Random variables

Assigning probabilities to numbers or range of numbers rather than in terms of outcomes, events ...

→ Mapping between the space of events, outcomes etc to the space of numbers

$$\Omega \longrightarrow \mathbb{R}^n$$

(Ω: sample space)

[mapping between the sample space and the Real line]

a function ⇒ Random variable

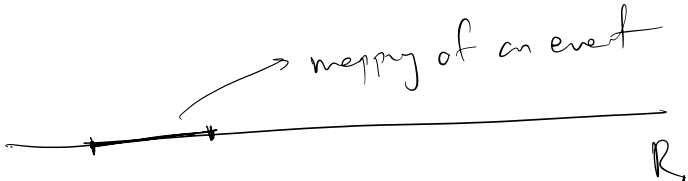
eg. R.V. is the sum of the face value on the two dice
(discrete R.V)

eg.
- R.V. Recorded temperature on a sensor
- R.V. Rounding of the temperature value
  - → (continuous R.V)

$\Lambda \longrightarrow \mathbb{R}$ (1D)

outcomes → numbers

events / combinations of outcomes → number or range of numbers (intervals)



eg. Prob of Discrete R.V.

$P(X = 1)$ | $P(X = \{1, 2, 3\})$

$P(X = 10)$ | $P(X = \{2, 10, 100\})$

⋮

eg. Prob of continuous R.V.

$P(a \leq X \leq b)$

$P(X \geq C)$

$P(X < C)$

where, $a, b, C \in \mathbb{R}$

→ assigning probabilities to diff intervals on $\mathbb{R}$

CDF: $F_X(x) = P(X \leq x)$

cumulative

Probability values assigned to all outcomes which are mapped on $\mathbb{R}$, via the R.V. X, that fall in the range $X \leq x$