

t11\_binarith  
(TMTRAtppZjWZZruT26jtCtyTsyHc6rNABo4)

October 27, 2020

Let  $v1\_xboolean : \iota \Rightarrow o$  be given. Let  $k5\_xboolean : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v1\_xcmplx\_0 : \iota \Rightarrow o$  be given. Let  $k3\_xcmplx\_0 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k3\_xboolean : \iota \Rightarrow \iota$  be given. Let  $k4\_xboolean : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v1\_xreal\_0 : \iota \Rightarrow o$  be given. Let  $v7\_ordinal1 : \iota \Rightarrow o$  be given. Assume the following.

$$\forall X0. \forall X1. \forall X2. ((v1\_xcmplx\_0 X0) \wedge ((v1\_xcmplx\_0 X1) \wedge (v1\_xcmplx\_0 X2))) \Rightarrow (k3\_xcmplx\_0 (k3\_xcmplx\_0 X0 X1) X2 = k3\_xcmplx\_0 X0 (k3\_xcmplx\_0 X1 X2)) \quad (1)$$

Assume the following.

$$\forall X0. (v1\_xboolean X0) \Rightarrow (k3\_xboolean (k3\_xboolean X0) = X0) \quad (2)$$

Assume the following.

$$\forall X0. \forall X1. ((v1\_xboolean X0) \wedge (v1\_xboolean X1)) \Rightarrow (v1\_xboolean (k5\_xboolean X0 X1)) \quad (3)$$

Assume the following.

$$\forall X0. \forall X1. ((v1\_xboolean X0) \wedge (v1\_xboolean X1)) \Rightarrow (v1\_xboolean (k4\_xboolean X0 X1)) \quad (4)$$

Assume the following.

$$\forall X0. (v1\_xboolean X0) \Rightarrow (v1\_xboolean (k3\_xboolean X0)) \quad (5)$$

Assume the following.

$$\forall X0. (v1\_xboolean X0) \Rightarrow (\forall X1. (v1\_xboolean X1) \Rightarrow (k5\_xboolean X0 X1 = k3\_xboolean (k4\_xboolean (k3\_xboolean X0) (k3\_xboolean X1)))) \quad (6)$$

Assume the following.

$$\forall X0. (v1\_xboolean X0) \Rightarrow (\forall X1. (v1\_xboolean X1) \Rightarrow (k4\_xboolean X0 X1 = k3\_xcmplx\_0 X0 X1)) \quad (7)$$

Assume the following.

$$\forall X0.\forall X1.((v1\_xboolean\ X0)\wedge(v1\_xboolean\ X1))\Rightarrow(k5\_xboolean\ X0\ X1 = k5\_xboolean\ X1\ X0) \quad (8)$$

Assume the following.

$$\forall X0.\forall X1.((v1\_xboolean\ X0)\wedge(v1\_xboolean\ X1))\Rightarrow(k4\_xboolean\ X0\ X1 = k4\_xboolean\ X1\ X0) \quad (9)$$

Assume the following.

$$\forall X0.(v1\_xreal\_0\ X0)\Rightarrow(v1\_xcmplx\_0\ X0) \quad (10)$$

Assume the following.

$$\forall X0.(v7\_ordinal1\ X0)\Rightarrow(v1\_xreal\_0\ X0) \quad (11)$$

Assume the following.

$$\forall X0.(v1\_xboolean\ X0)\Rightarrow(v7\_ordinal1\ X0) \quad (12)$$

**Theorem 1**

$$\forall X0.(v1\_xboolean\ X0)\Rightarrow(\forall X1.(v1\_xboolean\ X1)\Rightarrow(\forall X2.(v1\_xboolean\ X2)\Rightarrow(k5\_xboolean\ (k5\_xboolean\ X0\ X1)\ X2 = k5\_xboolean\ X0\ (k5\_xboolean\ X1\ X2))))$$