X0) (k3\_relat\_1 (u2\_graph\_1 X0) (k1\_xtuple\_0 \\ & X1)) (k3\_relat\_1 (u1\_graph\_1 X0) (k1\_xtuple\_0 X1)) (k8\_index\_1 \\ & (u1\_struct\_0 X0) (u4\_struct\_0 X0) (u2\_graph\_1 X0) (u1\_graph\_1 \\ & X0) X1) X4) (k2\_index\_1 (u1\_struct\_0 X0) (k1\_xtuple\_0 X1) X3) (k2\_index\_1 \\ & (u1\_struct\_0 X0) (k1\_xtuple\_0 X1) X2))))))))) \end{aligned}$$