Partitions

1 Why

We divide a set into disjoint subsets whose union is the whole set. In this way we can handle each subset of the main set individually, and so handle the entire set piece by piece.

2 Definition

A set of sets is *disjoint* if the intersection of any two member sets is empty. A *partition* of a set is a disjoint family of subsets of the set whose union is the set. A *piece* of a partition is an element of the partition.

We say that the pieces of the partition are *mutually exclusive* (pairwise disjoint) and *collectively exhaustive* (union is full set).

2.1 Notation

We avoid introducing new notation for partitions. Instead, we here record the properties of partitions in prior notation.

Let A be a set. Let $\mathcal{A}$ be a set of subsets of A We denote the

condition that the $\mathcal{A}$ is disjoint by $B \cap C = \varnothing$ for all $B, C \in \mathcal{A}$. We denote the condition that the union of the members of $\mathcal{A}$ is A by $\cup_{\alpha \in I} A_\alpha = A$.