

Extended Set Operations and Indexed Families of Sets

Let \mathcal{A} be a family of sets. The union over \mathcal{A} is

$$\bigcup_{A \in \mathcal{A}} A = \{x : x \in A \text{ for some } A \in \mathcal{A}\}.$$

Let \mathcal{A} be a family of sets. The intersection over \mathcal{A} is

$$\bigcap_{A \in \mathcal{A}} A = \{x : x \in A \text{ for every } A \in \mathcal{A}\}.$$

Let Δ be a nonempty set such that for each $\alpha \in \Delta$, there is a corresponding set A_α . The family $\{A_\alpha : \alpha \in \Delta\}$ is an indexed family of sets. The set Δ is called the indexing set and each $\alpha \in \Delta$ is an index.

The indexed family $\mathcal{A} = \{A_\alpha : \alpha \in \Delta\}$ of sets is pairwise disjoint iff for all α and β in Δ , either $A_\alpha = A_\beta$ or $A_\alpha \cap A_\beta = \emptyset$.