thm_2EringNorm_2Espolynom__simplify__def (TMYTD-frZRtQh7sbuSRquHiDjYWMMXWVJJ7g)

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Let $ty\_2Esemi\_\_ring\_2Esemi\_\_ring : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A0.nonempty\ A0 \Rightarrow nonempty\ (ty\_2Esemi\_\_ring\_2Esemi\_\_ring\ A0) \quad (1)$$

Let $ty\_2Ecanonical\_2Ecanonical\_\_sum : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A0.nonempty\ A0 \Rightarrow nonempty\ (ty\_2Ecanonical\_2Ecanonical\_\_sum\ A0) \quad (2)$$

Let $ty\_2Ecanonical\_2Espolynom : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A0.nonempty\ A0 \Rightarrow nonempty\ (ty\_2Ecanonical\_2Espolynom\ A0) \quad (3)$$

Let $c\_2Ecanonical\_2Espolynom\_\_normalize : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A\_27a.nonempty\ A\_27a \Rightarrow c\_2Ecanonical\_2Espolynom\_\_normalize\ A\_27a \in (((ty\_2Ecanonical\_2Ecanonical\_\_sum\ A\_27a)^{(ty\_2Ecanonical\_2Espolynom\ A\_27a)})^{(ty\_2Esemi\_\_ring\_2E} \quad (4)$$

Let $c\_2Ecanonical\_2Ecanonical\_\_sum\_\_simplify : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A\_27a.nonempty\ A\_27a \Rightarrow c\_2Ecanonical\_2Ecanonical\_\_sum\_\_simplify\ A\_27a \in (((ty\_2Ecanonical\_2Ecanonical\_\_sum\ A\_27a)^{(ty\_2Ecanonical\_2Ecanonical\_\_sum\ A\_27a)})^{(ty\_2Esemi\_\_ri} \quad (5)$$

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* $(ap\ (ap\ (\mathsf{c\_2Emin\_2E\_3D}\ (2^2))\ (\lambda V0x \in 2.V0x))\ (\lambda V1x \in 2.V$

Definition 3 *We define* c_2Ebool_2E_21 *to be* $\lambda A\_27a : \iota.(\lambda V0P \in (2^{A\_27a}).(ap\ (ap\ (\mathsf{c\_2Emin\_2E\_3D}\ (2^{A\_27}$

Definition 4 *We define* c_2Ecanonical_2Espolynom__simplify *to be* $\lambda A\_27a : \iota.\lambda V0sr \in (ty\_2Esemi\_\_ring\_2E$

Let $ty\_2Ering\_2Ering : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A0. nonempty\ A0 \Rightarrow nonempty\ (ty\_2Ering\_2Ering\ A0) \quad (6)$$

Let $c\_2Ering\_2Ering\_\_RM : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A\_27a. nonempty\ A\_27a \Rightarrow c\_2Ering\_2Ering\_\_RM\ A\_27a \in (((A\_27a^{A\_27a})^{A\_27a})^{(ty\_2Ering\_2Ering\ A\_27a)}) \quad (7)$$

Let $c\_2Ering\_2Ering\_\_RP : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A\_27a. nonempty\ A\_27a \Rightarrow c\_2Ering\_2Ering\_\_RP\ A\_27a \in (((A\_27a^{A\_27a})^{A\_27a})^{(ty\_2Ering\_2Ering\ A\_27a)}) \quad (8)$$

Let $c\_2Ering\_2Ering\_\_R1 : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A\_27a. nonempty\ A\_27a \Rightarrow c\_2Ering\_2Ering\_\_R1\ A\_27a \in (A\_27a^{(ty\_2Ering\_2Ering\ A\_27a)}) \quad (9)$$

Let $c\_2Ering\_2Ering\_\_R0 : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A\_27a. nonempty\ A\_27a \Rightarrow c\_2Ering\_2Ering\_\_R0\ A\_27a \in (A\_27a^{(ty\_2Ering\_2Ering\ A\_27a)}) \quad (10)$$

Let $c\_2Esemi\_\_ring\_2Erecordtype\_2Esemi\_\_ring : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A\_27a. nonempty\ A\_27a \Rightarrow c\_2Esemi\_\_ring\_2Erecordtype\_2Esemi\_\_ring\ A\_27a \in (((((ty\_2Esemi\_\_ring\_2Esemi\_\_ring\ A\_27a)^{((A\_27a^{A\_27a})^{A\_27a})})^{((A\_27a^{A\_27a})^{A\_27a})})^{A\_27a})^{A\_27a}) \quad (11)$$

Definition 5 *We define* c_2Ering_2Esemi__ring__of *to be* $\lambda A\_27a : \iota. \lambda V0r \in (ty\_2Ering\_2Ering\ A\_27a).(ap$

Definition 6 *We define* c_2EringNorm_2Er__spolynom__simplify *to be* $\lambda A\_27a : \iota. \lambda V0r \in (ty\_2Ering\_2Ering$

Definition 7 *We define* c_2EringNorm_2Er__spolynom__normalize *to be* $\lambda A\_27a : \iota. \lambda V0r \in (ty\_2Ering\_2Eri$

Definition 8 *We define* c_2EringNorm_2Er__canonical__sum__simplify *to be* $\lambda A\_27a : \iota. \lambda V0r \in (ty\_2Ering\_2$

Assume the following.

$$\forall A\_27a. nonempty\ A\_27a \Rightarrow (\forall V0x \in A\_27a.(\forall V1y \in A\_27a.((V0x = V1y) \Leftrightarrow (V1y = V0x)))) \quad (12)$$

Theorem 1

$$\forall A\_27a. nonempty\ A\_27a \Rightarrow (\forall V0r \in (ty\_2Ering\_2Ering\ A\_27a).(\forall V1x \in (ty\_2Ecanonical\_2Espolynom\ A\_27a).((ap\ (ap\ (\mathsf{c\_2EringNorm\_2Er\_\_spolynom\_\_simplify}\ A\_27a)\ V0r)\ V1x) = (ap\ (ap\ (\mathsf{c\_2EringNorm\_2Er\_\_canonical\_\_sum\_\_simplify}\ A\_27a)\ V0r)\ (ap\ (ap\ (\mathsf{c\_2EringNorm\_2Er\_\_spolynom\_\_normalize}\ A\_27a)\ V0r)\ V1x)))))$$