

## t18\_substut2

(TMVhRTG832YDutxWgeyWUfV51W362pwPG8M)

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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  $k1\_substut1 : \iota \Rightarrow \iota$  be given. Let  $k7\_cqc\_sim1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k39\_substut1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k2\_substut2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k6\_cqc\_lang : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k16\_substut1 : \iota \Rightarrow \iota$  be given. Let  $k37\_substut1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k20\_substut1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k13\_qc\_lang1 : \iota \Rightarrow \iota \Rightarrow \iota$  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  $k38\_substut1 : \iota \Rightarrow \iota$  be given. Assume the following.

$$\forall X0.(m1\_qc\_lang1 X0) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (k16\_substut1 X0)) \Rightarrow (k37\_substut1 X0 (k20\_substut1 X0 X1) = k13\_qc\_lang1 X0 (k37\_substut1 X0 X1))) \quad (1)$$

Assume the following.

$$\forall X0.(m1\_qc\_lang1 X0) \Rightarrow (\forall X1.(m2\_subset\_1 X1 (k9\_qc\_lang1 X0) (k3\_cqc\_lang X0)) \Rightarrow (\forall X2.(m1\_subset\_1 X2 (k1\_substut1 X0)) \Rightarrow (k2\_substut2 X0 (k6\_cqc\_lang X0 X1) X2 = k5\_sublemma X0 (k2\_substut2 X0 X1 X2)))) \quad (2)$$

Assume the following.

$$\forall X0.(m1\_qc\_lang1 X0) \Rightarrow (\forall X1.(m2\_subset\_1 X1 (k9\_qc\_lang1 X0) (k3\_cqc\_lang X0)) \Rightarrow (k7\_cqc\_sim1 X0 (k6\_cqc\_lang X0 X1) = k7\_cqc\_sim1 X0 X1)) \quad (3)$$

Assume the following.

$$\forall X0.\forall X1.((\neg v1\_xboole\_0 X0) \wedge ((\neg v1\_xboole\_0 X1) \wedge (m1\_subset\_1 X1 (k1\_zfmisc\_1 X0)))) \Rightarrow (\forall X2.(m2\_subset\_1 X2 X0 X1) \Leftrightarrow (m1\_subset\_1 X2 X1)) \quad (4)$$

Assume the following.

$$\forall X0.\forall X1.((m1\_qc\_lang1 X0) \wedge (m1\_subset\_1 X1 (k3\_cqc\_lang X0))) \Rightarrow (k6\_cqc\_lang X0 X1 = k13\_qc\_lang1 X0 X1) \quad (5)$$

Assume the following.

$$\forall X0.\forall X1.((m1\_qc\_lang1\ X0)\wedge(m1\_subset\_1\ X1\ (k38\_subst1\ X0)))\Rightarrow(k5\_sublemma\ X0\ X1 = k20\_subst1\ X0\ X1) \quad (6)$$

Assume the following.

$$\forall X0.\forall X1.((m1\_qc\_lang1\ X0)\wedge(m1\_subset\_1\ X1\ (k38\_subst1\ X0)))\Rightarrow(k39\_subst1\ X0\ X1 = k37\_subst1\ X0\ X1) \quad (7)$$

Assume the following.

$$\forall X0.(m1\_qc\_lang1\ X0)\Rightarrow(\neg v1\_xboole\_0\ (k38\_subst1\ X0)) \quad (8)$$

Assume the following.

$$\forall X0.(m1\_qc\_lang1\ X0)\Rightarrow(\neg v1\_xboole\_0\ (k3\_cqc\_lang\ X0)) \quad (9)$$

Assume the following.

$$\forall X0.\forall X1.((\neg v1\_xboole\_0\ X0)\wedge((\neg v1\_xboole\_0\ X1)\wedge(m1\_subset\_1\ X1\ (k1\_zfmisc\_1\ X0))))\Rightarrow(\forall X2.(m2\_subset\_1\ X2\ X0\ X1)\Rightarrow(m1\_subset\_1\ X2\ X0)) \quad (10)$$

Assume the following.

$$\forall X0.\forall X1.((m1\_qc\_lang1\ X0)\wedge(m1\_subset\_1\ X1\ (k38\_subst1\ X0)))\Rightarrow(m2\_subset\_1\ (k5\_sublemma\ X0\ X1)\ (k16\_subst1\ X0)\ (k38\_subst1\ X0)) \quad (11)$$

Assume the following.

$$\forall X0.(m1\_qc\_lang1\ X0)\Rightarrow(m1\_subset\_1\ (k3\_cqc\_lang\ X0)\ (k1\_zfmisc\_1\ (k9\_qc\_lang1\ X0))) \quad (12)$$

Assume the following.

$$\forall X0.\forall X1.((m1\_qc\_lang1\ X0)\wedge(m1\_subset\_1\ X1\ (k38\_subst1\ X0)))\Rightarrow(m2\_subset\_1\ (k39\_subst1\ X0\ X1)\ (k9\_qc\_lang1\ X0)\ (k3\_cqc\_lang\ X0)) \quad (13)$$

Assume the following.

$$\forall X0.(m1\_qc\_lang1\ X0)\Rightarrow(m1\_subset\_1\ (k38\_subst1\ X0)\ (k1\_zfmisc\_1\ (k16\_subst1\ X0))) \quad (14)$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.((m1\_qc\_lang1\ X0)\wedge((m1\_subset\_1\ X1\ (k3\_cqc\_lang\ X0))\wedge(m1\_subset\_1\ X2\ (k1\_subst1\ X0))))\Rightarrow(m2\_subset\_1\ (k2\_subst2\ X0\ X1\ X2)\ (k16\_subst1\ X0)\ (k38\_subst1\ X0)) \quad (15)$$

Assume the following.

$$\forall X0.(v1\_xboole\_0 X0) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (k1\_zfmisc.1 X0)) \Rightarrow (v1\_xboole\_0 X1)) \quad (16)$$

**Theorem 1**

$$\begin{aligned} & \forall X0.(m1\_qc\_lang1 X0) \Rightarrow (\forall X1.(m2\_subset\_1 X1 (k9\_qc\_lang1 \\ & X0) (k3\_cqc\_lang X0)) \Rightarrow ((\forall X2.(m1\_subset\_1 X2 (k1\_subst1 \\ X0)) \Rightarrow (k7\_cqc\_sim1 X0 X1 = k7\_cqc\_sim1 X0 (k39\_subst1 X0 (k2\_subst2 \\ X0 X1 X2)))) \Rightarrow (\forall X2.(m1\_subset\_1 X2 (k1\_subst1 X0)) \Rightarrow (k7\_cqc\_sim1 \\ X0 (k6\_cqc\_lang X0 X1) = k7\_cqc\_sim1 X0 (k39\_subst1 X0 (k2\_subst2 \\ X0 (k6\_cqc\_lang X0 X1) X2)))))) \end{aligned}$$