

## t27\_cat\_5

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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  $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $u4\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $m2\_subset\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k9\_cat\_5 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k3\_graph\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k4\_graph\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v1\_xboole\_0 : \iota \Rightarrow o$  be given. Let  $u1\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $k1\_zfmisc\_1 : \iota \Rightarrow \iota$  be given. Let  $l1\_graph\_1 : \iota \Rightarrow o$  be given. Assume the following.

$$\forall X0. \forall X1. (m1\_subset\_1 X0 X1) \Rightarrow ((v1\_xboole\_0 X1) \vee (X0 \in X1)) \quad (1)$$

Assume the following.

$$\begin{aligned} \forall X0. ((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 X0) \wedge (l1\_cat\_1 X0)))))))) \Rightarrow (\forall X1. (m1\_subset\_1 X1 (u1\_struct\_0 X0)) \Rightarrow (\forall X2. (m1\_subset\_1 X2 (u4\_struct\_0 X0)) \Rightarrow ((X2 \in k9\_cat\_5 X0 X1) \Leftrightarrow (k4\_graph\_1 X0 X2 = X1)))) \end{aligned} \quad (2)$$

Assume the following.

$$\begin{aligned} \forall X0. ((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 X0) \wedge (l1\_cat\_1 X0)))))))) \Rightarrow (\forall X1. (m1\_subset\_1 X1 (u4\_struct\_0 X0)) \Rightarrow (\forall X2. (m1\_subset\_1 X2 (u4\_struct\_0 X0)) \Rightarrow ((k3\_graph\_1 X0 X2 = k4\_graph\_1 X0 X1) \Rightarrow ((k3\_graph\_1 X0 (k1\_cat\_1 X0 X1 X2) = k3\_graph\_1 X0 X1) \wedge (k4\_graph\_1 X0 (k1\_cat\_1 X0 X1 X2) = k4\_graph\_1 X0 X2)))))) \end{aligned} \quad (3)$$

Assume the following.

$$\forall X0. \forall X1. ((\neg v1\_xboole\_0 X0) \wedge ((\neg v1\_xboole\_0 X1) \wedge (m1\_subset\_1 X1 (k1\_zfmisc\_1 X0)))) \Rightarrow (\forall X2. (m2\_subset\_1 X2 X0 X1) \Leftrightarrow (m1\_subset\_1 X2 X1)) \quad (4)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. (((\neg v2\_struct\_0 X0) \wedge (\neg v11\_struct\_0 X0) \wedge \\ & ((v2\_cat\_1 X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge \\ & ((v6\_cat\_1 X0) \wedge (l1\_cat\_1 X0)))))))) \wedge (m1\_subset\_1 X1 (u1\_struct\_0 \\ & X0))) \Rightarrow (\neg v1\_xboole\_0 (k9\_cat\_5 X0 X1)) \end{aligned} \quad (5)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. ((\neg v1\_xboole\_0 X0) \wedge ((\neg v1\_xboole\_0 X1) \wedge \\ & (m1\_subset\_1 X1 (k1\_zfmisc\_1 X0)))) \Rightarrow (\forall X2. (m2\_subset\_1 \\ & X2 X0 X1) \Rightarrow (m1\_subset\_1 X2 X0)) \end{aligned} \quad (6)$$

Assume the following.

$$\forall X0. (l1\_cat\_1 X0) \Rightarrow (l1\_graph\_1 X0) \quad (7)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. (((\neg v2\_struct\_0 X0) \wedge (\neg v11\_struct\_0 X0) \wedge \\ & ((v2\_cat\_1 X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge \\ & ((v6\_cat\_1 X0) \wedge (l1\_cat\_1 X0)))))))) \wedge (m1\_subset\_1 X1 (u1\_struct\_0 \\ & X0))) \Rightarrow (m1\_subset\_1 (k9\_cat\_5 X0 X1) (k1\_zfmisc\_1 (u4\_struct\_0 \\ & X0))) \end{aligned} \quad (8)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. (((\neg v2\_struct\_0 X0) \wedge (\neg v11\_struct\_0 X0) \wedge \\ & (l1\_graph\_1 X0))) \wedge (m1\_subset\_1 X1 (u4\_struct\_0 X0))) \Rightarrow (m1\_subset\_1 \\ & (k4\_graph\_1 X0 X1) (u1\_struct\_0 X0)) \end{aligned} \quad (9)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. (((\neg v2\_struct\_0 X0) \wedge (\neg v11\_struct\_0 X0) \wedge \\ & (l1\_graph\_1 X0))) \wedge (m1\_subset\_1 X1 (u4\_struct\_0 X0))) \Rightarrow (m1\_subset\_1 \\ & (k3\_graph\_1 X0 X1) (u1\_struct\_0 X0)) \end{aligned} \quad (10)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. \forall X2. ((l1\_cat\_1 X0) \wedge ((m1\_subset\_1 \\ & X1 (u4\_struct\_0 X0)) \wedge (m1\_subset\_1 X2 (u4\_struct\_0 X0)))) \Rightarrow (m1\_subset\_1 \\ & (k1\_cat\_1 X0 X1 X2) (u4\_struct\_0 X0)) \end{aligned} \quad (11)$$

Assume the following.

$$\forall X0. (v1\_xboole\_0 X0) \Rightarrow (\forall X1. (m1\_subset\_1 X1 (k1\_zfmisc\_1 X0)) \Rightarrow (v1\_xboole\_0 X1)) \quad (12)$$

**Theorem 1**

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\ & X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\ & X0) \wedge (l1\_cat\_1 X0))))))) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (u4\_struct\_0 \\ & X0)) \Rightarrow (\forall X2.(m2\_subset\_1 X2 (u4\_struct\_0 X0) (k9\_cat\_5 X0 \\ & (k3\_graph\_1 X0 X1))) \Rightarrow (k1\_cat\_1 X0 X2 X1 \in k9\_cat\_5 X0 (k4\_graph\_1 \\ & X0 X1)))) \end{aligned}$$