

t41\_functor3 (TMN-  
MsG67PU5jBQ9shGg3uV6MiCxrY3dq4Ui)

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  $v12\_altcat\_1 : \iota \Rightarrow o$  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  $k8\_functor3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k1\_altcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v3\_altcat\_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v1\_altcat\_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v2\_altcat\_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  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  $k2\_functor2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_xboole\_0 : \iota$  be given. Let  $k1\_altcat\_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k3\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  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  $r2\_functor2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Assume the following.

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v11\_altcat\_1 \\ & X0) \wedge ((v12\_altcat\_1 X0) \wedge (l2\_altcat\_1 X0)))))) \Rightarrow (\forall X1.(m1\_subset\_1 \\ & X1 (u1\_struct\_0 X0)) \Rightarrow (\forall X2.(m1\_subset\_1 X2 (u1\_struct\_0 \\ & X0)) \Rightarrow (\forall X3.(m1\_subset\_1 X3 (k1\_altcat\_1 X0 X1 X2)) \Rightarrow ((v3\_altcat\_3 \\ & X3 X0 X1 X2) \Rightarrow ((v1\_altcat\_3 X3 X0 X1 X2) \wedge (v2\_altcat\_3 X3 X0 X1 X2)))))) \end{aligned} \quad (1)$$

Assume the following.

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

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v11\_altcat\_1 \\
& X0) \wedge ((v12\_altcat\_1 X0) \wedge (l2\_altcat\_1 X0)))))) \Rightarrow (\forall X1.(m1\_subset\_1 \\
& X1 (u1\_struct\_0 X0)) \Rightarrow (\forall X2.(m1\_subset\_1 X2 (u1\_struct\_0 \\
& X0)) \Rightarrow (\neg(k1\_altcat\_1 X0 X1 X2 \neq k1\_xboole\_0) \wedge ((k1\_altcat\_1 X0 X2 \\
& X1 \neq k1\_xboole\_0) \wedge (\exists X3.(m1\_subset\_1 X3 (k1\_altcat\_1 X0 \\
& X1 X2)) \wedge ((v1\_altcat\_3 X3 X0 X1 X2) \wedge ((v2\_altcat\_3 X3 X0 X1 X2) \wedge (k1\_altcat\_3 \\
& X0 X2 X1 (k1\_altcat\_3 X0 X1 X2 X3) \neq X3)))))))
\end{aligned} \tag{3}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v11\_altcat\_1 \\
& X0) \wedge ((v12\_altcat\_1 X0) \wedge (l2\_altcat\_1 X0)))))) \Rightarrow (\forall X1.(( \\
& \neg v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 X1) \wedge ((v11\_altcat\_1 X1) \wedge ((v12\_altcat\_1 \\
& X1) \wedge (l2\_altcat\_1 X1)))))) \Rightarrow (\forall X2.((v15\_functor0 X2 X1 X0) \wedge \\
& (m2\_functor0 X2 X1 X0)) \Rightarrow (\forall X3.((v15\_functor0 X3 X1 X0) \wedge ( \\
& m2\_functor0 X3 X1 X0)) \Rightarrow (\forall X4.(m1\_functor3 X4 X1 X0 X2 X3) \Rightarrow \\
& (\forall X5.(m1\_subset\_1 X5 (u1\_struct\_0 X1)) \Rightarrow ((r1\_functor3 \\
& X1 X0 X2 X3) \Rightarrow (k2\_functor2 X1 X0 X3 X2 (k8\_functor3 X1 X0 X2 X3 X4) X5 = \\
& k1\_altcat\_3 X0 (k3\_functor0 X1 X0 X2 X5) (k3\_functor0 X1 X0 X3 X5) \\
& (k2\_functor2 X1 X0 X2 X3 X4 X5)))))))
\end{aligned} \tag{4}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.\forall X3.(((\neg v2\_struct\_0 \\
& X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v11\_altcat\_1 X0) \wedge ((v12\_altcat\_1 X0) \wedge \\
& (l2\_altcat\_1 X0)))))) \wedge (((\neg v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 X1) \wedge \\
& ((v11\_altcat\_1 X1) \wedge ((v12\_altcat\_1 X1) \wedge (l2\_altcat\_1 X1)))))) \wedge \\
& (((v15\_functor0 X2 X0 X1) \wedge (m2\_functor0 X2 X0 X1)) \wedge ((v15\_functor0 \\
& X3 X0 X1) \wedge (m2\_functor0 X3 X0 X1)))) \Rightarrow ((r1\_functor3 X0 X1 X2 X3) \Rightarrow \\
& (r1\_functor3 X0 X1 X3 X2))
\end{aligned} \tag{5}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.\forall X3.(((\neg v2\_struct\_0 \\
& X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v12\_altcat\_1 X0) \wedge (l2\_altcat\_1 X0)))) \wedge \\
& (((\neg v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 X1) \wedge ((v12\_altcat\_1 X1) \wedge ( \\
& l2\_altcat\_1 X1)))))) \wedge (((v15\_functor0 X2 X0 X1) \wedge (m2\_functor0 X2 \\
& X0 X1)) \wedge ((v15\_functor0 X3 X0 X1) \wedge (m2\_functor0 X3 X0 X1)))) \Rightarrow (\forall X4. \\
& (m2\_functor2 X4 X0 X1 X2 X3) \Rightarrow (m1\_functor2 X4 X0 X1 X2 X3))
\end{aligned} \tag{6}$$

Assume the following.

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

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.(((\neg v2\_struct\_0 \\ & X0)\wedge((v2\_altcat\_1 X0)\wedge((v11\_altcat\_1 X0)\wedge((v12\_altcat\_1 X0)\wedge \\ & (l2\_altcat\_1 X0)))))\wedge(((\neg v2\_struct\_0 X1)\wedge((v2\_altcat\_1 X1)\wedge \\ & ((v11\_altcat\_1 X1)\wedge((v12\_altcat\_1 X1)\wedge(l2\_altcat\_1 X1)))))\wedge \\ & (((v15\_functor0 X2 X0 X1)\wedge(m2\_functor0 X2 X0 X1))\wedge((v15\_functor0 \\ & X3 X0 X1)\wedge(m2\_functor0 X3 X0 X1))))\Rightarrow(\forall X4.(m1\_functor3 \\ & X4 X0 X1 X2 X3)\Rightarrow(m2\_functor2 X4 X0 X1 X2 X3)) \end{aligned} \quad (8)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.((l1\_altcat\_1 X0)\wedge(l1\_altcat\_1 X1))\Rightarrow( \\ & \forall X2.(l2\_functor0 X2 X0 X1)\Rightarrow(l1\_functor0 X2 X0 X1)) \end{aligned} \quad (9)$$

Assume the following.

$$\forall X0.(l2\_altcat\_1 X0)\Rightarrow(l1\_altcat\_1 X0) \quad (10)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.(((\neg v2\_struct\_0 \\ & X0)\wedge((v2\_altcat\_1 X0)\wedge((v11\_altcat\_1 X0)\wedge((v12\_altcat\_1 X0)\wedge \\ & (l2\_altcat\_1 X0)))))\wedge(((\neg v2\_struct\_0 X1)\wedge((v2\_altcat\_1 X1)\wedge \\ & ((v11\_altcat\_1 X1)\wedge((v12\_altcat\_1 X1)\wedge(l2\_altcat\_1 X1)))))\wedge \\ & (((v15\_functor0 X2 X0 X1)\wedge(m2\_functor0 X2 X0 X1))\wedge((v15\_functor0 \\ & X3 X0 X1)\wedge(m2\_functor0 X3 X0 X1))\wedge(m1\_functor3 X4 X0 X1 X2 X3))))\Rightarrow \\ & (m1\_functor3 (k8\_functor3 X0 X1 X2 X3 X4) X0 X1 X3 X2) \end{aligned} \quad (11)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.(((\neg v2\_struct\_0 \\ & X0)\wedge(l1\_altcat\_1 X0))\wedge(((\neg v2\_struct\_0 X1)\wedge(l1\_altcat\_1 X1))\wedge \\ & ((l1\_functor0 X2 X0 X1)\wedge(m1\_subset\_1 X3 (u1\_struct\_0 X0))))\Rightarrow \\ & (m1\_subset\_1 (k3\_functor0 X0 X1 X2 X3) (u1\_struct\_0 X1)) \end{aligned} \quad (12)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.\forall X5. \\ & (((\neg v2\_struct\_0 X0)\wedge((v2\_altcat\_1 X0)\wedge((v12\_altcat\_1 X0)\wedge \\ & (l2\_altcat\_1 X0))))\wedge(((\neg v2\_struct\_0 X1)\wedge((v2\_altcat\_1 X1)\wedge \\ & (v12\_altcat\_1 X1)\wedge(l2\_altcat\_1 X1))))\wedge((m2\_functor0 X2 X0 X1)\wedge \\ & ((m2\_functor0 X3 X0 X1)\wedge((m1\_functor2 X4 X0 X1 X2 X3)\wedge(m1\_subset\_1 \\ & X5 (u1\_struct\_0 X0))))))\Rightarrow(m1\_subset\_1 (k2\_functor2 X0 X1 X2 X3 \\ & X4 X5) (k1\_altcat\_1 X1 (k3\_functor0 X0 X1 X2 X5) (k3\_functor0 X0 X1 \\ & X3 X5))) \end{aligned} \quad (13)$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v11\_altcat\_1 \\
& \quad X0) \wedge ((v12\_altcat\_1 X0) \wedge (l2\_altcat\_1 X0)))))) \Rightarrow (\forall X1.(( \\
& \neg v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 X1) \wedge ((v11\_altcat\_1 X1) \wedge ((v12\_altcat\_1 \\
& \quad X1) \wedge (l2\_altcat\_1 X1)))))) \Rightarrow (\forall X2.((v15\_functor0 X2 X0 X1) \wedge \\
& \quad (m2\_functor0 X2 X0 X1)) \Rightarrow (\forall X3.((v15\_functor0 X3 X0 X1) \wedge ( \\
& \quad m2\_functor0 X3 X0 X1)) \Rightarrow ((r1\_functor3 X0 X1 X2 X3) \Rightarrow (\forall X4.( \\
& \quad m2\_functor2 X4 X0 X1 X2 X3) \Rightarrow ((m1\_functor3 X4 X0 X1 X2 X3) \Leftrightarrow (\forall X5. \\
& \quad (m1\_subset\_1 X5 (u1\_struct\_0 X0)) \Rightarrow (v3\_altcat\_3 (k2\_functor2 \\
& \quad X0 X1 X2 X3 X4 X5) X1 (k3\_functor0 X0 X1 X2 X5) (k3\_functor0 X0 X1 X3 X5))))))))) \\
& \hspace{15em} (14)
\end{aligned}$$

Assume the following.

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

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v12\_altcat\_1 \\
& \quad X0) \wedge (l2\_altcat\_1 X0)))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 \\
& \quad X1) \wedge ((v12\_altcat\_1 X1) \wedge (l2\_altcat\_1 X1)))) \Rightarrow (\forall X2.(m2\_functor0 \\
& \quad X2 X0 X1) \Rightarrow (\forall X3.(m2\_functor0 X3 X0 X1) \Rightarrow ((r1\_functor2 X0 X1 \\
& \quad X2 X3) \Leftrightarrow (\forall X4.(m1\_subset\_1 X4 (u1\_struct\_0 X0)) \Rightarrow (k1\_altcat\_1 \\
& \quad X1 (k3\_functor0 X0 X1 X2 X4) (k3\_functor0 X0 X1 X3 X4) \neq k1\_xboole\_0)))))) \\
& \hspace{15em} (16)
\end{aligned}$$

**Theorem 1**

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