

# t18\_grcat\_1 (TM- RzB7mtG3jVP6dhHnYYAhA6k8rw4MV3CNx)

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Let  $v2\_struct\_0 : \iota \Rightarrow o$  be given. Let  $v13\_algstr\_0 : \iota \Rightarrow o$  be given. Let  $v3\_rlvect\_1 : \iota \Rightarrow o$  be given. Let  $v4\_rlvect\_1 : \iota \Rightarrow o$  be given. Let  $l2\_algstr\_0 : \iota \Rightarrow o$  be given. Let  $m1\_grcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  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  $u1\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k1\_zfmisc\_1 : \iota \Rightarrow \iota$  be given. Let  $k2\_zfmisc\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $g1\_grcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k14\_grcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_partfun1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k13\_grcat\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v2\_grcat\_1 : \iota \Rightarrow o$  be given. Let  $l1\_grcat\_1 : \iota \Rightarrow o$  be given. Let  $v1\_grcat\_1 : \iota \Rightarrow o$  be given. Let  $k7\_grcat\_1 : \iota \Rightarrow \iota$  be given. Let  $u1\_grcat\_1 : \iota \Rightarrow \iota$  be given. Let  $k8\_grcat\_1 : \iota \Rightarrow \iota$  be given. Let  $u2\_grcat\_1 : \iota \Rightarrow \iota$  be given. Let  $u3\_grcat\_1 : \iota \Rightarrow \iota$  be given. Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. \forall X2. \forall X3. \forall X4. (((\neg v2\_struct\_0 \\ & X0) \wedge ((v13\_algstr\_0 X0) \wedge ((v3\_rlvect\_1 X0) \wedge ((v4\_rlvect\_1 X0) \wedge \\ & (l2\_algstr\_0 X0)))))) \wedge (((\neg v2\_struct\_0 X1) \wedge ((v13\_algstr\_0 X1) \wedge \\ & ((v3\_rlvect\_1 X1) \wedge ((v4\_rlvect\_1 X1) \wedge (l2\_algstr\_0 X1)))))) \wedge ( \\ & ((\neg v2\_struct\_0 X2) \wedge ((v13\_algstr\_0 X2) \wedge ((v3\_rlvect\_1 X2) \wedge ( \\ & v4\_rlvect\_1 X2) \wedge (l2\_algstr\_0 X2)))))) \wedge ((m1\_grcat\_1 X3 X1 X2) \wedge \\ & (m1\_grcat\_1 X4 X0 X1)))) \Rightarrow (k14\_grcat\_1 X0 X1 X2 X3 X4 = k13\_grcat\_1 \\ & X3 X4) \end{aligned} \tag{1}$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. \forall X2. (((\neg v2\_struct\_0 X0) \wedge ((v13\_algstr\_0 \\ & X0) \wedge ((v3\_rlvect\_1 X0) \wedge ((v4\_rlvect\_1 X0) \wedge (l2\_algstr\_0 X0)))))) \wedge \\ & (((\neg v2\_struct\_0 X1) \wedge ((v13\_algstr\_0 X1) \wedge ((v3\_rlvect\_1 X1) \wedge ( \\ & v4\_rlvect\_1 X1) \wedge (l2\_algstr\_0 X1)))))) \wedge ((v1\_funct\_1 X2) \wedge ((v1\_funct\_2 \\ & X2 (u1\_struct\_0 X0) (u1\_struct\_0 X1)) \wedge (m1\_subset\_1 X2 (k1\_zfmisc\_1 \\ & (k2\_zfmisc\_1 (u1\_struct\_0 X0) (u1\_struct\_0 X1)))))) \Rightarrow (\forall X3. \\ & \forall X4. \forall X5. (g1\_grcat\_1 X0 X1 X2 = g1\_grcat\_1 X3 X4 X5) \Rightarrow \\ & ((X0 = X3) \wedge ((X1 = X4) \wedge (X2 = X5)))) \end{aligned} \tag{2}$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. (((\neg v2\_struct\_0 X0) \wedge ((v13\_algstr\_0 X0) \wedge \\ & ((v3\_rlvect\_1 X0) \wedge ((v4\_rlvect\_1 X0) \wedge (l2\_algstr\_0 X0)))))) \wedge ( \\ & (\neg v2\_struct\_0 X1) \wedge ((v13\_algstr\_0 X1) \wedge ((v3\_rlvect\_1 X1) \wedge ((v4\_rlvect\_1 \\ & X1) \wedge (l2\_algstr\_0 X1)))))) \Rightarrow (\forall X2. (m1\_grcat\_1 X2 X0 X1) \Rightarrow \\ & ((v2\_grcat\_1 X2) \wedge (l1\_grcat\_1 X2))) \end{aligned} \quad (3)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. (((v2\_grcat\_1 X0) \wedge (l1\_grcat\_1 X0)) \wedge (( \\ & v2\_grcat\_1 X1) \wedge (l1\_grcat\_1 X1))) \Rightarrow ((v1\_grcat\_1 (k13\_grcat\_1 \\ & X0 X1)) \wedge ((v2\_grcat\_1 (k13\_grcat\_1 X0 X1)) \wedge (l1\_grcat\_1 (k13\_grcat\_1 \\ & X0 X1)))) \end{aligned} \quad (4)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. \forall X2. (((\neg v2\_struct\_0 X0) \wedge ((v13\_algstr\_0 \\ & X0) \wedge ((v3\_rlvect\_1 X0) \wedge ((v4\_rlvect\_1 X0) \wedge (l2\_algstr\_0 X0)))))) \wedge \\ & (((\neg v2\_struct\_0 X1) \wedge ((v13\_algstr\_0 X1) \wedge ((v3\_rlvect\_1 X1) \wedge ( \\ & v4\_rlvect\_1 X1) \wedge (l2\_algstr\_0 X1)))))) \wedge ((v1\_funct\_1 X2) \wedge ((v1\_funct\_2 \\ & X2 (u1\_struct\_0 X0) (u1\_struct\_0 X1)) \wedge (m1\_subset\_1 X2 (k1\_zfmisc\_1 \\ & (k2\_zfmisc\_1 (u1\_struct\_0 X0) (u1\_struct\_0 X1))))))))) \Rightarrow ((v1\_grcat\_1 \\ & (g1\_grcat\_1 X0 X1 X2)) \wedge (l1\_grcat\_1 (g1\_grcat\_1 X0 X1 X2))) \end{aligned} \quad (5)$$

Assume the following.

$$\forall X0. (l1\_grcat\_1 X0) \Rightarrow (k7\_grcat\_1 X0 = u1\_grcat\_1 X0) \quad (6)$$

Assume the following.

$$\begin{aligned}
& \forall X0.((v2\_grcat\_1 X0) \wedge (l1\_grcat\_1 X0)) \Rightarrow (\forall X1.(( \\
& v2\_grcat\_1 X1) \wedge (l1\_grcat\_1 X1)) \Rightarrow ((k7\_grcat\_1 X0 = k8\_grcat\_1 \\
& X1) \Rightarrow (\forall X2.((v1\_grcat\_1 X2) \wedge ((v2\_grcat\_1 X2) \wedge (l1\_grcat\_1 \\
& X2))) \Rightarrow ((X2 = k13\_grcat\_1 X0 X1) \Leftrightarrow (\forall X3.((\neg v2\_struct\_0 X3) \wedge \\
& ((v13\_algstr\_0 X3) \wedge ((v3\_rlvect\_1 X3) \wedge ((v4\_rlvect\_1 X3) \wedge (l2\_algstr\_0 \\
& X3)))))) \Rightarrow (\forall X4.((\neg v2\_struct\_0 X4) \wedge ((v13\_algstr\_0 X4) \wedge \\
& ((v3\_rlvect\_1 X4) \wedge ((v4\_rlvect\_1 X4) \wedge (l2\_algstr\_0 X4)))))) \Rightarrow ( \\
& \forall X5.((\neg v2\_struct\_0 X5) \wedge ((v13\_algstr\_0 X5) \wedge ((v3\_rlvect\_1 \\
& X5) \wedge ((v4\_rlvect\_1 X5) \wedge (l2\_algstr\_0 X5)))))) \Rightarrow (\forall X6.((v1\_funct\_1 \\
& X6) \wedge ((v1\_funct\_2 X6 (u1\_struct\_0 X4) (u1\_struct\_0 X5)) \wedge (m1\_subset\_1 \\
& X6 (k1\_zfmisc\_1 (k2\_zfmisc\_1 (u1\_struct\_0 X4) (u1\_struct\_0 X5)))))) \Rightarrow \\
& (\forall X7.((v1\_funct\_1 X7) \wedge ((v1\_funct\_2 X7 (u1\_struct\_0 X3) \\
& (u1\_struct\_0 X4)) \wedge (m1\_subset\_1 X7 (k1\_zfmisc\_1 (k2\_zfmisc\_1 \\
& (u1\_struct\_0 X3) (u1\_struct\_0 X4)))))) \Rightarrow (((g1\_grcat\_1 (u1\_grcat\_1 \\
& X0) (u2\_grcat\_1 X0) (u3\_grcat\_1 X0) = g1\_grcat\_1 X4 X5 X6) \wedge (g1\_grcat\_1 \\
& (u1\_grcat\_1 X1) (u2\_grcat\_1 X1) (u3\_grcat\_1 X1) = g1\_grcat\_1 X3 \\
& X4 X7)) \Rightarrow (X2 = g1\_grcat\_1 X3 X5 (k1\_partfun1 (u1\_struct\_0 X3) (u1\_struct\_0 \\
& X4) (u1\_struct\_0 X4) (u1\_struct\_0 X5) X7 X6)))))))))
\end{aligned} \tag{7}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v13\_algstr\_0 X0) \wedge ((v3\_rlvect\_1 \\
& X0) \wedge ((v4\_rlvect\_1 X0) \wedge (l2\_algstr\_0 X0)))))) \Rightarrow (\forall X1.((\neg \\
& v2\_struct\_0 X1) \wedge ((v13\_algstr\_0 X1) \wedge ((v3\_rlvect\_1 X1) \wedge ((v4\_rlvect\_1 \\
& X1) \wedge (l2\_algstr\_0 X1)))))) \Rightarrow (\forall X2.((v2\_grcat\_1 X2) \wedge (l1\_grcat\_1 \\
& X2)) \Rightarrow ((m1\_grcat\_1 X2 X0 X1) \Leftrightarrow ((k7\_grcat\_1 X2 = X0) \wedge (k8\_grcat\_1 \\
& X2 = X1))))))
\end{aligned} \tag{8}$$

Assume the following.

$$\forall X0.(l1\_grcat\_1 X0) \Rightarrow (k8\_grcat\_1 X0 = u2\_grcat\_1 X0) \tag{9}$$

Assume the following.

$$\begin{aligned}
& \forall X0.(l1\_grcat\_1 X0) \Rightarrow ((v1\_grcat\_1 X0) \Rightarrow (X0 = g1\_grcat\_1 \\
& (u1\_grcat\_1 X0) (u2\_grcat\_1 X0) (u3\_grcat\_1 X0)))
\end{aligned} \tag{10}$$

**Theorem 1**

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v13\_algstr\_0 X0) \wedge ((v3\_rlvect\_1 \\
& \quad X0) \wedge ((v4\_rlvect\_1 X0) \wedge (l2\_algstr\_0 X0)))))) \Rightarrow (\forall X1.((\neg \\
& v2\_struct\_0 X1) \wedge ((v13\_algstr\_0 X1) \wedge ((v3\_rlvect\_1 X1) \wedge ((v4\_rlvect\_1 \\
& \quad X1) \wedge (l2\_algstr\_0 X1)))))) \Rightarrow (\forall X2.((\neg v2\_struct\_0 X2) \wedge (( \\
& v13\_algstr\_0 X2) \wedge ((v3\_rlvect\_1 X2) \wedge ((v4\_rlvect\_1 X2) \wedge (l2\_algstr\_0 \\
& \quad X2)))))) \Rightarrow (\forall X3.(m1\_gcat\_1 X3 X1 X2) \Rightarrow (\forall X4.(m1\_gcat\_1 \\
& X4 X0 X1) \Rightarrow (\forall X5.((v1\_funct\_1 X5) \wedge ((v1\_funct\_2 X5 (u1\_struct\_0 \\
& X1) (u1\_struct\_0 X2)) \wedge (m1\_subset\_1 X5 (k1\_zfmisc\_1 (k2\_zfmisc\_1 \\
& \quad (u1\_struct\_0 X1) (u1\_struct\_0 X2)))))) \Rightarrow (\forall X6.((v1\_funct\_1 \\
& X6) \wedge ((v1\_funct\_2 X6 (u1\_struct\_0 X0) (u1\_struct\_0 X1)) \wedge (m1\_subset\_1 \\
& \quad X6 (k1\_zfmisc\_1 (k2\_zfmisc\_1 (u1\_struct\_0 X0) (u1\_struct\_0 X1)))))) \Rightarrow \\
& ((X3 = g1\_gcat\_1 X1 X2 X5) \wedge (X4 = g1\_gcat\_1 X0 X1 X6)) \Rightarrow (k14\_gcat\_1 \\
& X0 X1 X2 X3 X4 = g1\_gcat\_1 X0 X2 (k1\_partfun1 (u1\_struct\_0 X0) (u1\_struct\_0 \\
& \quad X1) (u1\_struct\_0 X1) (u1\_struct\_0 X2) X6 X5))))))
\end{aligned}$$