

COMMENTS ON “THE GEOMETRY OF FROBENIIDS I”

SHINICHI MOCHIZUKI

December 2015

(1.) In Definition A.1 of the Appendix: The phrase “*isomorphism classes* of morphisms” in line 4 should read “*isomorphism classes* of 1-morphisms”. The phrase “*coarsification* of \mathcal{C} ” in line 5 should read “*coarsification* of \mathcal{D} ”.

(2.) The hypothesis that the Frobenioids under consideration be of “*unit-profinite type*” in Proposition 5.6 — hence also in Corollary 5.7, (iii) — may be *removed*. Indeed, if, in the notation of the proof of Proposition 5.6, one writes $\phi'_p = c_p \cdot \phi_p$, where $c_p \in \mathcal{O}^\times(A)$, for $p \in \mathfrak{Primes}$, then one has

$$\begin{aligned} c_2 \cdot c_p^2 \cdot \phi_2 \cdot \phi_p &= c_2 \cdot \phi_2 \cdot c_p \cdot \phi_p = \phi'_2 \cdot \phi'_p = \phi'_p \cdot \phi'_2 \\ &= c_p \cdot \phi_p \cdot c_2 \cdot \phi_2 = c_p \cdot c_2^p \cdot \phi_p \cdot \phi_2 = c_p \cdot c_2^p \cdot \phi_2 \cdot \phi_p \end{aligned}$$

— so $c_2 \cdot c_p^2 = c_p \cdot c_2^p$, i.e., $c_p = c_2^{p-1}$, for $p \in \mathfrak{Primes}$. Thus, $\phi'_p = c_2^{-1} \cdot \phi_p \cdot c_2$, so by taking $u \stackrel{\text{def}}{=} c_2^{-1}$, one may *eliminate the final two paragraphs* of the proof of Proposition 5.6.

(3.) In the second to last sentence of Definition 1.1, (ii),

“ Φ^{pf} ”

should read as follows:

“ Φ^{pf} ”

(4.) The phrase “If M is a \mathbb{Q} -monoprime monoid” toward the end of the discussion entitled “Numbers” in §0 should read “If M is a \mathbb{Q} - or \mathbb{R} -monoprime monoid”.

(5.) In the proof of Theorem 3.4, (iv), the phrase “ α arises as the endomorphism of A ” should read “ β arises as the endomorphism of B ”; also, in the same sentence, the notation “ $(\mathcal{P}_i)_A$ ” should read “ $(\mathcal{P}_i)_B$ ”.

(6.) The phrase “in which α, β are *primary* with zero divisor in \mathfrak{p} ;” immediately following the final display of the proof of Theorem 4.9 should read “in which α, β are *primary*;”.

(7.) In the proof of Theorem 3.4, (i), the phrase “for each $A \in \text{Ob}(\mathcal{C}^{\text{istr}})$ that” should read “for each $A \in \text{Ob}(\mathcal{C}_1^{\text{istr}})$, that”.

(8.) In the proof of Theorem 4.2, (i), the phrase “[cf. also Theorem 3.4, (ii)]” should read “[cf. also Theorem 3.4, (ii), (iii)]”.

(9.) In the fourth paragraph of the proof of Theorem 5.1, the notation “ $\psi : B' \rightarrow C$ ” should read “ $\psi' : B' \rightarrow C$ ”.

(10.) In the first display of the proof of Theorem 5.2, (iv), the notation “ $(B \rightarrow A, A \rightarrow C)$ ” should read “ $(B \rightarrow A, B \rightarrow C)$ ”.

(11.) In Example 6.1, the phrase “may be identified with the *group of Cartier divisors* on $V[L]$, and” should read “may be identified with the *group of Cartier divisors* on $V[L]$ with support in \mathbb{D}_L , and”.

(12.) In the proof of Lemma 6.5, (ii), the phrase “Indeed, since the ...” should read “Indeed, suppose that there exist $\lambda_1, \lambda_2 \in \mathbb{Q}_{>0}$ as in the statement of assertion (ii). Then since the ...”

(13.) In the discussion of §0 entitled “Numbers” the phrase “Also, we shall refer to ...” should read “Here, we regard the elements of the set $\{\mathbb{Z}, \mathbb{Q}, \mathbb{R}\}$ as being equipped with the ordering $\mathbb{Z} < \mathbb{Q} < \mathbb{R}$. Also, we shall refer to ...”.

(14.) In §I4, the phrase “that as appear as” should read “that appear as”.

(15.) In the second paragraph of the proof of Theorem 4.9, the phrase “this subset maps the subset” should read “this isomorphism maps the subset”.

(16.) In the discussion following the first display of Theorem 3.4, (iii), the notation “ $\Psi_{\geq 1}^{\mathbb{N}}$ ” should read “ $\Psi^{\mathbb{N}_{\geq 1}}$ ”.

(17.) In the first paragraph of the proof of Theorem 3.4, (iv), the phrase “existence of a a” should read “existence of a”.

(18.) In Example 6.1 and Theorem 6.2, the phrase “[possibly subvarieties of codimension ≥ 1]” (which is logically correct, but misleading) should be *deleted*.

(19.) In the second sentence following the display of Remark 3.1.2, the “ $\mathbb{Z}_{\geq 0}$ ” is to be understood as the image of $\mathbb{Z}_{\geq 0}$ in \mathbb{F} via the natural inclusion $\mathbb{Z}_{\geq 0} \xrightarrow{\sim} \mathbb{Z}_{\geq 0} \times \{1\} \hookrightarrow \mathbb{F} = \mathbb{Z}_{\geq 0} \times \mathbb{N}_{\geq 1}$ (cf. the final portion of Definition 1.1, (iii)) into the first factor of the product determined by $1 \in \mathbb{N}_{\geq 1}$.

(20.) In Theorem 5.2, (i), (b), the phrase “**projection to \mathcal{D} to ϕ** ” should read “**projection to \mathcal{D} of ϕ** ”.

(21.) In Proposition 1.6, (v), (vi), the phrase “A object” should read “An object”.

(22.) In Corollary 4.11, (iii), the phrase “ Ψ^{Base} of (i)” should read “ Ψ^{Base} of (ii)”.

(23.) In the second sentence of the proof of Theorem 5.1, the notation “ $\psi : B' \rightarrow C'$ ” should read “ $\psi' : B' \rightarrow C'$ ”.

(24.) In the explanation immediately following the first display of Theorem 5.2, (i), the notation “ $A \stackrel{\text{def}}{=} (A_{\mathcal{D}}, \alpha)$,” should be inserted immediately following the word “set”.

(25.) In Theorem 5.2, (i), the notation “ $\Phi(\text{Base}(\phi))$ ” (2 instances) should read “ $\underline{\Phi}(\text{Base}(\phi))^{\text{gp}}$ ”.