

## t14\_sublemma

(TMcFFpqneipztc7yH33LsCp83Jf22B76PGQ)

October 27, 2020

Let  $m1\_qc\_lang1 : \iota \Rightarrow o$  be given. Let  $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k5\_numbers : \iota$  be given. Let  $m2\_subset\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k6\_qc\_lang1 : \iota \Rightarrow \iota$  be given. Let  $k8\_qc\_lang1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v5\_relat\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k3\_qc\_lang1 : \iota \Rightarrow \iota$  be given. Let  $v3\_card\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $m2\_finseq\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k2\_qc\_lang1 : \iota \Rightarrow \iota$  be given. Let  $k1\_subst1 : \iota \Rightarrow \iota$  be given. Let  $k2\_sublemma : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k4\_sublemma : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k4\_cqc\_lang : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k17\_subst1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_domain\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k9\_qc\_lang1 : \iota \Rightarrow \iota$  be given. Let  $k10\_qc\_lang1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_xtuple\_0 : \iota \Rightarrow \iota$  be given. Let  $k4\_tarski : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k2\_xtuple\_0 : \iota \Rightarrow \iota$  be given. Let  $v1\_xboole\_0 : \iota \Rightarrow o$  be given. Let  $k1\_zfmisc\_1 : \iota \Rightarrow \iota$  be given. Let  $m1\_finseq\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k38\_subst1 : \iota \Rightarrow \iota$  be given. Let  $k16\_subst1 : \iota \Rightarrow \iota$  be given. Assume the following.

$$\begin{aligned} & \forall X0.(m1\_qc\_lang1 X0) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (k1\_subst1 \\ & X0)) \Rightarrow (\forall X2.(m1\_subset\_1 X2 k5\_numbers) \Rightarrow (\forall X3.(m2\_subset\_1 \\ & X3 (k6\_qc\_lang1 X0) (k8\_qc\_lang1 X0 X2)) \Rightarrow (\forall X4.((v3\_card\_1 \\ & X4 X2) \wedge (m2\_finseq\_1 X4 (k2\_qc\_lang1 X0))) \Rightarrow (k17\_subst1 X0 X3 \\ & X4 X1 = k1\_domain\_1 (k9\_qc\_lang1 X0) (k1\_subst1 X0) (k10\_qc\_lang1 \\ & X0 X3 X4) X1)))))) \end{aligned} \tag{1}$$

Assume the following.

$$\forall X0.\forall X1.(k1\_xtuple\_0 (k4\_tarski X0 X1) = X0) \wedge (k2\_xtuple\_0 (k4\_tarski X0 X1) = X1) \tag{2}$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.((\neg v1\_xboole\_0 X0) \wedge ((\neg v1\_xboole\_0 X1) \wedge \\ & (m1\_subset\_1 X1 (k1\_zfmisc\_1 X0)))) \Rightarrow (\forall X2.(m2\_subset\_1 \\ & X2 X0 X1) \Leftrightarrow (m1\_subset\_1 X2 X1)) \end{aligned} \tag{3}$$

Assume the following.

$$\forall X0.\forall X1.(m2\_finseq\_1 X1 X0) \Leftrightarrow (m1\_finseq\_1 X1 X0) \tag{4}$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.((m1\_subset\_1 \\ & X0\ k5\_numbers)\wedge((m1\_qc\_lang1\ X1)\wedge((m1\_subset\_1\ X2\ (k8\_qc\_lang1 \\ & X1\ X0))\wedge((v5\_relat\_1\ X3\ (k3\_qc\_lang1\ X1))\wedge((v3\_card\_1\ X3\ X0)\wedge \\ & (m1\_finseq\_1\ X3\ (k2\_qc\_lang1\ X1))))\wedge(m1\_subset\_1\ X4\ (k1\_subst1 \\ & X1))))))\Rightarrow(k4\_sublemma\ X0\ X1\ X2\ X3\ X4 = k17\_subst1\ X1\ X2\ X3\ X4) \end{aligned} \quad (5)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.((m1\_subset\_1\ X0 \\ & k5\_numbers)\wedge((m1\_qc\_lang1\ X1)\wedge((m1\_subset\_1\ X2\ (k8\_qc\_lang1 \\ & X1\ X0))\wedge((v5\_relat\_1\ X3\ (k3\_qc\_lang1\ X1))\wedge((v3\_card\_1\ X3\ X0)\wedge \\ & (m1\_finseq\_1\ X3\ (k2\_qc\_lang1\ X1))))))\Rightarrow(k4\_cqc\_lang\ X0\ X1\ X2\ X3 = \\ & k10\_qc\_lang1\ X1\ X2\ X3) \end{aligned} \quad (6)$$

Assume the following.

$$\forall X0.\forall X1.((m1\_qc\_lang1\ X0)\wedge(m1\_subset\_1\ X1\ (k38\_subst1\ X0)))\Rightarrow(k2\_sublemma\ X0\ X1 = k1\_xtuple\_0\ X1) \quad (7)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.((\neg v1\_xboole\_0\ X0)\wedge \\ & ((\neg v1\_xboole\_0\ X1)\wedge((m1\_subset\_1\ X2\ X0)\wedge(m1\_subset\_1\ X3\ X1))))\Rightarrow \\ & (k1\_domain\_1\ X0\ X1\ X2\ X3 = k4\_tarski\ X2\ X3) \end{aligned} \quad (8)$$

Assume the following.

$$\forall X0.(m1\_qc\_lang1\ X0)\Rightarrow(\neg v1\_xboole\_0\ (k38\_subst1\ X0)) \quad (9)$$

Assume the following.

$$\forall X0.\forall X1.((m1\_subset\_1\ X0\ k5\_numbers)\wedge(m1\_qc\_lang1\ X1))\Rightarrow(\neg v1\_xboole\_0\ (k8\_qc\_lang1\ X1\ X0)) \quad (10)$$

Assume the following.

$$\forall X0.(m1\_qc\_lang1\ X0)\Rightarrow(\neg v1\_xboole\_0\ (k1\_subst1\ X0)) \quad (11)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.((\neg v1\_xboole\_0\ X0)\wedge((\neg v1\_xboole\_0\ X1)\wedge \\ & (m1\_subset\_1\ X1\ (k1\_zfmisc\_1\ X0))))\Rightarrow(\forall X2.(m2\_subset\_1 \\ & X2\ X0\ X1)\Rightarrow(m1\_subset\_1\ X2\ X0)) \end{aligned} \quad (12)$$

Assume the following.

$$\forall X0.(m1\_qc\_lang1\ X0)\Rightarrow(\neg v1\_xboole\_0\ (k9\_qc\_lang1\ X0)) \quad (13)$$

Assume the following.

$$\forall X0.\forall X1.((m1\_qc\_lang1 X0)\wedge(m1\_subset\_1 X1 k5\_numbers))\Rightarrow (m1\_subset\_1 (k8\_qc\_lang1 X0 X1) (k1\_zfmisc\_1 (k6\_qc\_lang1 X0))) \quad (14)$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.\forall X3.\forall X4.((m1\_subset\_1 X0 k5\_numbers)\wedge((m1\_qc\_lang1 X1)\wedge((m1\_subset\_1 X2 (k8\_qc\_lang1 X1 X0))\wedge(((v5\_relat\_1 X3 (k3\_qc\_lang1 X1))\wedge((v3\_card\_1 X3 X0)\wedge(m1\_finseq\_1 X3 (k2\_qc\_lang1 X1))))))\wedge(m1\_subset\_1 X4 (k1\_subst1 X1))))))\Rightarrow(m2\_subset\_1 (k4\_sublemma X0 X1 X2 X3 X4) (k16\_subst1 X1) (k38\_subst1 X1)) \quad (15)$$

Assume the following.

$$\forall X0.(m1\_qc\_lang1 X0)\Rightarrow(m1\_subset\_1 (k38\_subst1 X0) (k1\_zfmisc\_1 (k16\_subst1 X0))) \quad (16)$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.((m1\_qc\_lang1 X0)\wedge((m1\_subset\_1 X1 (k6\_qc\_lang1 X0))\wedge(m1\_finseq\_1 X2 (k2\_qc\_lang1 X0))))\Rightarrow(m1\_subset\_1 (k10\_qc\_lang1 X0 X1 X2) (k9\_qc\_lang1 X0)) \quad (17)$$

Assume the following.

$$\forall X0.(v1\_xboole\_0 X0)\Rightarrow(\forall X1.(m1\_subset\_1 X1 (k1\_zfmisc\_1 X0))\Rightarrow(v1\_xboole\_0 X1)) \quad (18)$$

**Theorem 1**

$$\forall X0.(m1\_qc\_lang1 X0)\Rightarrow(\forall X1.(m1\_subset\_1 X1 k5\_numbers)\Rightarrow(\forall X2.(m2\_subset\_1 X2 (k6\_qc\_lang1 X0) (k8\_qc\_lang1 X0 X1))\Rightarrow(\forall X3.((v5\_relat\_1 X3 (k3\_qc\_lang1 X0))\wedge((v3\_card\_1 X3 X1)\wedge(m2\_finseq\_1 X3 (k2\_qc\_lang1 X0))))\Rightarrow(\forall X4.(m1\_subset\_1 X4 (k1\_subst1 X0))\Rightarrow(k2\_sublemma X0 (k4\_sublemma X1 X0 X2 X3 X4) = k4\_cqc\_lang X1 X0 X2 X3))))))$$