

thm\_2EHolSmt\_2Er047  
(TMG3N3DTYQq1acryx2JytACCTuvbbyHaGbE)

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**Definition 1** We define `c_2Emin_2E_3D` to be  $\lambda A. \lambda x \in A. \lambda y \in A. \text{inj\_o } (x = y)$  of type  $\iota \Rightarrow \iota$ .

**Definition 2** We define `c_2Ebool_2ET` to be  $(\text{ap } (\text{ap } (\text{c\_2Emin\_2E\_3D } (2^2))) (\lambda V0x \in 2. V0x)) (\lambda V1x \in 2. V1x)$

**Definition 3** We define `c_2Ebool_2E_21` to be  $\lambda A. 27a : \iota. (\lambda V0P \in (2^{A-27a}). (\text{ap } (\text{ap } (\text{c\_2Emin\_2E\_3D } (2^{A-27a}))))$

**Definition 4** We define `c_2Ebool_2EF` to be  $(\text{ap } (\text{c\_2Ebool\_2E\_21 } 2)) (\lambda V0t \in 2. V0t)$ .

**Definition 5** We define `c_2Emin_2E_3D_3D_3E` to be  $\lambda P \in 2. \lambda Q \in 2. \text{inj\_o } (p \Rightarrow P \Rightarrow Q)$  of type  $\iota$ .

**Definition 6** We define `c_2Ebool_2E_5C_2F` to be  $(\lambda V0t1 \in 2. (\lambda V1t2 \in 2. (\text{ap } (\text{c\_2Ebool\_2E\_21 } 2)) (\lambda V2t \in 2. V2t)))$

**Definition 7** We define `c_2Ebool_2E_2F_5C` to be  $(\lambda V0t1 \in 2. (\lambda V1t2 \in 2. (\text{ap } (\text{c\_2Ebool\_2E\_21 } 2)) (\lambda V2t \in 2. V2t)))$

**Definition 8** We define `c_2Ebool_2E_7E` to be  $(\lambda V0t \in 2. (\text{ap } (\text{ap } (\text{c\_2Emin\_2E\_3D\_3D\_3E } V0t)) (\text{c\_2Ebool\_2EF } 2)))$

Assume the following.

$$\text{True} \tag{1}$$

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$$\begin{aligned} & (\forall V0t \in 2. (((\text{True} \vee (p \vee V0t)) \Leftrightarrow \text{True}) \wedge (((p \vee V0t) \vee \text{True}) \Leftrightarrow \text{True}) \wedge \\ & (((\text{False} \vee (p \vee V0t)) \Leftrightarrow (p \vee V0t)) \wedge (((p \vee V0t) \vee \text{False}) \Leftrightarrow (p \vee V0t)) \wedge (((p \vee V0t) \vee \\ & (p \vee V0t)) \Leftrightarrow (p \vee V0t)))))) \end{aligned} \tag{2}$$

Assume the following.

$$\begin{aligned} & (\forall V0t \in 2. (((\text{True} \Leftrightarrow (p \vee V0t)) \Leftrightarrow (p \vee V0t)) \wedge (((p \vee V0t) \Leftrightarrow \text{True}) \Leftrightarrow \\ & (p \vee V0t)) \wedge (((\text{False} \Leftrightarrow (p \vee V0t)) \Leftrightarrow \neg(p \vee V0t)) \wedge (((p \vee V0t) \Leftrightarrow \text{False}) \Leftrightarrow \neg( \\ & p \vee V0t)))))) \end{aligned} \tag{3}$$

Assume the following.

$$(\forall V0t \in 2. ((\neg(\neg(p \vee V0t))) \Leftrightarrow (p \vee V0t))) \tag{4}$$

Assume the following.

$$(\forall V0A \in 2.((p \vee 0A) \Rightarrow ((\neg(p \vee 0A)) \Rightarrow \text{False}))) \quad (5)$$

Assume the following.

$$(\forall V0A \in 2.(\forall V1B \in 2.(((\neg((p \vee 0A) \vee (p \vee 1B))) \Rightarrow \text{False}) \Leftrightarrow ((p \vee 0A) \Rightarrow \text{False}) \Rightarrow ((\neg(p \vee 1B)) \Rightarrow \text{False})))) \quad (6)$$

Assume the following.

$$(\forall V0A \in 2.(\forall V1B \in 2.(((\neg(\neg(p \vee 0A))) \vee (p \vee 1B))) \Rightarrow \text{False}) \Leftrightarrow ((p \vee 0A) \Rightarrow ((\neg(p \vee 1B)) \Rightarrow \text{False})))) \quad (7)$$

Assume the following.

$$(\forall V0A \in 2.(((\neg(p \vee 0A)) \Rightarrow \text{False}) \Rightarrow ((p \vee 0A) \Rightarrow \text{False}) \Rightarrow \text{False})) \quad (8)$$

Assume the following.

$$(\forall V0p \in 2.(\forall V1q \in 2.(\forall V2r \in 2.(((p \vee 0p) \Leftrightarrow ((p \vee 1q) \Leftrightarrow (p \vee 2r))) \Leftrightarrow (((p \vee 0p) \vee ((p \vee 1q) \vee (p \vee 2r))) \wedge (((p \vee 0p) \vee ((\neg(p \vee 2r)) \vee (\neg(p \vee 1q)))) \wedge (((p \vee 1q) \vee ((\neg(p \vee 2r)) \vee (\neg(p \vee 0p)))) \wedge ((p \vee 2r) \vee ((\neg(p \vee 1q)) \vee (\neg(p \vee 0p)))))))))) \quad (9)$$

Assume the following.

$$(\forall V0p \in 2.(\forall V1q \in 2.(((p \vee 0p) \Leftrightarrow (\neg(p \vee 1q))) \Leftrightarrow (((p \vee 0p) \vee (p \vee 1q)) \wedge ((\neg(p \vee 1q)) \vee (\neg(p \vee 0p)))))) \quad (10)$$

**Theorem 1**  $(\forall V0p \in 2.((\text{False} \vee (p \vee 0p)) \Leftrightarrow (p \vee 0p)))$ .