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 elemenet 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). $A \cap C(A) = \varnothing$

Definition

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

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                          Set Decompositions
                         ╱        │        ╲
                        ╱         │         ╲
            Pair Intersections  Pair Unions  ╲
                   │              │            ╲
                   │              ▼             ╲
                   │           Set Unions    Set Complements
                   │            ╱    ╲        ╱    │    ╲
                   │           ▼      ╲      ▼     │     ╲
                   │    Unordered Pairs  Empty Set │   Set Differences
                   │           ╲         ╱  ╲      │      ╱
                   ╲            ╲       ╱    ╲     ╱      ╱
                    ╲            ▼     ▼      ▼   ▼      ╱
                         Set Specification

                             Set Inclusion

                         Standardized Accounts

                               Accounts

                              Deductions

                         Quantified Statements

                          Logical Statements

                             Statements
                            ╱        ╲
                           ▼          ▼
                      Identities      Sets
                           ╲          ╱
                            ▼        ▼
                               Names
                             ╱      ╲
                            ▼        ▼
                        Letters    Objects
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