



SET DECOMPOSITIONS

Why

Let E denote a set and let A denote a set with $A \subset E$. A and $C(A)$ as breaking E into two pieces which do not overlap.

Discussion for complements

To make this precise, let us say that by “breaking E into two pieces” we mean that these two pieces are all of E . In other words, every element of E is contained either in A or $C(A)$. We use the language of set unions (Pair Unions).

Proposition 1 (Breaking). $A \cup C(A) = E$

Next, let us say that “do not overlap” means that no element of A is an element of $C(A)$ and vice versa. We use the language of set intersections (see Pair Intersections).

Proposition 2 (Non-overlapping). $A \cap C(A) = \emptyset$

Definition

We call a pair $\{A, B\}$ a *decomposition* of E if $A \cap B = \emptyset$ and $A \cup B = E$. If $A \cap B = \emptyset$ we say that $\{A, B\}$ are *disjoint*. If we have a set of sets \mathcal{A} satisfying $(A \in \mathcal{A} \wedge B \in \mathcal{A}) \longrightarrow (A \cap B = \emptyset)$ then we call \mathcal{A} *pairwise disjoint*.

