

t20\_ringcat1  
(TMVTAtsyUxs9ZcbZtUzbSzsH7Qczy2DS7jg)

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Let  $v1\_xboole\_0 : \iota \Rightarrow o$  be given. Let  $v4\_ringcat1 : \iota \Rightarrow o$  be given. Let  $m3\_ringcat1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k10\_ringcat1 : \iota \Rightarrow \iota$  be given. Let  $k11\_ringcat1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k12\_ringcat1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k6\_ringcat1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v2\_struct\_0 : \iota \Rightarrow o$  be given. Let  $v13\_algstr\_0 : \iota \Rightarrow o$  be given. Let  $v2\_rlvect\_1 : \iota \Rightarrow o$  be given. Let  $v3\_rlvect\_1 : \iota \Rightarrow o$  be given. Let  $v4\_rlvect\_1 : \iota \Rightarrow o$  be given. Let  $v3\_group\_1 : \iota \Rightarrow o$  be given. Let  $v4\_vectsp\_1 : \iota \Rightarrow o$  be given. Let  $v5\_vectsp\_1 : \iota \Rightarrow o$  be given. Let  $l6\_algstr\_0 : \iota \Rightarrow o$  be given. Let  $r1\_ringcat1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $m2\_ringcat1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $m1\_ringcat1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v2\_ringcat1 : \iota \Rightarrow o$  be given. Let  $k7\_ringcat1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v5\_ringcat1 : \iota \Rightarrow o$  be given. Assume the following.

$$\begin{aligned}
& \forall X0. ((\neg v2\_struct\_0 X0) \wedge ((v13\_algstr\_0 X0) \wedge ((v2\_rlvect\_1 X0) \wedge ((v3\_rlvect\_1 X0) \wedge ((v4\_rlvect\_1 X0) \wedge ((v3\_group\_1 X0) \wedge (v4\_vectsp\_1 X0) \wedge ((v5\_vectsp\_1 X0) \wedge (l6\_algstr\_0 X0)))))))))) \Rightarrow \\
& (\forall X1. ((\neg v2\_struct\_0 X1) \wedge ((v13\_algstr\_0 X1) \wedge ((v2\_rlvect\_1 X1) \wedge ((v3\_rlvect\_1 X1) \wedge ((v4\_rlvect\_1 X1) \wedge ((v3\_group\_1 X1) \wedge (v4\_vectsp\_1 X1) \wedge ((v5\_vectsp\_1 X1) \wedge (l6\_algstr\_0 X1)))))))))) \Rightarrow \\
& (\forall X2. ((\neg v2\_struct\_0 X2) \wedge ((v13\_algstr\_0 X2) \wedge ((v2\_rlvect\_1 X2) \wedge ((v3\_rlvect\_1 X2) \wedge ((v4\_rlvect\_1 X2) \wedge ((v3\_group\_1 X2) \wedge (v4\_vectsp\_1 X2) \wedge ((v5\_vectsp\_1 X2) \wedge (l6\_algstr\_0 X2)))))))))) \Rightarrow \\
& (((r1\_ringcat1 X0 X1) \wedge (r1\_ringcat1 X1 X2)) \Rightarrow (r1\_ringcat1 X0 X2))
\end{aligned} \tag{1}$$

Assume the following.

$$\begin{aligned}
& \forall X0. ((\neg v1\_xboole\_0 X0) \wedge (v4\_ringcat1 X0)) \Rightarrow (\forall X1. \\
& (m3\_ringcat1 X1 (k10\_ringcat1 X0)) \Rightarrow (\forall X2. (m3\_ringcat1 X2 (k10\_ringcat1 X0)) \Rightarrow (\neg (k11\_ringcat1 X0 X1 = k12\_ringcat1 X0 X2) \wedge \\
& (\forall X3. (m2\_ringcat1 X3 X0) \Rightarrow (\forall X4. (m2\_ringcat1 X4 X0) \Rightarrow \\
& (\forall X5. (m2\_ringcat1 X5 X0) \Rightarrow (\neg (r1\_ringcat1 X3 X4) \wedge ((r1\_ringcat1 X4 X5) \wedge ((m1\_ringcat1 X1 X4 X5) \wedge (m1\_ringcat1 X2 X3 X4))))))))))
\end{aligned} \tag{2}$$

Assume the following.

$$\begin{aligned} & \forall X0.((\neg v1\_xboole\_0 X0) \wedge (v4\_ringcat1 X0)) \Rightarrow (\forall X1. \\ & (m2\_ringcat1 X1 X0) \Rightarrow ((\neg v2\_struct\_0 X1) \wedge ((v13\_algstr\_0 X1) \wedge \\ & (v2\_rlvect\_1 X1) \wedge ((v3\_rlvect\_1 X1) \wedge ((v4\_rlvect\_1 X1) \wedge ((v3\_group\_1 \\ & X1) \wedge ((v4\_vectsp\_1 X1) \wedge ((v5\_vectsp\_1 X1) \wedge (l6\_algstr\_0 X1)))))))))) \end{aligned} \quad (3)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. \forall X2. \forall X3. \forall X4. (((\neg v2\_struct\_0 \\ & X0) \wedge ((v13\_algstr\_0 X0) \wedge ((v2\_rlvect\_1 X0) \wedge ((v3\_rlvect\_1 X0) \wedge \\ & ((v4\_rlvect\_1 X0) \wedge ((v3\_group\_1 X0) \wedge ((v4\_vectsp\_1 X0) \wedge ((v5\_vectsp\_1 \\ & X0) \wedge (l6\_algstr\_0 X0)))))))))) \wedge (((\neg v2\_struct\_0 X1) \wedge ((v13\_algstr\_0 \\ & X1) \wedge ((v2\_rlvect\_1 X1) \wedge ((v3\_rlvect\_1 X1) \wedge ((v4\_rlvect\_1 X1) \wedge \\ & ((v3\_group\_1 X1) \wedge ((v4\_vectsp\_1 X1) \wedge ((v5\_vectsp\_1 X1) \wedge (l6\_algstr\_0 \\ & X1)))))))))) \wedge (((\neg v2\_struct\_0 X2) \wedge ((v13\_algstr\_0 X2) \wedge ((v2\_rlvect\_1 \\ & X2) \wedge ((v3\_rlvect\_1 X2) \wedge ((v4\_rlvect\_1 X2) \wedge ((v3\_group\_1 X2) \wedge \\ & (v4\_vectsp\_1 X2) \wedge ((v5\_vectsp\_1 X2) \wedge (l6\_algstr\_0 X2)))))))))) \wedge \\ & ((m1\_ringcat1 X3 X1 X2) \wedge (m1\_ringcat1 X4 X0 X1))) \Rightarrow ((v2\_ringcat1 \\ & (k7\_ringcat1 X0 X1 X2 X3 X4) \wedge (m1\_ringcat1 (k7\_ringcat1 X0 X1 X2 \\ & X3 X4) X0 X2)) \end{aligned} \quad (4)$$

Assume the following.

$$\forall X0.((\neg v1\_xboole\_0 X0) \wedge (v4\_ringcat1 X0)) \Rightarrow ((\neg v1\_xboole\_0 (k10\_ringcat1 X0)) \wedge (v5\_ringcat1 (k10\_ringcat1 X0))) \quad (5)$$

Assume the following.

$$\begin{aligned} & \forall X0.((\neg v1\_xboole\_0 X0) \wedge (v4\_ringcat1 X0)) \Rightarrow (\forall X1. \\ & ((\neg v1\_xboole\_0 X1) \wedge (v5\_ringcat1 X1)) \Rightarrow ((X1 = k10\_ringcat1 X0) \Leftrightarrow \\ & (\forall X2.(X2 \in X1) \Leftrightarrow (\exists X3.(m2\_ringcat1 X3 X0) \wedge (\exists X4. \\ & (m2\_ringcat1 X4 X0) \wedge ((r1\_ringcat1 X3 X4) \wedge (m1\_ringcat1 X2 X3 X4)))))) \end{aligned} \quad (6)$$

Assume the following.

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v13\_algstr\_0 X0) \wedge ((v2\_rlvect\_1 \\ & X0) \wedge ((v3\_rlvect\_1 X0) \wedge ((v4\_rlvect\_1 X0) \wedge ((v3\_group\_1 X0) \wedge \\ & (v4\_vectsp\_1 X0) \wedge ((v5\_vectsp\_1 X0) \wedge (l6\_algstr\_0 X0)))))))))) \Rightarrow \\ & (\forall X1.((\neg v2\_struct\_0 X1) \wedge ((v13\_algstr\_0 X1) \wedge ((v2\_rlvect\_1 \\ & X1) \wedge ((v3\_rlvect\_1 X1) \wedge ((v4\_rlvect\_1 X1) \wedge ((v3\_group\_1 X1) \wedge \\ & (v4\_vectsp\_1 X1) \wedge ((v5\_vectsp\_1 X1) \wedge (l6\_algstr\_0 X1)))))))))) \Rightarrow \\ & (\forall X2.((\neg v2\_struct\_0 X2) \wedge ((v13\_algstr\_0 X2) \wedge ((v2\_rlvect\_1 \\ & X2) \wedge ((v3\_rlvect\_1 X2) \wedge ((v4\_rlvect\_1 X2) \wedge ((v3\_group\_1 X2) \wedge \\ & (v4\_vectsp\_1 X2) \wedge ((v5\_vectsp\_1 X2) \wedge (l6\_algstr\_0 X2)))))))))) \Rightarrow \\ & (\forall X3.(m1\_ringcat1 X3 X1 X2) \Rightarrow (\forall X4.(m1\_ringcat1 X4 \\ & X0 X1) \Rightarrow (((r1\_ringcat1 X0 X1) \wedge (r1\_ringcat1 X1 X2)) \Rightarrow (k7\_ringcat1 \\ & X0 X1 X2 X3 X4 = k6\_ringcat1 X3 X4)))))) \end{aligned} \quad (7)$$

**Theorem 1**

$$\begin{aligned} & \forall X0.((\neg v1\_xboole\_0 X0) \wedge (v4\_ringcat1 X0)) \Rightarrow (\forall X1. \\ & (m3\_ringcat1 X1 (k10\_ringcat1 X0)) \Rightarrow (\forall X2.(m3\_ringcat1 \\ & X2 (k10\_ringcat1 X0)) \Rightarrow ((k11\_ringcat1 X0 X1 = k12\_ringcat1 X0 X2) \Rightarrow \\ & (k6\_ringcat1 X1 X2 \in k10\_ringcat1 X0)))) \end{aligned}$$