

Erratum to “Local Zeta Functions for Non-degenerate Laurent Polynomials Over p -adic Fields”

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The condition on the critical set for the mapping f considered in Section 2.5 of our article is not sufficient to assure the vanishing of the local zeta functions $Z_{\Phi}(s, \chi, f)$ for almost all χ as we assert in Theorem 3.9. The following modifications should be done.

(1) in Section 2.5, the first four lines should be replaced by the following text: We consider f as a regular function on $T^n(K)$. The critical set of f is $C_f := C_f(K) = \{x \in T^n(K), \nabla f(x) = 0\}$. Notice that by the non-degeneracy condition on f , $C_f \cap f^{-1}(0) = \emptyset$. Later on we will use the following condition: (A) $C_f = \emptyset$; (B) let \mathcal{F} be a fixed simple, non trivial, fan subordinated to Γ_{∞} . For any n -dimensional cone Δ in \mathcal{F} spanned by a_1, \dots, a_n , $d(a_j) \neq 0$ for any j in (2.3). We will call these conditions *Hypothesis H1*.

Hypothesis H1 is necessary to assure the vanishing of the twisted local zeta functions, and thus, to use Igusa’s method for estimating p -adic oscillatory integrals.

(2) In the statement of Theorem 3.9 the condition “ $C_f \subset f^{-1}(0)$ ” must be replaced by “*Hypothesis H1*”.

(3) In the statement of Theorem 4.2, the first four lines must be replaced by: *Let f be a Laurent polynomial which is weakly non-degenerate with respect to Γ_{∞} , with $\dim \Gamma_{\infty} = n$. Let \mathcal{F} be a nontrivial simple fan subordinated to Γ_{∞} as before. Assume that f satisfies Hypothesis H1. Then the following assertions hold.*

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In addition in the second line of Section 2.4.1, $\sum_{m \in \mathbb{Z}}$ should be replaced by $\sum_{m \in \mathbb{Z}^n}$. In line 9 in page 578, $\sum_{m \notin \tau' \cap \text{supp}(f)}$ in the definition of $f_{\Delta, \tau'}(y)$ should be replaced by $\sum_{m \in \tau' \cap \text{supp}(f)}$.

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