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Closed subsets of a topological space

 Definition. Definition

Let X be a locally compact metrizable topological space with a countable basis. Let

$$\text{closed}(X)$$

be the collection of closed sets of X . We put a topology on $\text{closed}(X)$ such that a sequence $\{D_n\} \subseteq \text{closed}(X)$ converges to $D \in \text{closed}(X)$ in the **Chabauty topology** if

- for every $x \in D$ there exists a $x_n \in D_n$ for each $n \geq 1$ such that the sequence $\{x_n\}$ converges to x

$$x_n \xrightarrow{n \rightarrow \infty} x$$

- and for every sequence $\{x_{n_k} \in D_{n_k}\}$ that is convergent in X we have

$$\lim_{k \rightarrow \infty} x_{n_k} \in D$$

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