

# t9\_semi\_af1 (TMQXLZcFoVRMBUD- BKkaSvpyAzawtJ4xzNR9)

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Let  $v2\_struct\_0 : \iota \Rightarrow o$  be given. Let  $v1\_semi\_af1 : \iota \Rightarrow o$  be given. Let  $l1\_analoaf : \iota \Rightarrow o$  be given. Let  $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $u1\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $r2\_analoaf : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Assume the following.

$$\begin{aligned} & \forall X0. ((\neg v2\_struct\_0 X0) \wedge ((v1\_semi\_af1 X0) \wedge (l1\_analoaf \\ & X0))) \Rightarrow (\forall X1. (m1\_subset\_1 X1 (u1\_struct\_0 X0)) \Rightarrow (\forall X2. \\ & (m1\_subset\_1 X2 (u1\_struct\_0 X0)) \Rightarrow (\forall X3. (m1\_subset\_1 X3 \\ & (u1\_struct\_0 X0)) \Rightarrow (r2\_analoaf X0 X1 X1 X2 X3)))) \end{aligned} \quad (1)$$

Assume the following.

$$\begin{aligned} & \forall X0. ((\neg v2\_struct\_0 X0) \wedge ((v1\_semi\_af1 X0) \wedge (l1\_analoaf \\ & X0))) \Rightarrow (\forall X1. (m1\_subset\_1 X1 (u1\_struct\_0 X0)) \Rightarrow (\forall X2. \\ & (m1\_subset\_1 X2 (u1\_struct\_0 X0)) \Rightarrow (r2\_analoaf X0 X1 X2 X1 X2))) \end{aligned} \quad (2)$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge (l1\_analoaf X0)) \Rightarrow ((v1\_semi\_af1 \\
& X0) \Leftrightarrow ((\forall X1.(m1\_subset\_1 X1 (u1\_struct\_0 X0)) \Rightarrow (\forall X2. \\
& (m1\_subset\_1 X2 (u1\_struct\_0 X0)) \Rightarrow (r2\_analoaf X0 X1 X2 X2 X1)))) \wedge \\
& ((\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 \\
& (u1\_struct\_0 X0)) \Rightarrow (r2\_analoaf X0 X1 X2 X3 X3)))) \wedge ((\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 (u1\_struct\_0 X0)) \Rightarrow \\
& (\forall X4.(m1\_subset\_1 X4 (u1\_struct\_0 X0)) \Rightarrow (\forall X5.(m1\_subset\_1 \\
& X5 (u1\_struct\_0 X0)) \Rightarrow (\forall X6.(m1\_subset\_1 X6 (u1\_struct\_0 \\
& X0)) \Rightarrow (((r2\_analoaf X0 X1 X2 X3 X4) \wedge (r2\_analoaf X0 X1 X2 X5 X6)) \Rightarrow ( \\
& (X1 = X2) \vee (r2\_analoaf X0 X3 X4 X5 X6)))))))))) \wedge ((\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 (u1\_struct\_0 X0)) \Rightarrow ((r2\_analoaf \\
& X0 X1 X2 X1 X3) \Rightarrow (r2\_analoaf X0 X2 X1 X2 X3)))))) \wedge ((\neg \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 (u1\_struct\_0 X0)) \Rightarrow (r2\_analoaf \\
& X0 X1 X2 X1 X3)))))) \wedge ((\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 (u1\_struct\_0 X0)) \Rightarrow (\exists X4.(m1\_subset\_1 X4 (u1\_struct\_0 \\
& X0)) \wedge ((r2\_analoaf X0 X1 X2 X3 X4) \wedge (r2\_analoaf X0 X1 X3 X2 X4)))))) \wedge \\
& ((\forall X1.(m1\_subset\_1 X1 (u1\_struct\_0 X0)) \Rightarrow (\forall X2.( \\
& m1\_subset\_1 X2 (u1\_struct\_0 X0)) \Rightarrow (\exists X3.(m1\_subset\_1 X3 \\
& (u1\_struct\_0 X0)) \wedge (\forall X4.(m1\_subset\_1 X4 (u1\_struct\_0 X0)) \Rightarrow \\
& (\forall X5.(m1\_subset\_1 X5 (u1\_struct\_0 X0)) \Rightarrow ((r2\_analoaf X0 \\
& X1 X2 X1 X3) \wedge (\neg \forall X6.(m1\_subset\_1 X6 (u1\_struct\_0 X0)) \Rightarrow (( \\
& r2\_analoaf X0 X1 X3 X1 X4) \wedge (\neg (r2\_analoaf X0 X1 X5 X1 X6) \wedge (r2\_analoaf \\
& X0 X3 X5 X4 X6)))))))))) \wedge ((\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 (u1\_struct\_0 X0)) \Rightarrow (\forall X4.(m1\_subset\_1 X4 \\
& (u1\_struct\_0 X0)) \Rightarrow (\forall X5.(m1\_subset\_1 X5 (u1\_struct\_0 X0)) \Rightarrow \\
& (\forall X6.(m1\_subset\_1 X6 (u1\_struct\_0 X0)) \Rightarrow (\forall X7.(m1\_subset\_1 \\
& X7 (u1\_struct\_0 X0)) \Rightarrow (((r2\_analoaf X0 X1 X2 X1 X3) \wedge ((r2\_analoaf \\
& X0 X1 X4 X1 X5) \wedge ((r2\_analoaf X0 X1 X6 X1 X7) \wedge ((r2\_analoaf X0 X2 X4 X3 \\
& X5) \wedge (r2\_analoaf X0 X2 X6 X3 X7)))))) \Rightarrow ((r2\_analoaf X0 X1 X2 X1 X4) \vee \\
& ((r2\_analoaf X0 X1 X2 X1 X6) \vee (r2\_analoaf X0 X4 X6 X5 X7)))))) \wedge \\
& ((\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 \\
& (u1\_struct\_0 X0)) \Rightarrow (\forall X4.(m1\_subset\_1 X4 (u1\_struct\_0 X0)) \Rightarrow \\
& (\forall X5.(m1\_subset\_1 X5 (u1\_struct\_0 X0)) \Rightarrow (\forall X6.(m1\_subset\_1 \\
& X6 (u1\_struct\_0 X0)) \Rightarrow (((r2\_analoaf X0 X1 X2 X3 X4) \wedge ((r2\_analoaf \\
& X0 X1 X2 X5 X6) \wedge ((r2\_analoaf X0 X1 X3 X2 X4) \wedge (r2\_analoaf X0 X1 X5 X2 \\
& X6)))) \Rightarrow ((r2\_analoaf X0 X1 X2 X1 X3) \vee ((r2\_analoaf X0 X1 X2 X1 X5) \vee \\
& (r2\_analoaf X0 X3 X5 X4 X6)))))) \wedge ((\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 (u1\_struct\_0 X0)) \Rightarrow (\forall X4. \\
& (m1\_subset\_1 X4 (u1\_struct\_0 X0)) \Rightarrow (\forall X5.(m1\_subset\_1 X5 \\
& (u1\_struct\_0 X0)) \Rightarrow (\forall X6.(m1\_subset\_1 X6 (u1\_struct\_0 X0)) \Rightarrow \\
& ((r2\_analoaf X0 X1 X2 X1 X3) \wedge ((r2\_analoaf X0 X4 X5 X4 X6) \wedge ((r2\_analoaf \\
& X0 X1 X5 X2 X4) \wedge (r2\_analoaf X0 X2 X6 X3 X5)))))) \Rightarrow (r2\_analoaf X0 X3 X4 \\
& X1 X6)))))) \wedge ((\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 (u1\_struct\_0 X0)) \Rightarrow (\forall X4.(m1\_subset\_1 X4 (u1\_struct\_0 \\
& X0)) \Rightarrow (\neg (\neg r2\_analoaf X0 X1 X2 X1 X3) \wedge ((r2\_analoaf X0 X1 X2 X3 X4) \wedge \\
& ((r2\_analoaf X0 X1 X3 X2 X4) \wedge (r2\_analoaf X0 X1 X4 X2 X3)))))))))) \wedge \\
\end{aligned}$$

(3)

**Theorem 1**

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((v1\_semi\_af1 X0) \wedge (l1\_analoaf \\ & X0))) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (u1\_struct\_0 X0)) \Rightarrow (\forall X2. \\ & (m1\_subset\_1 X2 (u1\_struct\_0 X0)) \Rightarrow (\forall X3.(m1\_subset\_1 X3 \\ & (u1\_struct\_0 X0)) \Rightarrow ((\neg r2\_analoaf X0 X1 X2 X1 X3) \Rightarrow ((X1 \neq X2) \wedge ((X2 \neq \\ & X3) \wedge (X3 \neq X1))))))) \end{aligned}$$