

Definition 12.2. [2GW] Let $E \subseteq X$, $x_0 \in X$ accumulation point of E , $f : E \rightarrow \mathbb{R}$ function. We define

$$\limsup_{x \rightarrow x_0} f(x) = \inf_{U \text{ neighbourhood of } x_0} \sup_{x \in U \cap E} f(x) \quad (12.3)$$

$$\liminf_{x \rightarrow x_0} f(x) = \sup_{U \text{ neighbourhood of } x_0} \inf_{x \in U \cap E} f(x) \quad (12.4)$$

where the first "inf" (resp. the "sup") is performed with respect to the family of all the deleted neighbourhoods U of x_0 .^a

^aIf we wish not to refer to deleted neighbourhoods, we may specify $x \in U \cap E, x \neq x_0$ in the second term.