Sigma Algebra

1 Why

TODO

2 Definition

A **sigma algebra** a subset algebra which is closed under countable unions.

2.1 Notation

Let A be a set and $\mathcal{A} \subset 2^A$. We denote the subset algebra of A and $\mathcal{A}$ by $(A, \mathcal{A})$, read aloud as "A, script A."

3 Properties

Proposition 1 *For any set A, 2^A is a sigma algebra.*

Proposition 2 *The intersection of a family of sigma algebras is a sigma algebra.*

4 Generation

Proposition 3 *Let A a set and $\mathcal{B}$ a set of subsets. There is a unique smallest sigma algebra $(A, \mathcal{A})$ with $\mathcal{B} \subset \mathcal{A}$.*

We call the unique smallest sigma algebra containing B the **generated sigma algebra** of B.