

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 interserctions (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 $A \cap B$ we say that $\{A, B\}$ are disjoint. If we have a set of sets A satisfying $(A \in A \land B \in A) \longrightarrow (A \cap B = \emptyset)$ then we call A pairwise disjoint.

