

# t23\_functor3 (TMW- PumWpQ4J2z5STddEZD9xxV6e2twxHKGW)

October 27, 2020

Let  $v2\_struct\_0 : \iota \Rightarrow o$  be given. Let  $v2\_altcat\_1 : \iota \Rightarrow o$  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  $m1\_functor2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $r1\_functor2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $r8\_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $u1\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $k7\_functor3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k12\_functor0 : \iota \Rightarrow \iota$  be given. Let  $k4\_functor2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k3\_functor2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_functor2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k5\_functor3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k6\_functor3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_functor3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  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  $l1\_altcat\_1 : \iota \Rightarrow o$  be given. Let  $v9\_functor0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Assume the following.

$$\begin{aligned}
 & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v12\_altcat\_1 \\
 & X0) \wedge (l2\_altcat\_1 X0)))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 \\
 & X1) \wedge ((v12\_altcat\_1 X1) \wedge (l2\_altcat\_1 X1)))) \Rightarrow (\forall X2.(m2\_functor0 \\
 & X2 X0 X1) \Rightarrow (\forall X3.(m2\_functor0 X3 X0 X1) \Rightarrow ((r1\_functor2 X0 X1 \\
 & X2 X3) \Rightarrow (\forall X4.(m1\_functor2 X4 X0 X1 X2 X3) \Rightarrow ((r8\_pboole (u1\_struct\_0 \\
 & X0) (k3\_functor2 X0 X1 X2 X3 X3 X4 (k1\_functor2 X0 X1 X3)) X4) \wedge (r8\_pboole \\
 & (u1\_struct\_0 X0) (k3\_functor2 X0 X1 X2 X2 X3 (k1\_functor2 X0 X1 X2) \\
 & X4) X4))))))
 \end{aligned} \tag{1}$$

Assume the following.

$$\begin{aligned}
 & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v12\_altcat\_1 \\
 & X0) \wedge (l2\_altcat\_1 X0)))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 \\
 & X1) \wedge ((v12\_altcat\_1 X1) \wedge (l2\_altcat\_1 X1)))) \Rightarrow (\forall X2.((v15\_functor0 \\
 & X2 X0 X1) \wedge (m2\_functor0 X2 X0 X1)) \Rightarrow (\forall X3.((v15\_functor0 X3 \\
 & X0 X1) \wedge (m2\_functor0 X3 X0 X1)) \Rightarrow (\forall X4.(m1\_functor2 X4 X0 X1 \\
 & X2 X3) \Rightarrow ((r1\_functor2 X0 X1 X2 X3) \Rightarrow (r8\_pboole (u1\_struct\_0 X0) ( \\
 & k5\_functor3 X0 X1 X1 X2 X3 X4 (k12\_functor0 X1) X4))))))
 \end{aligned} \tag{2}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v12\_altcat\_1 \\
& X0) \wedge (l2\_altcat\_1 X0)))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 \\
& X1) \wedge ((v12\_altcat\_1 X1) \wedge (l2\_altcat\_1 X1)))) \Rightarrow (\forall X2.((\neg \\
& v2\_struct\_0 X2) \wedge ((v2\_altcat\_1 X2) \wedge ((v12\_altcat\_1 X2) \wedge (l2\_altcat\_1 \\
& X2)))) \Rightarrow (\forall X3.((v15\_functor0 X3 X0 X1) \wedge (m2\_functor0 X3 X0 \\
& X1)) \Rightarrow (\forall X4.((v15\_functor0 X4 X1 X2) \wedge (m2\_functor0 X4 X1 X2)) \Rightarrow \\
& (r8\_pboole (u1\_struct\_0 X0) (k6\_functor3 X0 X1 X2 X4 X4 X3 (k4\_functor2 \\
& X1 X2 X4)) (k4\_functor2 X0 X2 (k1\_functor3 X0 X1 X2 X3 X4))))))
\end{aligned} \tag{3}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v12\_altcat\_1 \\
& X0) \wedge (l2\_altcat\_1 X0)))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 \\
& X1) \wedge ((v12\_altcat\_1 X1) \wedge (l2\_altcat\_1 X1)))) \Rightarrow (\forall X2.((\neg \\
& v2\_struct\_0 X2) \wedge ((v2\_altcat\_1 X2) \wedge ((v12\_altcat\_1 X2) \wedge (l2\_altcat\_1 \\
& X2)))) \Rightarrow (\forall X3.((v15\_functor0 X3 X0 X1) \wedge (m2\_functor0 X3 X0 \\
& X1)) \Rightarrow (\forall X4.((v15\_functor0 X4 X0 X1) \wedge (m2\_functor0 X4 X0 X1)) \Rightarrow \\
& (\forall X5.((v15\_functor0 X5 X1 X2) \wedge (m2\_functor0 X5 X1 X2)) \Rightarrow ( \\
& \forall X6.((v15\_functor0 X6 X1 X2) \wedge (m2\_functor0 X6 X1 X2)) \Rightarrow (( \\
& (r1\_functor2 X0 X1 X3 X4) \wedge (r1\_functor2 X1 X2 X5 X6)) \Rightarrow (r1\_functor2 \\
& X0 X2 (k1\_functor3 X0 X1 X2 X3 X5) (k1\_functor3 X0 X1 X2 X4 X6))))))
\end{aligned} \tag{4}$$

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.

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

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.

$$\begin{aligned} & \forall X0. \forall X1. \forall X2. \forall X3. (((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v12\_altcat\_1 X0) \wedge (l2\_altcat\_1 X0)))) \wedge \\ & ((\neg v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 X1) \wedge ((v12\_altcat\_1 X1) \wedge (l2\_altcat\_1 X1)))) \wedge ((m2\_functor0 X2 X0 X1) \wedge (m2\_functor0 X3 X0 X1))) \Rightarrow \\ & (\forall X4. (m1\_functor2 X4 X0 X1 X2 X3) \Rightarrow ((v1\_relat\_1 X4) \wedge ((v4\_relat\_1 X4 (u1\_struct\_0 X0)) \wedge ((v1\_funct\_1 X4) \wedge (v1\_partfun1 X4 (u1\_struct\_0 X0)))))) \end{aligned} \quad (9)$$

Assume the following.

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

Assume the following.

$$\forall X0. (l1\_altcat\_1 X0) \Rightarrow (l1\_struct\_0 X0) \quad (11)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. \forall X2. \forall X3. \forall X4. \forall X5. \\ & \forall X6. (((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v12\_altcat\_1 X0) \wedge (l2\_altcat\_1 X0)))) \wedge ((\neg v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 X1) \wedge ((v12\_altcat\_1 X1) \wedge (l2\_altcat\_1 X1)))) \wedge ((\neg v2\_struct\_0 X2) \wedge ((v2\_altcat\_1 X2) \wedge ((v12\_altcat\_1 X2) \wedge (l2\_altcat\_1 X2)))) \wedge \\ & (((v15\_functor0 X3 X1 X2) \wedge (m2\_functor0 X3 X1 X2)) \wedge ((v15\_functor0 X4 X1 X2) \wedge (m2\_functor0 X4 X1 X2)) \wedge (((v15\_functor0 X5 X0 X1) \wedge (m2\_functor0 X5 X0 X1)) \wedge (m1\_functor2 X6 X1 X2 X3 X4)))) \Rightarrow (m1\_functor2 (k6\_functor3 X0 X1 X2 X3 X4 X5 X6) X0 X2 (k1\_functor3 X0 X1 X2 X5 X3) (k1\_functor3 X0 X1 X2 X5 X4)) \end{aligned} \quad (12)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. \forall X2. \forall X3. \forall X4. \forall X5. \\ & \forall X6. (((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v12\_altcat\_1 X0) \wedge (l2\_altcat\_1 X0)))) \wedge ((\neg v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 X1) \wedge ((v12\_altcat\_1 X1) \wedge (l2\_altcat\_1 X1)))) \wedge ((\neg v2\_struct\_0 X2) \wedge ((v2\_altcat\_1 X2) \wedge ((v12\_altcat\_1 X2) \wedge (l2\_altcat\_1 X2)))) \wedge \\ & (((v15\_functor0 X3 X0 X1) \wedge (m2\_functor0 X3 X0 X1)) \wedge ((v15\_functor0 X4 X0 X1) \wedge (m2\_functor0 X4 X0 X1)) \wedge ((m1\_functor2 X5 X0 X1 X3 X4) \wedge ((v15\_functor0 X6 X1 X2) \wedge (m2\_functor0 X6 X1 X2)))) \Rightarrow (m1\_functor2 (k5\_functor3 X0 X1 X2 X3 X4 X5 X6) X0 X2 (k1\_functor3 X0 X1 X2 X3 X6) (k1\_functor3 X0 X1 X2 X4 X6)) \end{aligned} \quad (13)$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.(((\neg v2\_struct\_0 \\
& X0)\wedge((v2\_altcat\_1 X0)\wedge((v12\_altcat\_1 X0)\wedge(l2\_altcat\_1 X0))))\wedge \\
& (((\neg v2\_struct\_0 X1)\wedge((v2\_altcat\_1 X1)\wedge((v12\_altcat\_1 X1)\wedge \\
& l2\_altcat\_1 X1))))\wedge(((\neg v2\_struct\_0 X2)\wedge((v12\_altcat\_1 X2)\wedge \\
& (l2\_altcat\_1 X2))))\wedge(((v15\_functor0 X3 X0 X1)\wedge(m2\_functor0 X3 \\
& X0 X1)\wedge((v15\_functor0 X4 X1 X2)\wedge(m2\_functor0 X4 X1 X2))))\Rightarrow( \\
& (v9\_functor0 (k1\_functor3 X0 X1 X2 X3 X4) X0 X2)\wedge((v15\_functor0 \\
& (k1\_functor3 X0 X1 X2 X3 X4) X0 X2)\wedge(m2\_functor0 (k1\_functor3 X0 \\
& X1 X2 X3 X4) X0 X2)))
\end{aligned} \tag{14}$$

Assume the following.

$$\begin{aligned}
& \forall X0.\forall X1.\forall X2.(((\neg v2\_struct\_0 X0)\wedge((v2\_altcat\_1 \\
& X0)\wedge((v12\_altcat\_1 X0)\wedge(l2\_altcat\_1 X0))))\wedge(((\neg v2\_struct\_0 \\
& X1)\wedge((v2\_altcat\_1 X1)\wedge((v12\_altcat\_1 X1)\wedge(l2\_altcat\_1 X1))))\wedge \\
& (m2\_functor0 X2 X0 X1))\Rightarrow(m1\_functor2 (k1\_functor2 X0 X1 X2) X0 \\
& X1 X2 X2)
\end{aligned} \tag{15}$$

Assume the following.

$$\begin{aligned}
& \forall X0.(((\neg v2\_struct\_0 X0)\wedge((v2\_altcat\_1 X0)\wedge((v12\_altcat\_1 \\
& X0)\wedge(l2\_altcat\_1 X0))))\Rightarrow((v9\_functor0 (k12\_functor0 X0) X0 X0)\wedge \\
& ((v15\_functor0 (k12\_functor0 X0) X0 X0)\wedge(m2\_functor0 (k12\_functor0 \\
& X0) X0 X0)))
\end{aligned} \tag{16}$$

Assume the following.

$$\begin{aligned}
& \forall X0.(((\neg v2\_struct\_0 X0)\wedge((v2\_altcat\_1 X0)\wedge((v12\_altcat\_1 \\
& X0)\wedge(l2\_altcat\_1 X0))))\Rightarrow(\forall X1.(((\neg v2\_struct\_0 X1)\wedge((v2\_altcat\_1 \\
& X1)\wedge((v12\_altcat\_1 X1)\wedge(l2\_altcat\_1 X1))))\Rightarrow(\forall X2.((\neg \\
& v2\_struct\_0 X2)\wedge((v2\_altcat\_1 X2)\wedge((v12\_altcat\_1 X2)\wedge(l2\_altcat\_1 \\
& X2))))\Rightarrow(\forall X3.((v15\_functor0 X3 X0 X1)\wedge(m2\_functor0 X3 X0 \\
& X1))\Rightarrow(\forall X4.((v15\_functor0 X4 X0 X1)\wedge(m2\_functor0 X4 X0 X1))\Rightarrow \\
& (\forall X5.((v15\_functor0 X5 X1 X2)\wedge(m2\_functor0 X5 X1 X2))\Rightarrow( \\
& \forall X6.((v15\_functor0 X6 X1 X2)\wedge(m2\_functor0 X6 X1 X2))\Rightarrow(\forall X7. \\
& (m1\_functor2 X7 X0 X1 X3 X4)\Rightarrow(\forall X8.(m1\_functor2 X8 X1 X2 X5 \\
& X6)\Rightarrow(k7\_functor3 X0 X1 X2 X3 X4 X5 X6 X7 X8 = k3\_functor2 X0 X2 (k1\_functor3 \\
& X0 X1 X2 X3 X5) (k1\_functor3 X0 X1 X2 X4 X5) (k1\_functor3 X0 X1 X2 X4 X6) \\
& (k5\_functor3 X0 X1 X2 X3 X4 X7 X5) (k6\_functor3 X0 X1 X2 X5 X6 X4 X8))))))))))
\end{aligned} \tag{17}$$

**Theorem 1**

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v2\_altcat\_1 X0) \wedge ((v12\_altcat\_1 \\ & X0) \wedge (l2\_altcat\_1 X0)))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge ((v2\_altcat\_1 \\ & X1) \wedge ((v12\_altcat\_1 X1) \wedge (l2\_altcat\_1 X1)))) \Rightarrow (\forall X2.((v15\_functor0 \\ & X2 X0 X1) \wedge (m2\_functor0 X2 X0 X1)) \Rightarrow (\forall X3.((v15\_functor0 X3 \\ & X0 X1) \wedge (m2\_functor0 X3 X0 X1)) \Rightarrow (\forall X4.(m1\_functor2 X4 X0 X1 \\ & X2 X3) \Rightarrow ((r1\_functor2 X0 X1 X2 X3) \Rightarrow (r8\_pboole (u1\_struct\_0 X0) ( \\ & k7\_functor3 X0 X1 X1 X2 X3 (k12\_functor0 X1) (k12\_functor0 X1) X4 \\ & (k4\_functor2 X1 X1 (k12\_functor0 X1)) X4)))))) \end{aligned}$$