

Definition 8.67. [OKB]^a Let (X, τ) and (Y, σ) be two topological spaces, with (Y, σ) Hausdorff.^b Let $E \subseteq X$ and $f : E \rightarrow Y$. Let also x_0 be an accumulation point of E in X . We define that $\lim_{x \rightarrow x_0} f(x) = \ell \in Y$ if and only if, for every neighborhood V of ℓ in Y , there exists U neighbourhood of x_0 in X such that $f(U \cap E \setminus \{x_0\}) \subseteq V$.

^aDefinition 5.7.2 in the notes [3].

^bTo have uniqueness of the limit and therefore to give an unique meaning to $\lim_{x \rightarrow x_0} f(x)$ as an element of Y .