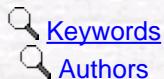


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Two Lemmas on Formal Power Series

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Abstract: Let L be a local field and \tilde{L} the completion of the maximal unramified extension of L . In this short note, we prove (I) the sequences $(1^{\prime\prime}) \rightarrowtail \{\mathcal{O}\}_{\tilde{L}}[[X_1, \dots, X_n]] \rightarrowtail \{\mathcal{O}\}_{\tilde{L}}[[X_1, \dots, X_n]] \rightarrowtail 0$ and (2) $1 \rightarrowtail \{\mathcal{O}\}_L[[X_1, \dots, X_n]] \rightarrowtail \{\mathcal{O}\}_{\tilde{L}}[[X_1, \dots, X_n]] \rightarrowtail 1$ are exact, where θ_L is the Frobenius automorphism over L applied on the coefficients of $\{\mathcal{O}\}_{\tilde{L}}[[X_1, \dots, X_n]]$, and $\theta_L - 1$ respectively denotes the mapping $\alpha \mapsto \alpha^{\theta_L} - \alpha$ for (1) and $\varepsilon \mapsto \frac{\varepsilon^{\phi_L}}{\varepsilon}$ for (2); (II) $\{\mathcal{C}\}^{\circ}(\tilde{L}, h)$ being the group the Coleman power series of degree 0, the sequence $1 \rightarrowtail \{\mathcal{C}\}^{\circ}(L, h) \rightarrowtail \{\mathcal{C}\}^{\circ}(\tilde{L}, h) \rightarrowtail \{\mathcal{C}\}^{\circ}(\tilde{L}, h) \rightarrowtail 1$ is exact, where $\{\mathcal{C}\}^{\circ}(L, h) = \{\mathcal{O}\}_L[[X]] \cap \{\mathcal{C}\}^{\circ}(\tilde{L}, h)$.

Key Words: Formal power series, Local fields, Formal groups, Lubin-Tate theory, Coleman power series.

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