

thm\_2Ebool\_2Eliteral\_\_case\_\_CONG  
(TMX21RtKnDLzbDRkQcXnZR1pjTN4GAsWg19)

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**Definition 1** We define  $c\_2Emin\_2E\_3D$  to be  $\lambda A.\lambda x \in A.\lambda y \in A.inj\_o (x = y)$  of type  $\iota \Rightarrow \iota$ .

**Definition 2** We define  $c\_2Ebool\_2Eliteral\_case$  to be  $\lambda A.\lambda a : \iota.\lambda A.\lambda b : \iota.(\lambda V0f \in (A.\lambda b^{A \cdot 27a}).(\lambda V1x \in 2.V0f x))$

**Definition 3** We define  $c\_2Emin\_2E\_3D\_3D\_3E$  to be  $\lambda P \in 2.\lambda Q \in 2.inj\_o (p \Rightarrow q)$  of type  $\iota$ .

**Definition 4** We define  $c\_2Ebool\_2ET$  to be  $(ap (ap (c\_2Emin\_2E\_3D (2^2)) (\lambda V0x \in 2.V0x)) (\lambda V1x \in 2.V1x))$

**Definition 5** We define  $c\_2Ebool\_2E\_21$  to be  $\lambda A.\lambda a : \iota.(\lambda V0P \in (2^{A \cdot 27a}).(ap (ap (c\_2Emin\_2E\_3D (2^{A \cdot 27a})) (\lambda V1x \in 2.V1x)) (\lambda V2x \in 2.V2x)))$

**Definition 6** We define  $c\_2Ebool\_2E\_2F\_5C$  to be  $(\lambda V0t1 \in 2.(\lambda V1t2 \in 2.(ap (c\_2Ebool\_2E\_21 2) (\lambda V2t \in 2.V2t)))$

Assume the following.

$$\begin{aligned} & (\forall V0t1 \in 2.(\forall V1t2 \in 2.(\forall V2t3 \in 2.(((p \ V0t1) \Rightarrow \\ & ((p \ V1t2) \Rightarrow (p \ V2t3))) \Leftrightarrow (((p \ V0t1) \wedge (p \ V1t2)) \Rightarrow (p \ V2t3)))))) \end{aligned} \quad (1)$$

**Theorem 1**

$$\begin{aligned} & \forall A.\lambda a.nonempty \ A.\lambda a \Rightarrow \forall A.\lambda b.nonempty \ A.\lambda b \Rightarrow ( \\ & \forall V0f \in (A.\lambda b^{A \cdot 27a}).(\forall V1g \in (A.\lambda b^{A \cdot 27a}).(\forall V2M \in \\ & A.\lambda a.(\forall V3N \in A.\lambda a.(((V2M = V3N) \wedge (\forall V4x \in A.\lambda a.( \\ & (V4x = V3N) \Rightarrow ((ap \ V0f \ V4x) = (ap \ V1g \ V4x)))))) \Rightarrow ((ap (ap (c\_2Ebool\_2Eliteral\_case \\ & A.\lambda a \ A.\lambda b) \ V0f) \ V2M) = (ap (ap (c\_2Ebool\_2Eliteral\_case \ A.\lambda a \\ & \ A.\lambda b) \ V1g) \ V3N)))))) \end{aligned}$$