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CORRIGENDUM TO "ON THE CARTIER DUALITY OF CERTAIN FINITE GROUP SCHEMES OF ORDER p^n, II" [Tsukuba J. Math. 37 (2) (2013) 259–269]

By

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Abstract. We correct an error of the proof of Lemma 1 in the author's paper [1]. Also a typographical error is corrected.

There is an error in the proof of Lemma 1 in [1], which is amended as follows.

On Page 266, line -3, it is claimed that the diagram there given were commutative. But it is false. The only consequence of this wrong claim that is used in the subsequent argument is the inclusion

$$\mathrm{Ker}(F^{(\lambda)} \circ T_{\boldsymbol{a}}) \subset \mathrm{Ker}(F^{(\lambda^{p^\ell})}).$$

See Page 267, line 2. Therefore, one has only to reprove this inclusion.

Suppose $\boldsymbol{x} \in \mathrm{Ker}(F^{(\lambda)} \circ T_{\boldsymbol{a}})$, or equivalently,

$$\Phi_{k+1}(T_{\boldsymbol{a}}(\boldsymbol{x})) = \lambda^{p^k(p-1)}\Phi_k(T_{\boldsymbol{a}}(\boldsymbol{x})), \quad k \geq 0. \tag{C1}$$

See Page 265, line -8. To show $\boldsymbol{x} \in \mathrm{Ker}(F^{(\lambda^{p^\ell})})$, we wish to prove the equivalent

$$(\Phi_k(F^{(\lambda^{p^\ell})}(\boldsymbol{x})) =)\Phi_{k+1}(\boldsymbol{x}) - \lambda^{p^{\ell+k}(p-1)}\Phi_k(\boldsymbol{x}) = 0, \quad k \geq 0 \tag{C2}$$

by induction on k.

Suppose $k = 0$. The desired equality then follows by direct computation using Eqs. (5) and (7) on Page 265.

Suppose $k > 0$. The induction hypothesis $\Phi_i(F^{(\lambda^{p^\ell})}(\boldsymbol{x})) = 0$, $0 \leq i < k$, immediately implies

$$\Phi_{i+1}(\boldsymbol{x}) = \lambda^{p^\ell(p^{i+1}-1)}\Phi_0(\boldsymbol{x}), \quad 0 \leq i < k. \tag{C3}$$

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Using (5) again, we compute

$$\begin{aligned}\Phi_{k+1}(T_{\boldsymbol{a}}(\boldsymbol{x})) &= a_0^{p^{k+1}}\Phi_{k+1}(\boldsymbol{x}) + pa_1^{p^k}\Phi_k(\boldsymbol{x}) + \cdots + p^{k+1}a_{k+1}\Phi_0(\boldsymbol{x}) \\ &= a_0^{p^{k+1}}\Phi_{k+1}(\boldsymbol{x}) + (p^{\ell}\lambda^{p^{k+1}}/\lambda^{p^{\ell}}) \\ &\quad \times \Bigg\{ (p^{(\ell-1)(p^k-1)}\alpha_1^{p^k} + \cdots + p^{(\ell-k)(p-1)}\alpha_k^p) \\ &\qquad + 1 - p^{(p^{k+1}-1)\ell} - \sum_{i=1}^{k} p^{(p^{k+1-i}-1)(\ell-i)}\alpha_i^{p^{k+1-i}} \Bigg\}\Phi_0(\boldsymbol{x}) \\ &= a_0^{p^{k+1}}\Phi_{k+1}(\boldsymbol{x}) + \{(p^{\ell}\lambda^{p^{k+1}}/\lambda^{p^{\ell}}) - (p^{\ell p^{k+1}}\lambda^{p^{k+1}}/\lambda^{p^{\ell}})\}\Phi_0(\boldsymbol{x}).\end{aligned}$$

Similarly we have $\Phi_k(T_{\boldsymbol{a}}(\boldsymbol{x})) = (p^{\ell}\lambda^{p^k}/\lambda^{p^{\ell}})\Phi_0(\boldsymbol{x})$. The last two results, combined with (C1), show that the equality (C3) holds when $i = k$, as well. The equalities (C3) for $i = k-1, k$ show the desired (C2).

There is a misprint in [1]. On page 268, line -2 should read "$E_p(z, \lambda^{p^{\ell}}; \psi^{(\ell)}(x))$" instead of "$E_p(z, \lambda; \psi^{(\ell)}(x))$."

Reference

[1] M. Amano, On the Cartier duality of certain finite group schemes of order p^n, II, Tsukuba J. Math. **37** (2013), no. 2, 259–269.

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