Ex. A coin toss

$\Omega = \{H, T\}$ $\quad F = \{\emptyset, \{H\}, \{T\}, \{H, T\}\}$

$P: F \rightarrow [0,1]$

$P(\Omega)=1$, $\cancel{P(\Omega)\leq 1}$ $P(A)\geq 0, A\in F$,

$P(\bigcup A) = \sum_{i=1}^{n} P(A_i)$ if $A_i \cap A_j = \emptyset$ (disjiont).

$P(A^c)=1-P(A)$, $P(A)\leq 1 \rightarrow P(A^c)\geq 0$, $P(\emptyset)=0$

$P(A\cup B)=P(A)+P(B)-P(A\cap B)$

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

Geometric distribution $=(1-p)^{k-1}p$: The probability that we get an outcome ~~in~~ given a number of failures.

Binomial distribution: $\binom{n}{k} p^k (1-p)^{n-k}$; The probability of getting ~~that~~ a number of wanted results given a number of ~~tir~~ trials.

Poisson distribution: $f(k,\lambda)=\frac{\lambda^k e^{-\lambda}}{k!}$: number of wanted results in given period of time.

PDF : probability density function: $P[a\leq X\leq b]=\int_a^b f_X(x)\,dx$.