CORRECTION TO: “GALOIS THEORY OF DIFFERENTIAL FIELDS OF POSITIVE CHARACTERISTIC”

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The proof of Proposition 11 of this paper contains an error in the stage of proving that $C(\sigma)$ is finitely generated over $C$. We present here a correct proof.

**Proof.** Since $\sigma N$ is finitely generated over $K$ and $\sigma$ is strong, $N\sigma N = NC(\sigma)$ is finitely generated over $N$. Hence, there exist elements $\gamma_1, \ldots, \gamma_s$ of $C(\sigma)$ such that $NC(\sigma) = N(\gamma_1, \ldots, \gamma_s)$. For each element $c$ of $C(\sigma)$, there exist polynomials $F$ and $G$ in $N[X_1, \ldots, X_s]$ such that

$$F(\gamma_1, \ldots, \gamma_s) - cG(\gamma_1, \ldots, \gamma_s) = 0$$

and $G(\gamma_1, \ldots, \gamma_s) \neq 0$. Among the monomials of $\gamma_1, \ldots, \gamma_s$ in the equation (1), we choose linearly independent elements $c_1, \ldots, c_r$ over $C$ and rewrite (1) in the form

$$\sum_{i=1}^r c_i a_i - c \left( \sum_{i=1}^r c_i b_i \right) = 0$$

where $a_1, \ldots, a_r, b_1, \ldots, b_r \in N$ and $\sum_{i=1}^r c_i b_i \neq 0$. If $\{\alpha_1, \ldots, \alpha_t\}$ is a maximal set of linearly independent elements over $C$ in $\{a_1, \ldots, a_r, b_1, \ldots, b_r\}$, then $a_i$ and $b_i$ ($i = 1, \ldots, r$) are represented by

$$a_i = \sum_{j=1}^t a_{ij} \alpha_j \quad (a_{i1}, \ldots, a_{it} \in C)$$

and

$$b_i = \sum_{j=1}^t b_{ij} \alpha_j \quad (b_{i1}, \ldots, b_{it} \in C).$$

By (2), we have

$$0 = \sum_{i=1}^r c_i \left( \sum_{j=1}^t a_{ij} \alpha_j \right) - c \left( \sum_{i=1}^r c_i \left( \sum_{j=1}^t b_{ij} \alpha_j \right) \right)$$

$$= \sum_{j=1}^t \left( \sum_{i=1}^r c_i a_{ij} - c \left( \sum_{i=1}^r c_i b_{ij} \right) \right) \alpha_j.$$
Since $N$ and $C(\sigma)$ are linearly disjoint over $C$, $\alpha_1, \ldots, \alpha_t$ are linearly independent over $C(\sigma)$ and thus

\begin{equation}
\sum_{i=1}^{r} c_i a_{ij} - c \left( \sum_{i=1}^{r} c_i b_{ij} \right) = 0 \quad (j = 1, \ldots, t).
\end{equation}

Suppose $\sum_{i=1}^{r} c_i b_{ij} (j = 1, \ldots, r)$ are all equal to zero, then

\[ b_{ij} = 0 \quad (i = 1, \ldots, r, j = 1, \ldots, t) \]

since $c_1, \ldots, c_r$ are linearly independent over $C$. Thus,

\[ \sum_{i=1}^{r} c_i b_i = \sum_{i=1}^{r} c_i \left( \sum_{j=1}^{t} b_{ij} \alpha_j \right) = 0, \]

and this contradicts $\sum_{i=1}^{r} c_i b_i \neq 0$. Therefore, there exists at least one index $k$ such that $\sum_{i=1}^{r} c_i b_{ik} \neq 0$. Consequently, by (3),

\[ c = \frac{\sum_{i=1}^{r} c_i a_{ij}}{\sum_{i=1}^{r} c_i b_{ij}} \in C(\gamma_1, \ldots, \gamma_s). \]

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