Probability & Statistics

L-12

Continuous Probability measure/ Continuous random variables.

Ω = uncountable set

$(\mathbb{R}/\mathbb{R}^n)$

$[a,b]$

$p(x) : \mathbb{R} \to [0,\infty)$

$\Downarrow$ $\qquad\qquad \int_{-\infty}^{\infty} p(x)\,dx = 1$

$P_X(X = x)$,

Distribution Function.

In order to define distribution function on $(\Omega, \mathcal{A}, P)$. we always consider

$\Omega = \mathbb{R}$

even if a random experiment has only finite outcome.

For example, throwing a die

$$\Omega = \{1, 2, \ldots, 6\}.$$

But we consider the probability space $(\mathbb{R}, \mathcal{P}(\mathbb{R}), P)$

s.t. $P(\{k\}) = \frac{1}{6}$, $k \in \{1, 2, \ldots, 6\}$

$= 0$, otherwise.

Def. The function

$$F : \mathbb{R} \to [0, \infty)$$

defined by

$$F(t) = P((-\infty, t))$$

is called the distribution fn on $(\Omega, \mathcal{A}, P)$