

t40\_functor3 (TM-  
ZocvGsF5PB3UaNsnsJA3GQLy9WKJU17CM)

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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  $v15\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $m2\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $m1\_functor3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $r1\_functor3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $r8\_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $u1\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $k5\_functor2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k8\_functor3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k4\_functor2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k2\_functor2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_functor2 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k8\_altcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k3\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $r1\_functor2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $m1\_functor2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k1\_altcat\_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v1\_xboole\_0 : \iota \Rightarrow o$  be given. Let  $v1\_relat\_1 : \iota \Rightarrow o$  be given. Let  $v4\_relat\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v1\_funct\_1 : \iota \Rightarrow o$  be given. Let  $v1\_partfun1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $l1\_struct\_0 : \iota \Rightarrow o$  be given. Let  $m2\_functor2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $l2\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $l1\_altcat\_1 : \iota \Rightarrow o$  be given. Let  $l1\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k3\_functor2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_altcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $r2\_functor2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v3\_altcat\_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k5\_altcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Assume the following.

$$\begin{aligned}
 & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v12\_altcat\_1 \\
 & X0) \wedge (l2\_altcat\_1 X0)))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 \\
 & X1) \wedge ((v12\_altcat\_1 X1) \wedge (l2\_altcat\_1 X1)))) \Rightarrow (\forall X2.(m2\_functor0 \\
 & X2 X0 X1) \Rightarrow (\forall X3.(m1\_subset\_1 X3 (u1\_struct\_0 X0)) \Rightarrow (k2\_functor2 \\
 & X0 X1 X2 X2 (k1\_functor2 X0 X1 X2) X3 = k8\_altcat\_1 X1 (k3\_functor0 \\
 & X0 X1 X2 X3))))))
 \end{aligned}
 \tag{1}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v12\_altcat\_1 \\
& X0) \wedge (l2\_altcat\_1 X0)))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 \\
& X1) \wedge ((v12\_altcat\_1 X1) \wedge (l2\_altcat\_1 X1)))) \Rightarrow (\forall X2.(m2\_functor0 \\
& X2 X0 X1) \Rightarrow (\forall X3.(m2\_functor0 X3 X0 X1) \Rightarrow ((r1\_functor2 X0 X1 \\
& X2 X3) \Rightarrow (\forall X4.(m1\_functor2 X4 X0 X1 X2 X3) \Rightarrow (\forall X5.(m1\_functor2 \\
& X5 X0 X1 X2 X3) \Rightarrow ((\forall X6.(m1\_subset\_1 X6 (u1\_struct\_0 X0)) \Rightarrow \\
& (k2\_functor2 X0 X1 X2 X3 X4 X6 = k2\_functor2 X0 X1 X2 X3 X5 X6)) \Rightarrow (r8\_pboole \\
& (u1\_struct\_0 X0) X4 X5)))))))))
\end{aligned} \tag{2}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v11\_altcat\_1 \\
& X0) \wedge ((v12\_altcat\_1 X0) \wedge (l2\_altcat\_1 X0)))) \Rightarrow (\forall X1.((\neg \\
& v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 X1) \wedge ((v11\_altcat\_1 X1) \wedge ((v12\_altcat\_1 \\
& X1) \wedge (l2\_altcat\_1 X1)))) \Rightarrow (\forall X2.((v15\_functor0 X2 X1 X0) \wedge \\
& (m2\_functor0 X2 X1 X0)) \Rightarrow (\forall X3.((v15\_functor0 X3 X1 X0) \wedge ( \\
& m2\_functor0 X3 X1 X0)) \Rightarrow (\forall X4.(m1\_functor3 X4 X1 X0 X2 X3) \Rightarrow \\
& (\forall X5.(m1\_subset\_1 X5 (u1\_struct\_0 X1)) \Rightarrow ((r1\_functor3 \\
& X1 X0 X2 X3) \Rightarrow (k2\_functor2 X1 X0 X3 X2 (k8\_functor3 X1 X0 X2 X3 X4) X5 = \\
& k1\_altcat\_3 X0 (k3\_functor0 X1 X0 X2 X5) (k3\_functor0 X1 X0 X3 X5) \\
& (k2\_functor2 X1 X0 X2 X3 X4 X5)))))))))
\end{aligned} \tag{3}$$

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. \forall X2. \forall X3. (((\neg v2\_struct\_0 \\
& X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v11\_altcat\_1 X0) \wedge ((v12\_altcat\_1 X0) \wedge \\
& (l2\_altcat\_1 X0)))) \wedge (((\neg v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 X1) \wedge \\
& ((v11\_altcat\_1 X1) \wedge ((v12\_altcat\_1 X1) \wedge (l2\_altcat\_1 X1)))) \wedge \\
& (((v15\_functor0 X2 X0 X1) \wedge (m2\_functor0 X2 X0 X1)) \wedge ((v15\_functor0 \\
& X3 X0 X1) \wedge (m2\_functor0 X3 X0 X1)))) \Rightarrow ((r1\_functor3 X0 X1 X2 X3) \Rightarrow \\
& (r1\_functor3 X0 X1 X3 X2))
\end{aligned} \tag{4}$$

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. \forall X2. \forall X3. (((\neg v2\_struct\_0 \\
& X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v12\_altcat\_1 X0) \wedge (l2\_altcat\_1 X0)))) \wedge \\
& (((\neg v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 X1) \wedge ((v12\_altcat\_1 X1) \wedge ( \\
& l2\_altcat\_1 X1)))) \wedge ((m2\_functor0 X2 X0 X1) \wedge (m2\_functor0 X3 X0 \\
& X1))) \Rightarrow (r1\_functor2 X0 X1 X2 X2)
\end{aligned} \tag{5}$$

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. \forall X2. ((\neg v1\_xboole\_0 X0) \wedge (((v1\_relat\_1 \\
& X1) \wedge ((v4\_relat\_1 X1 X0) \wedge ((v1\_funct\_1 X1) \wedge (v1\_partfun1 X1 X0)))) \wedge \\
& ((v1\_relat\_1 X2) \wedge ((v4\_relat\_1 X2 X0) \wedge ((v1\_funct\_1 X2) \wedge (v1\_partfun1 \\
& X2 X0)))) \Rightarrow ((r8\_pboole X0 X1 X2) \Leftrightarrow (X1 = X2))
\end{aligned} \tag{6}$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. \forall X2. (((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 \\ & X0) \wedge ((v12\_altcat\_1 X0) \wedge (l2\_altcat\_1 X0)))) \wedge (((\neg v2\_struct\_0 \\ & X1) \wedge ((v2\_altcat\_1 X1) \wedge ((v12\_altcat\_1 X1) \wedge (l2\_altcat\_1 X1)))) \wedge \\ & ((v15\_functor0 X2 X0 X1) \wedge (m2\_functor0 X2 X0 X1))) \Rightarrow (k4\_functor2 \\ & X0 X1 X2 = k1\_functor2 X0 X1 X2) \end{aligned} \quad (7)$$

Assume the following.

$$\forall X0. ((\neg v2\_struct\_0 X0) \wedge (l1\_struct\_0 X0)) \Rightarrow (\neg v1\_xboole\_0 (u1\_struct\_0 X0)) \quad (8)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. \forall X2. \forall X3. (((\neg v2\_struct\_0 \\ & X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v12\_altcat\_1 X0) \wedge (l2\_altcat\_1 X0)))) \wedge \\ & (((\neg v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 X1) \wedge ((v12\_altcat\_1 X1) \wedge ( \\ & l2\_altcat\_1 X1)))) \wedge ((v15\_functor0 X2 X0 X1) \wedge (m2\_functor0 X2 \\ & X0 X1)) \wedge ((v15\_functor0 X3 X0 X1) \wedge (m2\_functor0 X3 X0 X1))) \Rightarrow (\forall X4. \\ & (m2\_functor2 X4 X0 X1 X2 X3) \Rightarrow (m1\_functor2 X4 X0 X1 X2 X3)) \end{aligned} \quad (9)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. (((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge \\ & ((v12\_altcat\_1 X0) \wedge (l2\_altcat\_1 X0)))) \wedge ((\neg v2\_struct\_0 X1) \wedge \\ & ((v12\_altcat\_1 X1) \wedge (l2\_altcat\_1 X1)))) \Rightarrow (\forall X2. (m2\_functor0 \\ & X2 X0 X1) \Rightarrow (l2\_functor0 X2 X0 X1)) \end{aligned} \quad (10)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. \forall X2. \forall X3. (((\neg v2\_struct\_0 \\ & X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v11\_altcat\_1 X0) \wedge ((v12\_altcat\_1 X0) \wedge \\ & (l2\_altcat\_1 X0)))) \wedge (((\neg v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 X1) \wedge \\ & ((v11\_altcat\_1 X1) \wedge ((v12\_altcat\_1 X1) \wedge (l2\_altcat\_1 X1)))) \wedge \\ & ((v15\_functor0 X2 X0 X1) \wedge (m2\_functor0 X2 X0 X1)) \wedge ((v15\_functor0 \\ & X3 X0 X1) \wedge (m2\_functor0 X3 X0 X1))) \Rightarrow (\forall X4. (m1\_functor3 \\ & X4 X0 X1 X2 X3) \Rightarrow (m2\_functor2 X4 X0 X1 X2 X3)) \end{aligned} \quad (11)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. \forall X2. \forall X3. (((\neg v2\_struct\_0 \\ & X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v12\_altcat\_1 X0) \wedge (l2\_altcat\_1 X0)))) \wedge \\ & (((\neg v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 X1) \wedge ((v12\_altcat\_1 X1) \wedge ( \\ & l2\_altcat\_1 X1)))) \wedge ((m2\_functor0 X2 X0 X1) \wedge (m2\_functor0 X3 X0 \\ & X1))) \Rightarrow (\forall X4. (m1\_functor2 X4 X0 X1 X2 X3) \Rightarrow ((v1\_relat\_1 X4) \wedge \\ & ((v4\_relat\_1 X4 (u1\_struct\_0 X0)) \wedge ((v1\_funct\_1 X4) \wedge (v1\_partfun1 \\ & X4 (u1\_struct\_0 X0)))))) \end{aligned} \quad (12)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.((l1\_altcat\_1 X0)\wedge(l1\_altcat\_1 X1))\Rightarrow( \\ & \forall X2.(l2\_functor0 X2 X0 X1)\Rightarrow(l1\_functor0 X2 X0 X1)) \end{aligned} \quad (13)$$

Assume the following.

$$\forall X0.(l2\_altcat\_1 X0)\Rightarrow(l1\_altcat\_1 X0) \quad (14)$$

Assume the following.

$$\forall X0.(l1\_altcat\_1 X0)\Rightarrow(l1\_struct\_0 X0) \quad (15)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.(((\neg v2\_struct\_0 \\ & X0)\wedge((v2\_altcat\_1 X0)\wedge((v11\_altcat\_1 X0)\wedge((v12\_altcat\_1 X0)\wedge \\ & (l2\_altcat\_1 X0))))))\wedge(((\neg v2\_struct\_0 X1)\wedge((v2\_altcat\_1 X1)\wedge \\ & ((v11\_altcat\_1 X1)\wedge((v12\_altcat\_1 X1)\wedge(l2\_altcat\_1 X1))))))\wedge \\ & (((v15\_functor0 X2 X0 X1)\wedge(m2\_functor0 X2 X0 X1))\wedge(((v15\_functor0 \\ & X3 X0 X1)\wedge(m2\_functor0 X3 X0 X1))\wedge(m1\_functor3 X4 X0 X1 X2 X3))))\Rightarrow \\ & (m1\_functor3 (k8\_functor3 X0 X1 X2 X3 X4) X0 X1 X3 X2) \end{aligned} \quad (16)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.\forall X5. \\ & \forall X6.(((\neg v2\_struct\_0 X0)\wedge((v2\_altcat\_1 X0)\wedge((v11\_altcat\_1 \\ & X0)\wedge((v12\_altcat\_1 X0)\wedge(l2\_altcat\_1 X0))))))\wedge(((\neg v2\_struct\_0 \\ & X1)\wedge((v2\_altcat\_1 X1)\wedge((v11\_altcat\_1 X1)\wedge((v12\_altcat\_1 X1)\wedge \\ & (l2\_altcat\_1 X1))))))\wedge(((v15\_functor0 X2 X0 X1)\wedge(m2\_functor0 \\ & X2 X0 X1))\wedge(((v15\_functor0 X3 X0 X1)\wedge(m2\_functor0 X3 X0 X1))\wedge(( \\ & (v15\_functor0 X4 X0 X1)\wedge(m2\_functor0 X4 X0 X1))\wedge((m2\_functor2 \\ & X5 X0 X1 X2 X3)\wedge(m2\_functor2 X6 X0 X1 X3 X4))))))\Rightarrow(m2\_functor2 ( \\ & k5\_functor2 X0 X1 X2 X3 X4 X5 X6) X0 X1 X2 X4) \end{aligned} \quad (17)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.\forall X5. \\ & \forall X6.(((\neg v2\_struct\_0 X0)\wedge((v2\_altcat\_1 X0)\wedge((v12\_altcat\_1 \\ & X0)\wedge(l2\_altcat\_1 X0))))\wedge(((\neg v2\_struct\_0 X1)\wedge((v2\_altcat\_1 \\ & X1)\wedge((v12\_altcat\_1 X1)\wedge(l2\_altcat\_1 X1))))\wedge((m2\_functor0 X2 \\ & X0 X1)\wedge((m2\_functor0 X3 X0 X1)\wedge((m2\_functor0 X4 X0 X1)\wedge((m1\_functor2 \\ & X5 X0 X1 X2 X3)\wedge(m1\_functor2 X6 X0 X1 X3 X4))))))\Rightarrow(m1\_functor2 ( \\ & k3\_functor2 X0 X1 X2 X3 X4 X5 X6) X0 X1 X2 X4) \end{aligned} \quad (18)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.(((\neg v2\_struct\_0 \\ & X0)\wedge(l1\_altcat\_1 X0))\wedge(((\neg v2\_struct\_0 X1)\wedge(l1\_altcat\_1 X1))\wedge \\ & ((l1\_functor0 X2 X0 X1)\wedge(m1\_subset\_1 X3 (u1\_struct\_0 X0))))\Rightarrow \\ & (m1\_subset\_1 (k3\_functor0 X0 X1 X2 X3) (u1\_struct\_0 X1)) \end{aligned} \quad (19)$$

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. \forall X2. \forall X3. \forall X4. \forall X5. \\
& (((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v12\_altcat\_1 X0) \wedge (l2\_altcat\_1 X0)))) \wedge (((\neg v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 X1) \wedge (v12\_altcat\_1 X1) \wedge (l2\_altcat\_1 X1)))) \wedge ((m2\_functor0 X2 X0 X1) \wedge ((m2\_functor0 X3 X0 X1) \wedge ((m1\_functor2 X4 X0 X1 X2 X3) \wedge (m1\_subset\_1 X5 (u1\_struct\_0 X0)))))) \Rightarrow (m1\_subset\_1 (k2\_functor2 X0 X1 X2 X3 X4 X5) (k1\_altcat\_1 X1 (k3\_functor0 X0 X1 X2 X5) (k3\_functor0 X0 X1 X3 X5)))
\end{aligned} \tag{20}$$

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. \forall X2. (((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v12\_altcat\_1 X0) \wedge (l2\_altcat\_1 X0)))) \wedge (((\neg v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 X1) \wedge ((v12\_altcat\_1 X1) \wedge (l2\_altcat\_1 X1)))) \wedge (m2\_functor0 X2 X0 X1))) \Rightarrow (m1\_functor2 (k1\_functor2 X0 X1 X2) X0 X1 X2 X2)
\end{aligned} \tag{21}$$

Assume the following.

$$\begin{aligned}
& \forall X0. (((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v11\_altcat\_1 X0) \wedge ((v12\_altcat\_1 X0) \wedge (l2\_altcat\_1 X0)))))) \Rightarrow (\forall X1. (((\neg v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 X1) \wedge ((v11\_altcat\_1 X1) \wedge ((v12\_altcat\_1 X1) \wedge (l2\_altcat\_1 X1)))))) \Rightarrow (\forall X2. ((v15\_functor0 X2 X0 X1) \wedge (m2\_functor0 X2 X0 X1))) \Rightarrow (\forall X3. ((v15\_functor0 X3 X0 X1) \wedge (m2\_functor0 X3 X0 X1))) \Rightarrow (\forall X4. ((v15\_functor0 X4 X0 X1) \wedge (m2\_functor0 X4 X0 X1))) \Rightarrow (((r2\_functor2 X0 X1 X2 X3) \wedge (r2\_functor2 X0 X1 X3 X4)) \Rightarrow (\forall X5. (m2\_functor2 X5 X0 X1 X2 X3) \Rightarrow (\forall X6. (m2\_functor2 X6 X0 X1 X3 X4) \Rightarrow (\forall X7. (m2\_functor2 X7 X0 X1 X2 X4) \Rightarrow ((X7 = k5\_functor2 X0 X1 X2 X3 X4 X5 X6) \Leftrightarrow (r8\_pboole (u1\_struct\_0 X0) X7 (k3\_functor2 X0 X1 X2 X3 X4 X5 X6))))))))))
\end{aligned} \tag{22}$$

Assume the following.

$$\begin{aligned}
& \forall X0. (((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v11\_altcat\_1 X0) \wedge ((v12\_altcat\_1 X0) \wedge (l2\_altcat\_1 X0)))))) \Rightarrow (\forall X1. (((\neg v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 X1) \wedge ((v11\_altcat\_1 X1) \wedge ((v12\_altcat\_1 X1) \wedge (l2\_altcat\_1 X1)))))) \Rightarrow (\forall X2. ((v15\_functor0 X2 X0 X1) \wedge (m2\_functor0 X2 X0 X1))) \Rightarrow (\forall X3. ((v15\_functor0 X3 X0 X1) \wedge (m2\_functor0 X3 X0 X1))) \Rightarrow ((r1\_functor3 X0 X1 X2 X3) \Rightarrow (\forall X4. (m2\_functor2 X4 X0 X1 X2 X3) \Rightarrow ((m1\_functor3 X4 X0 X1 X2 X3) \Leftrightarrow (\forall X5. (m1\_subset\_1 X5 (u1\_struct\_0 X0)) \Rightarrow (v3\_altcat\_3 (k2\_functor2 X0 X1 X2 X3 X4 X5) X1 (k3\_functor0 X0 X1 X2 X5) (k3\_functor0 X0 X1 X3 X5))))))))))
\end{aligned} \tag{23}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v12\_altcat\_1 \\
& X0) \wedge (l2\_altcat\_1 X0)))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 \\
& X1) \wedge ((v12\_altcat\_1 X1) \wedge (l2\_altcat\_1 X1)))) \Rightarrow (\forall X2.(m2\_functor0 \\
& X2 X0 X1) \Rightarrow (\forall X3.(m2\_functor0 X3 X0 X1) \Rightarrow (\forall X4.(m2\_functor0 \\
& X4 X0 X1) \Rightarrow (((r1\_functor2 X0 X1 X2 X3) \wedge (r1\_functor2 X0 X1 X3 X4)) \Rightarrow \\
& (\forall X5.(m1\_functor2 X5 X0 X1 X2 X3) \Rightarrow (\forall X6.(m1\_functor2 \\
& X6 X0 X1 X3 X4) \Rightarrow (\forall X7.(m1\_functor2 X7 X0 X1 X2 X4) \Rightarrow ((X7 = k3\_functor2 \\
& X0 X1 X2 X3 X4 X5 X6) \Leftrightarrow (\forall X8.(m1\_subset\_1 X8 (u1\_struct\_0 X0)) \Rightarrow \\
& (k2\_functor2 X0 X1 X2 X4 X7 X8 = k5\_altcat\_1 X1 (k3\_functor0 X0 X1 X2 \\
& X8) (k3\_functor0 X0 X1 X3 X8) (k3\_functor0 X0 X1 X4 X8) (k2\_functor2 \\
& X0 X1 X2 X3 X5 X8) (k2\_functor2 X0 X1 X3 X4 X6 X8))))))))))))) \\
& \hspace{15em} (24)
\end{aligned}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v11\_altcat\_1 \\
& X0) \wedge ((v12\_altcat\_1 X0) \wedge (l2\_altcat\_1 X0)))) \Rightarrow (\forall X1.(m1\_subset\_1 \\
& X1 (u1\_struct\_0 X0)) \Rightarrow (\forall X2.(m1\_subset\_1 X2 (u1\_struct\_0 \\
& X0)) \Rightarrow (\forall X3.(m1\_subset\_1 X3 (k1\_altcat\_1 X0 X1 X2)) \Rightarrow ((v3\_altcat\_3 \\
& X3 X0 X1 X2) \Leftrightarrow ((k5\_altcat\_1 X0 X2 X1 X2 (k1\_altcat\_3 X0 X1 X2 X3) X3 = \\
& k8\_altcat\_1 X0 X2) \wedge (k5\_altcat\_1 X0 X1 X2 X1 X3 (k1\_altcat\_3 X0 X1 \\
& X2 X3) = k8\_altcat\_1 X0 X1))))))))) \\
& \hspace{15em} (25)
\end{aligned}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v11\_altcat\_1 \\
& X0) \wedge ((v12\_altcat\_1 X0) \wedge (l2\_altcat\_1 X0)))) \Rightarrow (\forall X1.(( \\
& \neg v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 X1) \wedge ((v11\_altcat\_1 X1) \wedge ((v12\_altcat\_1 \\
& X1) \wedge (l2\_altcat\_1 X1)))) \Rightarrow (\forall X2.((v15\_functor0 X2 X0 X1) \wedge \\
& (m2\_functor0 X2 X0 X1) \Rightarrow (\forall X3.((v15\_functor0 X3 X0 X1) \wedge ( \\
& m2\_functor0 X3 X0 X1) \Rightarrow ((r1\_functor3 X0 X1 X2 X3) \Leftrightarrow ((r2\_functor2 \\
& X0 X1 X2 X3) \wedge ((r1\_functor2 X0 X1 X3 X2) \wedge (\exists X4.(m2\_functor2 \\
& X4 X0 X1 X2 X3) \wedge (\forall X5.(m1\_subset\_1 X5 (u1\_struct\_0 X0)) \Rightarrow ( \\
& v3\_altcat\_3 (k2\_functor2 X0 X1 X2 X3 X4 X5) X1 (k3\_functor0 X0 X1 X2 \\
& X5) (k3\_functor0 X0 X1 X3 X5))))))))))))) \\
& \hspace{15em} (26)
\end{aligned}$$

**Theorem 1**

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v11\_altcat\_1 \\
& X0) \wedge ((v12\_altcat\_1 X0) \wedge (l2\_altcat\_1 X0)))) \Rightarrow (\forall X1.(( \\
& \neg v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 X1) \wedge ((v11\_altcat\_1 X1) \wedge ((v12\_altcat\_1 \\
& X1) \wedge (l2\_altcat\_1 X1)))) \Rightarrow (\forall X2.((v15\_functor0 X2 X0 X1) \wedge \\
& (m2\_functor0 X2 X0 X1) \Rightarrow (\forall X3.((v15\_functor0 X3 X0 X1) \wedge ( \\
& m2\_functor0 X3 X0 X1) \Rightarrow (\forall X4.(m1\_functor3 X4 X0 X1 X2 X3) \Rightarrow \\
& ((r1\_functor3 X0 X1 X2 X3) \Rightarrow (r8\_pboole (u1\_struct\_0 X0) (k5\_functor2 \\
& X0 X1 X2 X3 X2 X4 (k8\_functor3 X0 X1 X2 X3 X4) (k4\_functor2 X0 X1 X2))))))))) \\
& \hspace{15em} (27)
\end{aligned}$$