

This note, that [was found here](#), as a part of [a collection](#) is written (completely with human hands) by [Rupadarshi Ray](#), was created on December 11, 2025 5:45:54 PM, was last modified on December 11, 2025 5:52:25 PM, and was exported on September 7, 2026 3:24:52 PM.

Convergent power series over a local field

Proposition: Let k be a local field with absolute value $|\cdot|_k$ and $f \in k[[X_1, \dots, X_k]]$. Then the following are equivalent

- $\exists \delta > 0$ such that $\sum_{\alpha \in \mathbb{N}^n} |f_\alpha|_k \delta^{|\alpha|}$ converges
- $\exists x \in k^{\times n}$ such that $\sum_{\alpha \in \mathbb{N}^n} f_\alpha x^\alpha$ converges in k

[1]

Definition. Ring of convergent power series over a local field

Let

$$k\{\{X_1, \dots, X_k\}\}$$

Current note has 0 direct children and 0 total descendants.

- [structures based on sets](#)
 - [Topological spaces](#)
 - [Local fields](#)
 - [Convergent power series over a local field](#)

And it has 1 siblings.

- [structures based on sets](#)
 - [Topological spaces](#)
 - [Local fields](#)
 - [Convergent power series over a local field](#)

1. [M S Raghunathan - Lie Groups and Lie Algebras \(2025\), p.29](#) ↩