

6. On an Equivalence of Convergences in Ranked Spaces

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K. Kunugi [1] has given the definitions of ranked spaces and convergences in ranked spaces.

One of convergences is defined as follows:

Let α be a natural number. Let $\{p_\alpha\}$ be a sequence of points and p a point in the ranked spaces R . Suppose that there is a decreasing sequence of the neighborhoods $V_\alpha(p)$ of the point p that has the rank γ_α , and that each of the neighborhoods $V_\alpha(p)$ satisfies the following conditions:

- 1) $V_1(p) \supseteq V_2(p) \supseteq \cdots \supseteq V_\alpha(p) \supseteq \cdots$,
- 2) $V_\alpha(p) \in \mathfrak{A}_{\gamma_\alpha}$, where $V_\alpha(p) \in \mathfrak{A}_{\gamma_\alpha}$ means that γ_α is the rank of $V_\alpha(p)$,
- 3) $\gamma_1 \leq \gamma_2 \leq \cdots \leq \gamma_\alpha \leq \cdots$,
- 4) $p_\alpha \in V_\alpha(p)$ for all α ,
- 5) $\lim_{\alpha \rightarrow \infty} \gamma_\alpha = +\infty$.

Then we say that the sequence $\{p_\alpha\}$ converges to the point p , and we write the following:

$$p \in \left\{ \lim_{\alpha} p_\alpha \right\}.$$

In this paper we shall define the para convergence and consider the relation between the convergence and the para convergence. To distinguish between the former and the latter, we shall say that a sequence $\{p_\alpha\}$ is R -convergent to the point p , if the sequence $\{p_\alpha\}$ converges to the point p .

Definition of the para convergence. Let α be a natural number. Let $\{p_\alpha\}$ be a sequence of points and p a point in the ranked space R . Suppose that there is a decreasing sequence of the neighborhoods $V_\alpha(p_\alpha)$ of p_α that has the rank γ_α , and that each of the neighborhoods $V_\alpha(p_\alpha)$ satisfies the following conditions,

- 1') $V_1(p_1) \supseteq V_2(p_2) \supseteq \cdots \supseteq V_\alpha(p_\alpha) \supseteq \cdots$,
- 2') $V_\alpha(p_\alpha) \in \mathfrak{A}_{\gamma_\alpha}$,
- 3') $\gamma_1 \leq \gamma_2 \leq \cdots \leq \gamma_\alpha \leq \cdots$,
- 4') $p \in V_\alpha(p_\alpha)$ for all α ,
- 5') $\lim_{\alpha \rightarrow \infty} \gamma_\alpha = +\infty$.

Then we say that the sequence $\{p_\alpha\}$ is para convergent to the point