Definition 12.2. [138] *A function* $f : X \to \mathbb{R}$ *is said* lower semicontinuous *(abbreviated* l.s.c.*) if*

$$\forall x_0 \in D(X) \quad , \quad \liminf_{x \to x_0} f(x) \geq f(x_0)$$

and vice versa it says upper semicontinuous *(abbreviated* u.s.c.*) if*

$$\forall x_0 \in D(X) \quad , \quad \limsup_{x \to x_0} f(x) \leq f(x_0) .$$

($D(X)$ are the accumulation points in X).