

## t21\_msafree3

(TMcY49p6VP7ki5Kd5m8AC2e1ztLyMEqDKtS)

October 27, 2020

Let  $v11\_struct\_0 : \iota \Rightarrow o$  be given. Let  $v1\_instalg1 : \iota \Rightarrow o$  be given. Let  $l1\_msualg\_1 : \iota \Rightarrow o$  be given. Let  $v1\_relat\_1 : \iota \Rightarrow o$  be given. Let  $v2\_relat\_1 : \iota \Rightarrow o$  be given. Let  $v4\_relat\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $u1\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $v1\_funct\_1 : \iota \Rightarrow o$  be given. Let  $v1\_partfun1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v3\_msualg\_2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k5\_msafree3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k11\_msafree : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $m3\_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $u3\_msualg\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $u4\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $m1\_msaterm : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k2\_msaterm : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $r1\_tarski : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k2\_relset\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k5\_trees\_3 : \iota \Rightarrow \iota$  be given. Let  $k5\_msafree : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k3\_card\_3 : \iota \Rightarrow \iota$  be given. Let  $k6\_msaterm : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_funct\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k2\_msualg\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Assume the following.

$$\begin{aligned}
 & \forall X0.((\neg v11\_struct\_0 X0) \wedge ((v1\_instalg1 X0) \wedge (l1\_msualg\_1 \\
 & X0))) \Rightarrow (\forall X1.((v1\_relat\_1 X1) \wedge ((v2\_relat\_1 X1) \wedge ((v4\_relat\_1 \\
 & X1 (u1\_struct\_0 X0)) \wedge ((v1\_funct\_1 X1) \wedge (v1\_partfun1 X1 (u1\_struct\_0 \\
 & X0)))))) \Rightarrow (\forall X2.(m3\_pboole X2 (u1\_struct\_0 X0) (u3\_msualg\_1 \\
 & X0 (k11\_msafree X0 X1))) \Rightarrow ((v3\_msualg\_2 X2 X0 (k11\_msafree X0 X1)) \Leftrightarrow \\
 & (\forall X3.(m1\_subset\_1 X3 (u4\_struct\_0 X0)) \Rightarrow (\forall X4.(m1\_msaterm \\
 & X4 X0 X1 (k2\_msaterm X0 X1 X3)) \Rightarrow ((r1\_tarski (k2\_relset\_1 (k5\_trees\_3 \\
 & (u1\_struct\_0 (k5\_msafree X0 X1))) X4) (k3\_card\_3 X2)) \Rightarrow (k6\_msaterm \\
 & X0 X1 (k2\_msaterm X0 X1 X3) X4 \in k1\_funct\_1 X2 (k2\_msualg\_1 X0 X3)))))))))) \\
 & (1)
 \end{aligned}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v11\_struct\_0 X0) \wedge ((v1\_instal g1 X0) \wedge (l1\_msual g\_1 \\
& X0))) \Rightarrow (\forall X1.((v1\_relat\_1 X1) \wedge ((v2\_relat\_1 X1) \wedge ((v4\_relat\_1 \\
& X1 (u1\_struct\_0 X0)) \wedge ((v1\_funct\_1 X1) \wedge (v1\_partfun1 X1 (u1\_struct\_0 \\
& X0)))))) \Rightarrow (\forall X2.((v1\_relat\_1 X2) \wedge ((v4\_relat\_1 X2 (u1\_struct\_0 \\
& X0)) \wedge ((v1\_funct\_1 X2) \wedge (v1\_partfun1 X2 (u1\_struct\_0 X0)))))) \Rightarrow \\
& (\forall X3.(m1\_subset\_1 X3 (u4\_struct\_0 X0)) \Rightarrow (\forall X4.(m1\_msaterm \\
& X4 X0 X1 (k2\_msaterm X0 X1 X3)) \Rightarrow ((k6\_msaterm X0 X1 (k2\_msaterm X0 \\
& X1 X3) X4 \in k1\_funct\_1 (k5\_msafree3 X0 X1 X2) (k2\_msual g\_1 X0 X3)) \Leftrightarrow \\
& (r1\_tarski (k2\_relset\_1 (k5\_trees\_3 (u1\_struct\_0 (k5\_msafree \\
& X0 X1))) X4) (k3\_card\_3 (k5\_msafree3 X0 X1 X2)))))))))
\end{aligned} \tag{2}$$

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. \forall X2. (((\neg v11\_struct\_0 X0) \wedge ((v1\_instal g1 \\
& X0) \wedge (l1\_msual g\_1 X0))) \wedge (((v1\_relat\_1 X1) \wedge ((v2\_relat\_1 X1) \wedge \\
& ((v4\_relat\_1 X1 (u1\_struct\_0 X0)) \wedge ((v1\_funct\_1 X1) \wedge (v1\_partfun1 \\
& X1 (u1\_struct\_0 X0)))))) \wedge ((v1\_relat\_1 X2) \wedge ((v4\_relat\_1 X2 (u1\_struct\_0 \\
& X0)) \wedge ((v1\_funct\_1 X2) \wedge (v1\_partfun1 X2 (u1\_struct\_0 X0)))))) \Rightarrow \\
& (m3\_pboole (k5\_msafree3 X0 X1 X2) (u1\_struct\_0 X0) (u3\_msual g\_1 \\
& X0 (k11\_msafree X0 X1)))
\end{aligned} \tag{3}$$

**Theorem 1**

$$\begin{aligned}
& \forall X0.((\neg v11\_struct\_0 X0) \wedge ((v1\_instal g1 X0) \wedge (l1\_msual g\_1 \\
& X0))) \Rightarrow (\forall X1.((v1\_relat\_1 X1) \wedge ((v2\_relat\_1 X1) \wedge ((v4\_relat\_1 \\
& X1 (u1\_struct\_0 X0)) \wedge ((v1\_funct\_1 X1) \wedge (v1\_partfun1 X1 (u1\_struct\_0 \\
& X0)))))) \Rightarrow (\forall X2.((v1\_relat\_1 X2) \wedge ((v4\_relat\_1 X2 (u1\_struct\_0 \\
& X0)) \wedge ((v1\_funct\_1 X2) \wedge (v1\_partfun1 X2 (u1\_struct\_0 X0)))))) \Rightarrow \\
& (v3\_msual g\_2 (k5\_msafree3 X0 X1 X2) X0 (k11\_msafree X0 X1)))
\end{aligned}$$