

The Bright Side of Mathematics



Measure theory - Part 1



Length: $b - a$

different notions of length

X set

$\mathcal{P}(X)$ power set X

Example: $X = \{a, b\}$, $\mathcal{P}(X) = \{\emptyset, X, \{a\}, \{b\}\}$

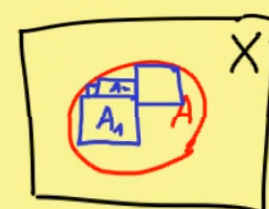
Definition: $\mathcal{A} \subseteq \mathcal{P}(X)$ is called a σ -algebra:

(a) $\emptyset, X \in \mathcal{A}$

(b) $A \in \mathcal{A} \Rightarrow A^c := X \setminus A \in \mathcal{A}$

(c) $A_i \in \mathcal{A}, i \in \mathbb{N} \Rightarrow \bigcup_{i=1}^{\infty} A_i \in \mathcal{A}$

$A \in \mathcal{A}$ is called a $\mathcal{A}$ -measurable set.



Example: (1) $\mathcal{A} = \{\emptyset, X\}$

(2) $\mathcal{A} = \mathcal{P}(X)$