

# l58\_oppcat\_1

(TMdXkZb4nSfpeLrsHKJqNDma1BXdCWgs9pG)

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  $m1\_oppcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k2\_oppcat\_1 : \iota \Rightarrow \iota$  be given. Let  $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $u4\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $k3\_funct\_2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $u1\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $k7\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k9\_oppcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  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  $k3\_oppcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v1\_xboole\_0 : \iota \Rightarrow o$  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  $k1\_funct\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_oppcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k2\_funct\_4 : \iota \Rightarrow \iota$  be given. Let  $g1\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v1\_cat\_1 : \iota \Rightarrow o$  be given. Let  $l5\_struct\_0 : \iota \Rightarrow o$  be given. Let  $l1\_graph\_1 : \iota \Rightarrow o$  be given. Let  $u2\_graph\_1 : \iota \Rightarrow \iota$  be given. Let  $u1\_graph\_1 : \iota \Rightarrow \iota$  be given. Let  $u1\_cat\_1 : \iota \Rightarrow \iota$  be given. Let  $k5\_oppcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Assume the following.

$$\begin{aligned}
 & \forall X0. ((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
 & X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
 & X0) \wedge (l1\_cat\_1 X0))))))) \Rightarrow (\forall X1. ((\neg v2\_struct\_0 X1) \wedge (( \\
 & \neg v11\_struct\_0 X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 X1) \wedge ((v4\_cat\_1 \\
 & X1) \wedge ((v5\_cat\_1 X1) \wedge ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 X1))))))) \Rightarrow (\forall X2. \\
 & (m1\_oppcat\_1 X2 (k2\_oppcat\_1 X0) X1) \Rightarrow (\forall X3. (m1\_subset\_1 \\
 & X3 (u1\_struct\_0 X0)) \Rightarrow (k3\_funct\_2 (u1\_struct\_0 X0) (u1\_struct\_0 \\
 & X1) (k7\_cat\_1 X0 X1 (k9\_oppcat\_1 X0 X1 X2)) X3 = k3\_funct\_2 (u1\_struct\_0 \\
 & (k2\_oppcat\_1 X0)) (u1\_struct\_0 X1) (k7\_cat\_1 (k2\_oppcat\_1 X0) \\
 & X1 X2) (k3\_oppcat\_1 X0 X3))))))
 \end{aligned} \tag{1}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
& X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
& X0) \wedge (l1\_cat\_1 X0))))))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge (( \\
& \neg v11\_struct\_0 X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 X1) \wedge ((v4\_cat\_1 \\
& X1) \wedge ((v5\_cat\_1 X1) \wedge ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 X1))))))) \Rightarrow (\forall X2. \\
& (m1\_oppcat\_1 X2 X0 X1) \Rightarrow (\forall X3.(m1\_subset\_1 X3 (u4\_struct\_0 \\
& X0)) \Rightarrow ((k3\_funct\_2 (u1\_struct\_0 X0) (u1\_struct\_0 X1) (k7\_cat\_1 \\
& X0 X1 X2) (k3\_graph\_1 X0 X3) = k4\_graph\_1 X1 (k3\_funct\_2 (u4\_struct\_0 \\
& X0) (u4\_struct\_0 X1) X2 X3)) \wedge (k3\_funct\_2 (u1\_struct\_0 X0) (u1\_struct\_0 \\
& X1) (k7\_cat\_1 X0 X1 X2) (k4\_graph\_1 X0 X3) = k3\_graph\_1 X1 (k3\_funct\_2 \\
& (u4\_struct\_0 X0) (u4\_struct\_0 X1) X2 X3))))))
\end{aligned} \tag{2}$$

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. \forall X2. \forall X3. ((\neg v1\_xboole\_0 X0) \wedge \\
& (((v1\_funct\_1 X2) \wedge ((v1\_funct\_2 X2 X0 X1) \wedge (m1\_subset\_1 X2 (k1\_zfmisc\_1 \\
& (k2\_zfmisc\_1 X0 X1)))))) \wedge (m1\_subset\_1 X3 X0))) \Rightarrow (k3\_funct\_2 X0 \\
& X1 X2 X3 = k1\_funct\_1 X2 X3)
\end{aligned} \tag{3}$$

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. \forall X2. \forall X3. ((\neg v1\_xboole\_0 X0) \wedge \\
& ((\neg v1\_xboole\_0 X1) \wedge ((\neg v1\_xboole\_0 X2) \wedge ((v1\_funct\_1 X3) \wedge (m1\_subset\_1 \\
& X3 (k1\_zfmisc\_1 (k2\_zfmisc\_1 (k2\_zfmisc\_1 X0 X1) X2)))))) \Rightarrow (k1\_oppcat\_1 \\
& X0 X1 X2 X3 = k2\_funct\_4 X3)
\end{aligned} \tag{4}$$

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. \forall X2. \forall X3. \forall X4. (((v1\_funct\_1 \\
& X2) \wedge ((v1\_funct\_2 X2 X1 X0) \wedge (m1\_subset\_1 X2 (k1\_zfmisc\_1 (k2\_zfmisc\_1 \\
& X1 X0)))))) \wedge (((v1\_funct\_1 X3) \wedge ((v1\_funct\_2 X3 X1 X0) \wedge (m1\_subset\_1 \\
& X3 (k1\_zfmisc\_1 (k2\_zfmisc\_1 X1 X0)))))) \wedge ((v1\_funct\_1 X4) \wedge (m1\_subset\_1 \\
& X4 (k1\_zfmisc\_1 (k2\_zfmisc\_1 (k2\_zfmisc\_1 X1 X1) X1)))))) \Rightarrow (\forall X5. \\
& \forall X6. \forall X7. \forall X8. \forall X9. (g1\_cat\_1 X0 X1 X2 \\
& X3 X4 = g1\_cat\_1 X5 X6 X7 X8 X9) \Rightarrow ((X0 = X5) \wedge ((X1 = X6) \wedge ((X2 = X7) \wedge ((X3 = \\
& X8) \wedge (X4 = X9))))))
\end{aligned} \tag{5}$$

Assume the following.

$$\begin{aligned}
& \forall X0. ((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
& X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
& X0) \wedge (l1\_cat\_1 X0))))))) \Rightarrow ((\neg v2\_struct\_0 (k2\_oppcat\_1 X0)) \wedge \\
& ((\neg v11\_struct\_0 (k2\_oppcat\_1 X0)) \wedge ((v1\_cat\_1 (k2\_oppcat\_1 X0)) \wedge \\
& ((v2\_cat\_1 (k2\_oppcat\_1 X0)) \wedge ((v3\_cat\_1 (k2\_oppcat\_1 X0)) \wedge \\
& (v4\_cat\_1 (k2\_oppcat\_1 X0)) \wedge ((v5\_cat\_1 (k2\_oppcat\_1 X0)) \wedge (v6\_cat\_1 \\
& (k2\_oppcat\_1 X0))))))))))
\end{aligned} \tag{6}$$

Assume the following.

$$\forall X0.((\neg v11\_struct\_0 X0) \wedge (l5\_struct\_0 X0)) \Rightarrow (\neg v1\_xboole\_0 (u4\_struct\_0 X0)) \quad (7)$$

Assume the following.

$$\forall X0.(l1\_graph\_1 X0) \Rightarrow ((v1\_funct\_1 (u2\_graph\_1 X0)) \wedge ((v1\_funct\_2 (u2\_graph\_1 X0) (u4\_struct\_0 X0) (u1\_struct\_0 X0)) \wedge (m1\_subset\_1 (u2\_graph\_1 X0) (k1\_zfmisc\_1 (k2\_zfmisc\_1 (u4\_struct\_0 X0) (u1\_struct\_0 X0)))))) \quad (8)$$

Assume the following.

$$\forall X0.(l1\_graph\_1 X0) \Rightarrow ((v1\_funct\_1 (u1\_graph\_1 X0)) \wedge ((v1\_funct\_2 (u1\_graph\_1 X0) (u4\_struct\_0 X0) (u1\_struct\_0 X0)) \wedge (m1\_subset\_1 (u1\_graph\_1 X0) (k1\_zfmisc\_1 (k2\_zfmisc\_1 (u4\_struct\_0 X0) (u1\_struct\_0 X0)))))) \quad (9)$$

Assume the following.

$$\forall X0.(l1\_cat\_1 X0) \Rightarrow ((v1\_funct\_1 (u1\_cat\_1 X0)) \wedge (m1\_subset\_1 (u1\_cat\_1 X0) (k1\_zfmisc\_1 (k2\_zfmisc\_1 (k2\_zfmisc\_1 (u4\_struct\_0 X0) (u4\_struct\_0 X0)) (u4\_struct\_0 X0)))))) \quad (10)$$

Assume the following.

$$\forall X0.\forall X1.(((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 X0) \wedge (l1\_cat\_1 X0)))))))))) \wedge ((\neg v2\_struct\_0 X1) \wedge ((\neg v11\_struct\_0 X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 X1) \wedge ((v4\_cat\_1 X1) \wedge ((v5\_cat\_1 X1) \wedge ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 X1)))))))))) \Rightarrow (\forall X2.(m1\_oppcat\_1 X2 X0 X1) \Rightarrow ((v1\_funct\_1 X2) \wedge ((v1\_funct\_2 X2 (u4\_struct\_0 X0) (u4\_struct\_0 X1)) \wedge (m1\_subset\_1 X2 (k1\_zfmisc\_1 (k2\_zfmisc\_1 (u4\_struct\_0 X0) (u4\_struct\_0 X1))))))) \quad (11)$$

Assume the following.

$$\forall X0.(l1\_graph\_1 X0) \Rightarrow (l5\_struct\_0 X0) \quad (12)$$

Assume the following.

$$\forall X0.(l1\_cat\_1 X0) \Rightarrow (l1\_graph\_1 X0) \quad (13)$$

Assume the following.

$$\forall X0.\forall X1.(((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 X0) \wedge (l1\_cat\_1 X0)))))))))) \wedge (m1\_subset\_1 X1 (u4\_struct\_0 X0)) \Rightarrow (m1\_subset\_1 (k5\_oppcat\_1 X0 X1) (u4\_struct\_0 (k2\_oppcat\_1 X0))) \quad (14)$$

Assume the following.

$$\forall X0.\forall X1.(((\neg v2\_struct\_0 X0)\wedge((\neg v11\_struct\_0 X0)\wedge(l1\_graph\_1 X0)))\wedge(m1\_subset\_1 X1 (u4\_struct\_0 X0)))\Rightarrow(m1\_subset\_1(k4\_graph\_1 X0 X1) (u1\_struct\_0 X0)) \quad (15)$$

Assume the following.

$$\forall X0.\forall X1.(((\neg v2\_struct\_0 X0)\wedge((\neg v11\_struct\_0 X0)\wedge(l1\_graph\_1 X0)))\wedge(m1\_subset\_1 X1 (u4\_struct\_0 X0)))\Rightarrow(m1\_subset\_1(k3\_graph\_1 X0 X1) (u1\_struct\_0 X0)) \quad (16)$$

Assume the following.

$$\forall X0.((\neg v2\_struct\_0 X0)\wedge((\neg v11\_struct\_0 X0)\wedge((v2\_cat\_1 X0)\wedge((v3\_cat\_1 X0)\wedge((v4\_cat\_1 X0)\wedge((v5\_cat\_1 X0)\wedge((v6\_cat\_1 X0)\wedge(l1\_cat\_1 X0))))))))\Rightarrow((\neg v2\_struct\_0 (k2\_oppcat\_1 X0))\wedge((\neg v11\_struct\_0 (k2\_oppcat\_1 X0))\wedge((v1\_cat\_1 (k2\_oppcat\_1 X0))\wedge(l1\_cat\_1 (k2\_oppcat\_1 X0)))))) \quad (17)$$

Assume the following.

$$\forall X0.((\neg v2\_struct\_0 X0)\wedge((\neg v11\_struct\_0 X0)\wedge((v2\_cat\_1 X0)\wedge((v3\_cat\_1 X0)\wedge((v4\_cat\_1 X0)\wedge((v5\_cat\_1 X0)\wedge((v6\_cat\_1 X0)\wedge(l1\_cat\_1 X0))))))))\Rightarrow(\forall X1.((\neg v2\_struct\_0 X1)\wedge((\neg v11\_struct\_0 X1)\wedge((v2\_cat\_1 X1)\wedge((v3\_cat\_1 X1)\wedge((v4\_cat\_1 X1)\wedge((v5\_cat\_1 X1)\wedge((v6\_cat\_1 X1)\wedge(l1\_cat\_1 X1))))))))\Rightarrow(\forall X2.((v1\_funct\_1 X2)\wedge((v1\_funct\_2 X2 (u4\_struct\_0 (k2\_oppcat\_1 X0)) (u4\_struct\_0 X1))\wedge(m1\_subset\_1 X2 (k1\_zfmisc\_1 (k2\_zfmisc\_1 (u4\_struct\_0 (k2\_oppcat\_1 X0)) (u4\_struct\_0 X1))))))\Rightarrow(\forall X3.((v1\_funct\_1 X3)\wedge((v1\_funct\_2 X3 (u4\_struct\_0 X0) (u4\_struct\_0 X1))\wedge(m1\_subset\_1 X3 (k1\_zfmisc\_1 (k2\_zfmisc\_1 (u4\_struct\_0 X0) (u4\_struct\_0 X1))))))\Rightarrow((X3 = k9\_oppcat\_1 X0 X1 X2)\Leftrightarrow(\forall X4.(m1\_subset\_1 X4 (u4\_struct\_0 X0))\Rightarrow(k3\_funct\_2 (u4\_struct\_0 X0) (u4\_struct\_0 X1) X3 X4 = k3\_funct\_2 (u4\_struct\_0 (k2\_oppcat\_1 X0)) (u4\_struct\_0 X1) X2 (k5\_oppcat\_1 X0 X4)))))) \quad (18)$$

Assume the following.

$$\forall X0.((\neg v2\_struct\_0 X0)\wedge((\neg v11\_struct\_0 X0)\wedge((v2\_cat\_1 X0)\wedge((v3\_cat\_1 X0)\wedge((v4\_cat\_1 X0)\wedge((v5\_cat\_1 X0)\wedge((v6\_cat\_1 X0)\wedge(l1\_cat\_1 X0))))))))\Rightarrow(\forall X1.(m1\_subset\_1 X1 (u4\_struct\_0 X0))\Rightarrow(k5\_oppcat\_1 X0 X1 = X1)) \quad (19)$$

Assume the following.

$$\forall X0.((\neg v2\_struct\_0 X0)\wedge((\neg v11\_struct\_0 X0)\wedge(l1\_graph\_1 X0)))\Rightarrow(\forall X1.(m1\_subset\_1 X1 (u4\_struct\_0 X0))\Rightarrow(k4\_graph\_1 X0 X1 = k3\_funct\_2 (u4\_struct\_0 X0) (u1\_struct\_0 X0) (u2\_graph\_1 X0 X1)) \quad (20)$$

Assume the following.

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge (l1\_graph\_1 \\ & X0))) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (u4\_struct\_0 X0)) \Rightarrow (k3\_graph\_1 \\ & X0 X1 = k3\_funct\_2 (u4\_struct\_0 X0) (u1\_struct\_0 X0) (u1\_graph\_1 \\ & X0) X1)) \end{aligned} \quad (21)$$

Assume the following.

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\ & X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\ & X0) \wedge (l1\_cat\_1 X0)))))))) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (u1\_struct\_0 \\ & X0)) \Rightarrow (k3\_oppcat\_1 X0 X1 = X1)) \end{aligned} \quad (22)$$

Assume the following.

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\ & X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\ & X0) \wedge (l1\_cat\_1 X0)))))))) \Rightarrow (k2\_oppcat\_1 X0 = g1\_cat\_1 (u1\_struct\_0 \\ & X0) (u4\_struct\_0 X0) (u2\_graph\_1 X0) (u1\_graph\_1 X0) (k1\_oppcat\_1 \\ & (u4\_struct\_0 X0) (u4\_struct\_0 X0) (u4\_struct\_0 X0) (u1\_cat\_1 X0))) \end{aligned} \quad (23)$$

Assume the following.

$$\begin{aligned} & \forall X0.(l1\_cat\_1 X0) \Rightarrow ((v1\_cat\_1 X0) \Rightarrow (X0 = g1\_cat\_1 (u1\_struct\_0 \\ & X0) (u4\_struct\_0 X0) (u1\_graph\_1 X0) (u2\_graph\_1 X0) (u1\_cat\_1 \\ & X0))) \end{aligned} \quad (24)$$

### Theorem 1

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\ & X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\ & X0) \wedge (l1\_cat\_1 X0)))))))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge (( \\ & \neg v11\_struct\_0 X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 X1) \wedge ((v4\_cat\_1 \\ & X1) \wedge ((v5\_cat\_1 X1) \wedge ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 X1)))))))) \Rightarrow (\forall X2. \\ & (m1\_oppcat\_1 X2 (k2\_oppcat\_1 X0) X1) \Rightarrow (\forall X3.(m1\_subset\_1 \\ & X3 (u4\_struct\_0 X0)) \Rightarrow ((k3\_funct\_2 (u1\_struct\_0 X0) (u1\_struct\_0 \\ & X1) (k7\_cat\_1 X0 X1 (k9\_oppcat\_1 X0 X1 X2)) (k3\_graph\_1 X0 X3) = k3\_graph\_1 \\ & X1 (k3\_funct\_2 (u4\_struct\_0 X0) (u4\_struct\_0 X1) (k9\_oppcat\_1 \\ & X0 X1 X2) X3)) \wedge (k3\_funct\_2 (u1\_struct\_0 X0) (u1\_struct\_0 X1) (k7\_cat\_1 \\ & X0 X1 (k9\_oppcat\_1 X0 X1 X2)) (k4\_graph\_1 X0 X3) = k4\_graph\_1 X1 (k3\_funct\_2 \\ & (u4\_struct\_0 X0) (u4\_struct\_0 X1) (k9\_oppcat\_1 X0 X1 X2) X3)))))) \end{aligned}$$