

thm\_2Ebitstring\_2Ev2w\_n2v  
 (TMJvtapBD5c1gKgzNy6ReB1Zfz9rk1yD5Kh)

October 26, 2020

Let  $ty\_2Elist\_2Elist : \iota \Rightarrow \iota$  be given. Assume the following.

$$\forall A_0.nonempty\ A_0 \Rightarrow nonempty\ (ty\_2Elist\_2Elist\ A_0) \quad (1)$$

Let  $c\_2Elist\_2ENIL : \iota \Rightarrow \iota$  be given. Assume the following.

$$\forall A_{27a}.nonempty\ A_{27a} \Rightarrow c\_2Elist\_2ENIL\ A_{27a} \in (ty\_2Elist\_2Elist\ A_{27a}) \quad (2)$$

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

Let  $c\_2Elist\_2ECONS : \iota \Rightarrow \iota$  be given. Assume the following.

$$\forall A_{27a}.nonempty\ A_{27a} \Rightarrow c\_2Elist\_2ECONS\ A_{27a} \in (((ty\_2Elist\_2Elist\ A_{27a})^{(ty\_2Elist\_2Elist\ A_{27a})})^{A_{27a}}) \quad (3)$$

Let  $ty\_2Enum\_2Enum : \iota$  be given. Assume the following.

$$nonempty\ ty\_2Enum\_2Enum \quad (4)$$

Let  $c\_2Elist\_2ELENGTH : \iota \Rightarrow \iota$  be given. Assume the following.

$$\forall A_{27a}.nonempty\ A_{27a} \Rightarrow c\_2Elist\_2ELENGTH\ A_{27a} \in (ty\_2Enum\_2Enum^{(ty\_2Elist\_2Elist\ A_{27a})}) \quad (5)$$

Let  $c\_2Earithmetic\_2E\_2D : \iota$  be given. Assume the following.

$$c\_2Earithmetic\_2E\_2D \in ((ty\_2Enum\_2Enum^{ty\_2Enum\_2Enum})^{ty\_2Enum\_2Enum}) \quad (6)$$

Let  $c\_2Elist\_2ETAKE : \iota \Rightarrow \iota$  be given. Assume the following.

$$\forall A_{27a}.nonempty\ A_{27a} \Rightarrow c\_2Elist\_2ETAKE\ A_{27a} \in (((ty\_2Elist\_2Elist\ A_{27a})^{(ty\_2Elist\_2Elist\ A_{27a})})^{ty\_2Enum\_2Enum}) \quad (7)$$

**Definition 3** We define  $c\_2Ebool\_2E\_21$  to be  $\lambda A.27a : \iota.(\lambda V0P \in (2^A)^{27a}).(ap\ (ap\ (ap\ (c\_2Emin\_2E\_3D\ (2^A^{27a})\ P)\ V)\ 0)\ P)$

**Definition 4** We define  $c_2Ebitstring\_2Eshift$  to be  $\lambda V0v \in (ty\_2Elist\_2Elist\ 2).\lambda V1m \in ty\_2Enum\_2Env$

Let  $c\_2Enum\_2EREPE\_num : \iota$  be given. Assume the following.

$$c\_2Enum\_2EREP\_num \in (\omega^{t y\_2Enum\_2Enum}) \quad (8)$$

Let  $c\_2Enum\_2ESUC\_REP : \iota$  be given. Assume the following.

$$c\_2Enum\_2ESUC\_REP \in (\omega^\omega)^\omega \quad (9)$$

Let  $c\_2Enum\_2EABS\_num : \iota$  be given. Assume the following.

$$c\_2Enum\_2EABS\_num \in (ty\_2Enum\_2Enum^{omega}) \quad (10)$$

**Definition 5** We define  $c\_2Enum\_2ESUC$  to be  $\lambda V0m \in ty\_2Enum\_2Enum.(ap\ c\_2Enum\_2EABS\_num$

Let  $c\_2Elist\_2EDROP : \iota \Rightarrow \iota$  be given. Assume the following.

$$\forall A\_27a.\text{nonempty } A\_27a \Rightarrow c\_2Elist\_2EDROP\ A\_27a \in (((ty\_2Elist\_2Elist\\ A\_27a)^{(ty\_2Elist\_2Elist\ A\_27a)})^{ty\_2Enum\_2Enum}) \quad (11)$$

**Definition 6** We define  $c\_2Ebool\_2EF$  to be  $(ap\ (c\_2Ebool\_2E_21\ 2)\ (\lambda V0t \in 2.V0t))$ .

**Definition 7** We define  $c\_2Ecombin\_2EK$  to be  $\lambda A\_27a : \iota. \lambda A\_27b : \iota. (\lambda V0x \in A\_27a. (\lambda V1y \in A\_27b. V0x))$

Let  $c\_2Elist\_2EGENLIST : \iota \Rightarrow \iota$  be given. Assume the following.

$$\forall A\_27a.\text{nonempty } A\_27a \Rightarrow c\_2Elist\_2E\text{GENLIST } A\_27a \in (((ty\_2Elist\_2Elist \\ A\_27a)^{ty\_2Enum\_2Enum})^{(A\_27a^{ty\_2Enum\_2Enum})}) \quad (12)$$

Let  $c\_2Elist\_2EAPPEND : \iota \Rightarrow \iota$  be given. Assume the following.

$$\forall A\_27a.\text{nonempty } A\_27a \Rightarrow c\_2Elist\_2EAPPEND\ A\_27a \in (((ty\_2Elist\_2Elist\\A\_27a)^{(ty\_2Elist\_2Elist\ A\_27a)})^{(ty\_2Elist\_2Elist\ A\_27a)}) \quad (13)$$

**Definition 8** We define  $c\_2Elist\_2EPAD\_LEFT$  to be  $\lambda A.\_27a : \iota.\lambda V0c \in A.\_27a.\lambda V1n \in ty\_2Enum\_2Enum$

**Definition 9** We define  $c\_2Ebitstring\_2Ezero\_extend$  to be  $\lambda V0n \in ty\_2Enum\_2Enum. \lambda V1v \in (ty\_2Elist\_2Ebitstring\_2Ezero\_extend)$

**Definition 10** We define  $c_{\text{Emin}} : \text{inj} \rightarrow \text{o}$  to be  $\lambda P \in 2. \lambda Q \in 2. \text{inj} \rightarrow \text{o} (p \rightarrow P \rightarrow Q)$  of type  $\iota$ .

**Definition 11** We define  $c\_2Ebool\_2E\_7E$  to be  $(\lambda V0t \in 2.(ap\ (ap\ c\_2Emin\_2E\_3D\_3D\_3E\ V0t)\ c\_2Ebool\_2E))$

**Definition 12** We define  $c\_Ebool\_2E\_2F\_5C$  to be  $(\lambda V0t1 \in 2.(\lambda V1t2 \in 2.(ap\ (c\_Ebool\_2E\_21\ 2)\ (\lambda V2t \in$

**Definition 13** We define  $c_{\text{2Emin\_2E\_40}}$  to be  $\lambda A. \lambda P \in 2^A. \text{if } (\exists x \in A. p \text{ (ap } P \text{ } x)) \text{ then } (\lambda x. x \in A \wedge p \text{ of type } \iota \Rightarrow \iota)$ .

**Definition 14** We define  $c_{\text{2Ebool\_2E\_3F}}$  to be  $\lambda A.27a : \iota.(\lambda V0P \in (2^A)^{27a}).(ap\;V0P\;(ap\;(c_{\text{2Emin\_2E\_40}})$

**Definition 15** We define  $c\_2Eprim\_rec\_2E\_3C$  to be  $\lambda V0m \in ty\_2Enum\_2Enum. \lambda V1n \in ty\_2Enum\_2Enum.$

**Definition 16** We define  $c_{\_2Ebool\_2ECOND}$  to be  $\lambda A.27a : \iota.(\lambda V0t \in 2.(\lambda V1t1 \in A.27a.(\lambda V2t2 \in A.27a.($

**Definition 17** We define  $c_{\_2Ebool\_2ELET}$  to be  $\lambda A.\_27a : \iota.\lambda A.\_27b : \iota.(\lambda V0f \in (A.\_27b^{A \rightarrow \iota}).(\lambda V1x \in A.\_27b^{A \rightarrow \iota}.$

**Definition 18** We define  $c\_2Ebitstring\_2Efixwidth$  to be  $\lambda V0n \in ty\_2Enum\_2Enum.\lambda V1v \in (ty\_2Elist\_2Elis)$

**Definition 19** We define  $c\_2Ebitstring\_2Efield$  to be  $\lambda V0h \in ty\_2Enum\_2Enum. \lambda V1l \in ty\_2Enum\_2Enum.$

**Definition 20** We define  $c\_2Ebitstring\_2Etestbit$  to be  $\lambda V0b \in ty\_2Enum\_2Enum. \lambda V1v \in (ty\_2Elist\_2Elist)$

Let  $ty\_2Efc\_{finite\_image} : \iota \Rightarrow \iota$  be given. Assume the following.

$\forall A0.\text{nonempty } A0 \Rightarrow \text{nonempty } (\text{ty\_}2E\text{fc}\text{p\_}2E\text{finite\_image } A0)$

*t<sub>y</sub>\_2Ebool\_2Eitself : t<sub>l</sub>⇒t<sub>l</sub>* be given. Assume the following.

$\forall A0.\text{nonempty}(A0) \Leftrightarrow \text{nonempty}(\text{ty} \ 2\text{Ebool} \ 2\text{Eitsel})$

Ques 2) The value of  $i$  be given. Assume the following

$\forall A \exists a \text{ nonempty } A \exists a \neg c \exists E \text{ bool } \exists E \text{ the value } A \exists a \in$

$\exists E \in \mathcal{E} \exists i \in \mathcal{I} \exists j \in \mathcal{J} \exists k \in \mathcal{K} \exists l \in \mathcal{L}$  such that  $E$  is given by  $\langle A, B, C, D, E, F, G, H, I, J, K, L \rangle$ . Assume the following:

$$\sqrt{4.27} \leq t - 4.27 \leq 2E\delta_0 + 2E\delta_1 \leq t - 4.27 \leq (t - 2)$$

$$\text{D.6.6.11.1.21.} \quad W_{\text{d},1,6} = 251 + 1.25 \cdot 25.21 \cdot 1.6 \cdot 1.4 \cdot 27 = 1190.8 \text{ N/mm}^2 \quad (\text{NOMR} = 244.27 \text{ N/mm}^2) \quad (17)$$

Fig. 2. (a) The 3D-UV-Vis spectra of the  $\text{Fe}^{2+}$ -TGA complex at different pH values. (b) The 3D-UV-Vis spectra of the  $\text{Fe}^{2+}$ -TGA complex at different concentrations.

**Definition 12** We define  $\text{SLE}_{\kappa}(\rho)$  to be the set of all  $\omega \in \Omega$  such that  $\omega \in \text{SLE}_{\kappa}(\rho)$ .

$\omega_0$ ,  $2E_{\text{fem}}$ ,  $2E_{\text{exact}}$ ,  $c_{\text{cont}}$ ,  $c_{\text{ext}}$ ) be given. Assumes the following

Let  $c_2Efcp_2Edest\_cart : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Assume the following.

$$\forall A\_27a.\text{nonempty } A\_27a \Rightarrow \forall A\_27b.\text{nonempty } A\_27b \Rightarrow c\_2Efcp\_2Edest\_cart A\_27a A\_27b \in ((A\_27a^{(ty\_2Efcp\_2Efinite\_image A\_27b)})^{(ty\_2Efcp\_2Ecart A\_27a A\_27b)}) \quad (19)$$

**Definition 23** We define  $c_{\text{2Efcp\_2Efcp\_index}}$  to be  $\lambda A_27a : \iota. \lambda A_27b : \iota. \lambda V0x \in (ty_2\text{Efcp\_2Ecart}\ A_27a)$

**Definition 24** We define  $c\_2Efcp\_2EFCP$  to be  $\lambda A\_27a : \iota. \lambda A\_27b : \iota. (\lambda V0g \in (A\_27a^{ty\_2Enum\_2Enum}).(ap$

**Definition 25** We define  $c\_2Ebitstring\_2Ev2w$  to be  $\lambda A\_27a : \iota. \lambda V0v \in (ty\_2Elist\_2Elist 2).(ap (c\_2Efcp\_2EFCP$

Let  $c\_2Enum\_2ZERO\_REP : \iota$  be given. Assume the following.

$$c\_2Enum\_2ZERO\_REP \in \omega \quad (20)$$

**Definition 26** We define  $c\_2Enum\_2E0$  to be  $(ap c\_2Enum\_2EABS\_num c\_2Enum\_2ZERO\_REP)$ .

**Definition 27** We define  $c\_2Earithmetic\_2ZERO$  to be  $c\_2Enum\_2E0$ .

Let  $c\_2Earithmetic\_2E\_2B : \iota$  be given. Assume the following.

$$c\_2Earithmetic\_2E\_2B \in ((ty\_2Enum\_2Enum^{ty\_2Enum\_2Enum})^{ty\_2Enum\_2Enum}) \quad (21)$$

**Definition 28** We define  $c\_2Earithmetic\_2EBIT1$  to be  $\lambda V0n \in ty\_2Enum\_2Enum.(ap (ap c\_2Earithmetic\_2E\_2B$

**Definition 29** We define  $c\_2Earithmetic\_2ENUMERAL$  to be  $\lambda V0x \in ty\_2Enum\_2Enum.V0x$ .

**Definition 30** We define  $c\_2Earithmetic\_2EBIT2$  to be  $\lambda V0n \in ty\_2Enum\_2Enum.(ap (ap c\_2Earithmetic\_2E\_2B$

Let  $c\_2Earithmetic\_2EEEXP : \iota$  be given. Assume the following.

$$c\_2Earithmetic\_2EEEXP \in ((ty\_2Enum\_2Enum^{ty\_2Enum\_2Enum})^{ty\_2Enum\_2Enum}) \quad (22)$$

Let  $c\_2Earithmetic\_2EDIV : \iota$  be given. Assume the following.

$$c\_2Earithmetic\_2EDIV \in ((ty\_2Enum\_2Enum^{ty\_2Enum\_2Enum})^{ty\_2Enum\_2Enum}) \quad (23)$$

**Definition 31** We define  $c\_2Ebit\_2EDIV\_2EXP$  to be  $\lambda V0x \in ty\_2Enum\_2Enum.\lambda V1n \in ty\_2Enum\_2Enum.(\lambda V0y \in$

Let  $c\_2Earithmetic\_2EMOD : \iota$  be given. Assume the following.

$$c\_2Earithmetic\_2EMOD \in ((ty\_2Enum\_2Enum^{ty\_2Enum\_2Enum})^{ty\_2Enum\_2Enum}) \quad (24)$$

**Definition 32** We define  $c\_2Ebit\_2EMOD\_2EXP$  to be  $\lambda V0x \in ty\_2Enum\_2Enum.\lambda V1n \in ty\_2Enum\_2Enum.(\lambda V0y \in$

**Definition 33** We define  $c\_2Ebit\_2EBITS$  to be  $\lambda V0h \in ty\_2Enum\_2Enum.\lambda V1l \in ty\_2Enum\_2Enum.\lambda V2m \in$

**Definition 34** We define  $c\_2Ebit\_2EBIT$  to be  $\lambda V0b \in ty\_2Enum\_2Enum.\lambda V1n \in ty\_2Enum\_2Enum.(ap (c\_2Efcp\_2EFC$

Let  $c\_2Enumposrep\_2En2l : \iota$  be given. Assume the following.

$$c\_2Enumposrep\_2En2l \in (((ty\_2Elist\_2Elist ty\_2Enum\_2Enum)^{ty\_2Enum\_2Enum})^{ty\_2Enum\_2Enum}) \quad (25)$$

**Definition 36** We define  $c\_2Enumposrep\_2Enum\_to\_bin\_list$  to be  $(ap\ c\_2Enumposrep\_2En2l\ (ap\ c\_2Ebitstring\_2Ebitify))$ .  
 Let  $c\_2Ebitstring\_2Ebitify : \iota$  be given. Assume the following.

$$c\_2Ebitstring\_2Ebitify \in (((ty\_2Elist\_2Elist\ 2)^{(ty\_2Elist\_2Elist\ ty\_2Enum\_2Enum)})^{(ty\_2Elist\_2Elist\ 2)})^{(ty\_2Elist\_2Elist\ 2)} \quad (26)$$

**Definition 37** We define  $c\_2Ebitstring\_2En2v$  to be  $\lambda V0n \in ty\_2Enum\_2Enum. (ap\ (ap\ c\_2Ebitstring\_2Ebitify\ V0n))$ .  
 Let  $c\_2Ebitstring\_2Ebitify : \iota$  be given. Assume the following.

$$c\_2Ebitstring\_2Ebitify \in (((ty\_2Elist\_2Elist\ ty\_2Enum\_2Enum)^{(ty\_2Elist\_2Elist\ 2)})^{(ty\_2Elist\_2Elist\ ty\_2Enum\_2Enum)})^{(ty\_2Elist\_2Elist\ 2)} \quad (27)$$

Let  $c\_2Enumposrep\_2El2n : \iota$  be given. Assume the following.

$$c\_2Enumposrep\_2El2n \in ((ty\_2Enum\_2Enum^{(ty\_2Elist\_2Elist\ ty\_2Enum\_2Enum)})^{ty\_2Enum\_2Enum})^{(ty\_2Elist\_2Elist\ 2)} \quad (28)$$

**Definition 38** We define  $c\_2Enumposrep\_2Enum\_from\_bin\_list$  to be  $(ap\ c\_2Enumposrep\_2El2n\ (ap\ c\_2Ebitstring\_2En2v))$ .

**Definition 39** We define  $c\_2Ebitstring\_2Ev2n$  to be  $\lambda V0l \in (ty\_2Elist\_2Elist\ 2). (ap\ c\_2Enumposrep\_2Enum\_from\_bin\_list\ V0l)$ .

Assume the following.

$$\begin{aligned} \forall A\_27a.\text{nonempty } A\_27a \Rightarrow & (\forall V0v \in (ty\_2Elist\_2Elist\ 2). ((ap\ (c\_2Ewords\_2En2w\ A\_27a)\ (ap\ c\_2Ebitstring\_2Ev2n\ V0v)) = \\ & (ap\ (c\_2Ebitstring\_2Ev2w\ A\_27a)\ V0v))) \end{aligned} \quad (29)$$

Assume the following.

$$(\forall V0n \in ty\_2Enum\_2Enum. ((ap\ c\_2Ebitstring\_2Ev2n\ (ap\ c\_2Ebitstring\_2En2v\ V0n)) = V0n)) \quad (30)$$

Assume the following.

$$True \quad (31)$$

Assume the following.

$$\begin{aligned} \forall A\_27a.\text{nonempty } A\_27a \Rightarrow & (\forall V0t \in 2. ((\forall V1x \in \\ & A\_27a. (p\ V0t) \Leftrightarrow (p\ V0t))) \end{aligned} \quad (32)$$

Assume the following.

$$\begin{aligned} \forall A\_27a.\text{nonempty } A\_27a \Rightarrow & (\forall V0x \in A\_27a. ((V0x = V0x) \Leftrightarrow \\ & True)) \end{aligned} \quad (33)$$

Assume the following.

$$\begin{aligned} \forall A\_27a.\text{nonempty } A\_27a \Rightarrow & (\forall V0x \in A\_27a. (\forall V1y \in \\ & A\_27a. ((V0x = V1y) \Leftrightarrow (V1y = V0x)))) \end{aligned} \quad (34)$$

### Theorem 1

$$\begin{aligned} \forall A\_27a.\text{nonempty } A\_27a \Rightarrow & (\forall V0n \in ty\_2Enum\_2Enum. ((ap\ (c\_2Ebitstring\_2Ev2w\ A\_27a)\ (ap\ c\_2Ebitstring\_2En2v\ V0n)) = \\ & (ap\ (c\_2Ewords\_2En2w\ A\_27a)\ V0n))) \end{aligned}$$