

t16\_substut2  
(TMcfi5NoJZ8RS6VXRpbUsoAhesoSSAXZ3rG)

October 27, 2020

Let  $m1\_qc\_lang1 : \iota \Rightarrow o$  be given. Let  $m2\_subset\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k9\_qc\_lang1 : \iota \Rightarrow \iota$  be given. Let  $k3\_cqc\_lang : \iota \Rightarrow \iota$  be given. Let  $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k1\_subst1 : \iota \Rightarrow \iota$  be given. Let  $k2\_subst2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k6\_cqc\_lang : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k5\_sublemma : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v1\_xboole\_0 : \iota \Rightarrow o$  be given. Let  $k1\_zfmisc\_1 : \iota \Rightarrow \iota$  be given. Let  $k13\_qc\_lang1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k38\_subst1 : \iota \Rightarrow \iota$  be given. Let  $k20\_subst1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k4\_tarski : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_domain\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k16\_subst1 : \iota \Rightarrow \iota$  be given. Let  $k19\_subst1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k2\_xtuple\_0 : \iota \Rightarrow \iota$  be given. Let  $k18\_subst1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_xtuple\_0 : \iota \Rightarrow \iota$  be given. Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. ((\neg v1\_xboole\_0 X0) \wedge ((\neg v1\_xboole\_0 X1) \wedge \\ & (m1\_subset\_1 X1 (k1\_zfmisc\_1 X0)))) \Rightarrow (\forall X2. (m2\_subset\_1 \\ & X2 X0 X1) \Leftrightarrow (m1\_subset\_1 X2 X1)) \end{aligned} \quad (1)$$

Assume the following.

$$\forall X0. \forall X1. ((m1\_qc\_lang1 X0) \wedge (m1\_subset\_1 X1 (k3\_cqc\_lang X0))) \Rightarrow (k6\_cqc\_lang X0 X1 = k13\_qc\_lang1 X0 X1) \quad (2)$$

Assume the following.

$$\forall X0. \forall X1. ((m1\_qc\_lang1 X0) \wedge (m1\_subset\_1 X1 (k38\_subst1 X0))) \Rightarrow (k5\_sublemma X0 X1 = k20\_subst1 X0 X1) \quad (3)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. \forall X2. ((m1\_qc\_lang1 X0) \wedge ((m1\_subset\_1 \\ & X1 (k3\_cqc\_lang X0)) \wedge (m1\_subset\_1 X2 (k1\_subst1 X0)))) \Rightarrow (k2\_subst2 \\ & X0 X1 X2 = k4\_tarski X1 X2) \end{aligned} \quad (4)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. \forall X2. \forall X3. ((\neg v1\_xboole\_0 X0) \wedge \\ & ((\neg v1\_xboole\_0 X1) \wedge ((m1\_subset\_1 X2 X0) \wedge (m1\_subset\_1 X3 X1)))) \Rightarrow \\ & (k1\_domain\_1 X0 X1 X2 X3 = k4\_tarski X2 X3) \end{aligned} \quad (5)$$

Assume the following.

$$\forall X0.\forall X1.((m1\_qc\_lang1 X0)\wedge(m1\_subset\_1 X1 (k16\_subst1 X0)))\Rightarrow(k19\_subst1 X0 X1 = k2\_xtuple\_0 X1) \quad (6)$$

Assume the following.

$$\forall X0.\forall X1.((m1\_qc\_lang1 X0)\wedge(m1\_subset\_1 X1 (k16\_subst1 X0)))\Rightarrow(k18\_subst1 X0 X1 = k1\_xtuple\_0 X1) \quad (7)$$

Assume the following.

$$\forall X0.\forall X1.k2\_xtuple\_0 (k4\_tarski X0 X1) = X1 \quad (8)$$

Assume the following.

$$\forall X0.\forall X1.k1\_xtuple\_0 (k4\_tarski X0 X1) = X0 \quad (9)$$

Assume the following.

$$\forall X0.(m1\_qc\_lang1 X0)\Rightarrow(\neg v1\_xboole\_0 (k38\_subst1 X0)) \quad (10)$$

Assume the following.

$$\forall X0.(m1\_qc\_lang1 X0)\Rightarrow(\neg v1\_xboole\_0 (k3\_cqc\_lang X0)) \quad (11)$$

Assume the following.

$$\forall X0.(m1\_qc\_lang1 X0)\Rightarrow(\neg v1\_xboole\_0 (k1\_subst1 X0)) \quad (12)$$

Assume the following.

$$\forall X0.\forall X1.((\neg v1\_xboole\_0 X0)\wedge((\neg v1\_xboole\_0 X1)\wedge(m1\_subset\_1 X1 (k1\_zfmisc\_1 X0))))\Rightarrow(\forall X2.(m2\_subset\_1 X2 X0 X1)\Rightarrow(m1\_subset\_1 X2 X0)) \quad (13)$$

Assume the following.

$$\forall X0.(m1\_qc\_lang1 X0)\Rightarrow(\neg v1\_xboole\_0 (k9\_qc\_lang1 X0)) \quad (14)$$

Assume the following.

$$\forall X0.\forall X1.((m1\_qc\_lang1 X0)\wedge(m1\_subset\_1 X1 (k3\_cqc\_lang X0)))\Rightarrow(m2\_subset\_1 (k6\_cqc\_lang X0 X1) (k9\_qc\_lang1 X0) (k3\_cqc\_lang X0)) \quad (15)$$

Assume the following.

$$\forall X0.(m1\_qc\_lang1 X0)\Rightarrow(m1\_subset\_1 (k3\_cqc\_lang X0) (k1\_zfmisc\_1 (k9\_qc\_lang1 X0))) \quad (16)$$

Assume the following.

$$\forall X0.(m1\_qc\_lang1 X0) \Rightarrow (m1\_subset\_1 (k38\_subst1 X0) (k1\_zfmisc\_1 (k16\_subst1 X0))) \quad (17)$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.((m1\_qc\_lang1 X0) \wedge ((m1\_subset\_1 X1 (k3\_cqc\_lang X0)) \wedge (m1\_subset\_1 X2 (k1\_subst1 X0)))) \Rightarrow (m2\_subset\_1 (k2\_subst2 X0 X1 X2) (k16\_subst1 X0) (k38\_subst1 X0)) \quad (18)$$

Assume the following.

$$\forall X0.(m1\_qc\_lang1 X0) \Rightarrow (\neg v1\_xboole\_0 (k16\_subst1 X0)) \quad (19)$$

Assume the following.

$$\forall X0.(m1\_qc\_lang1 X0) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (k16\_subst1 X0)) \Rightarrow (k20\_subst1 X0 X1 = k1\_domain\_1 (k9\_qc\_lang1 X0) (k1\_subst1 X0) (k13\_qc\_lang1 X0 (k18\_subst1 X0 X1)) (k19\_subst1 X0 X1))) \quad (20)$$

**Theorem 1**

$$\forall X0.(m1\_qc\_lang1 X0) \Rightarrow (\forall X1.(m2\_subset\_1 X1 (k9\_qc\_lang1 X0) (k3\_cqc\_lang X0)) \Rightarrow (\forall X2.(m1\_subset\_1 X2 (k1\_subst1 X0)) \Rightarrow (k2\_subst2 X0 (k6\_cqc\_lang X0 X1) X2 = k5\_sublemma X0 (k2\_subst2 X0 X1 X2))))$$