Measure-theoretic Probability

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This slide deck is a WIP.

(It is not complete. Just gradually adding to it here and there.)

Conditional probability

Elementary definition

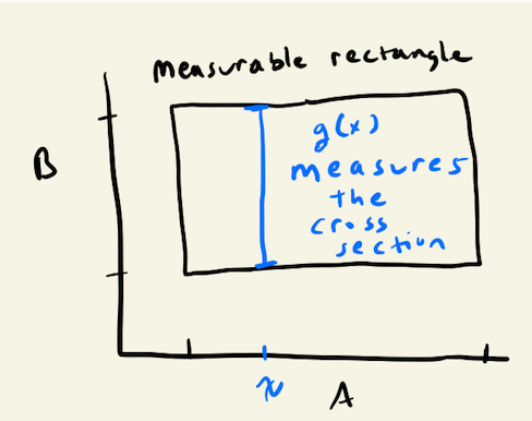
$$P(B \mid A) = \frac{P(A \cap B)}{P(B)}$$

what if $= 0$?

General definition

$$P(A \cap B) = \int_A g(x) \, dP(x)$$

defined as $P(B \mid x)$



Details

- $\lambda(A) := P(A \cap B)$ is a finite measure on A. Why?
- $\lambda \ll P$ (i.e. $P(A) = 0 \implies \lambda(A) = 0$). Why?
- Hence $g(x)$ must exist. Why?