

thm_2Esptree_2Edatatype__spt
(TMZ2vHLqngrjxgTpPcAno6zQRpivpgHsSau)

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Let $ty_2Esptree_2Espt : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A0.nonempty\ A0 \Rightarrow nonempty\ (ty_2Esptree_2Espt\ A0) \quad (1)$$

Let $c_2Esptree_2EBS : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow c_2Esptree_2EBS\ A_27a \in (((ty_2Esptree_2Espt\ A_27a)^{(ty_2Esptree_2Espt\ A_27a)})_{A_27a})^{(ty_2Esptree_2Espt\ A_27a)} \quad (2)$$

Let $c_2Esptree_2EBN : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow c_2Esptree_2EBN\ A_27a \in ((ty_2Esptree_2Espt\ A_27a)^{(ty_2Esptree_2Espt\ A_27a)})^{(ty_2Esptree_2Espt\ A_27a)} \quad (3)$$

Let $c_2Esptree_2ELS : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow c_2Esptree_2ELS\ A_27a \in ((ty_2Esptree_2Espt\ A_27a)^{A_27a})^{A_27a} \quad (4)$$

Let $c_2Esptree_2ELN : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow c_2Esptree_2ELN\ A_27a \in (ty_2Esptree_2Espt\ A_27a)^{A_27a} \quad (5)$$

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_2ET to be $(ap\ (ap\ (c_2Emin_2E_3D\ (2^2))\ (\lambda V0x \in 2.V0x))\ (\lambda V1x \in 2.V1x))$.

Definition 3 We define $c_2Ebool_2EDATATYPE$ to be $\lambda A_27a : \iota.(\lambda V0x \in A_27a.c_2Ebool_2ET)$.

Definition 4 We define $c_2Ebool_2E_21$ to be $\lambda A_27a : \iota.(\lambda V0P \in (2^{A_27a}).(ap\ (ap\ (c_2Emin_2E_3D\ (2^{A_27a}))\ (\lambda V1x \in 2.V1x))\ (\lambda V2x \in 2.V2x)))$.

Assume the following.

$$True \tag{6}$$

Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow (\forall V0x \in A_27a. ((p\ (ap\ (c_2Ebool_2EDATATYPE\ A_27a)\ V0x)) \Leftrightarrow True)) \tag{7}$$

Theorem 1

$$\forall A_27a.nonempty\ A_27a \Rightarrow (\forall V0spt \in (((2^{(((ty_2Esptree_2Espt\ A_27a)^{ty_2Esptree_2Espt\ A_27a})^{A_27a})^{ty_2Esptree_2Espt\ A_27a})} (p\ (ap\ (c_2Ebool_2EDATATYPE\ A_27a))\ (c_2Esptree_2ELS\ A_27a))))))$$