

Definition 3.141. [22R] Let $A \subseteq X$. The **majorants of A** (or **upper bounds**) are

$$M_A \stackrel{\text{def}}{=} \{x \in X : \forall a \in A, a \leq x\} \quad .$$

A set A is **bounded above** when there exists an $x \in X$ such that $\forall a \in A, a \leq x$, i.e. exactly when $M_A \neq \emptyset$.

If M_A has minimum s , then s is th **supremum**, a.k.a. **least upper bound**, of A , and we write $s = \sup A$.

By reversing the order relation in the above definition, we obtain the definition of **minorants/lower bounds, bounded below, infimum/greatest lower bound**.