

Advanced probability and applications: Introduction

Notations & conventions:

- A discrete set is a set in bijection with a subset of \mathbb{N}
(that is, a discrete set is either finite or countable)
- $\mathbb{N} = \{0, 1, 2, 3, \dots\}$ $\mathbb{N}^* = \{1, 2, 3, \dots\}$
- capital letters $X, Y, Z \leftrightarrow$ random variables
small letters $x, y, z \leftrightarrow$ numbers
- x is non-negative : $x \geq 0$
 x is positive : $x > 0$ (or " x is strictly positive")

- A mapping (= function) $f: \mathbb{R} \rightarrow \mathbb{R}$
 - is non-decreasing if $f(x) \leq f(y) \quad \forall x < y$
 - is (strictly) increasing if $f(x) < f(y) \quad \forall x < y$
- open interval: $]a, b[$
closed interval: $[a, b]$
- $A \subset B$ means "the set A is included in or equal to B "
 $A \subsetneq B$ means "A is strictly included in B"
- if x is an element of a set, then $\{x\}$ denotes the subset which is the singleton containing x only