1 Introduction

The table in the following section is a re-elaboration of a table in [2] (pag. 136). Kolmogorov's axiomatic theory of probability was very shortly reviewed in the first lecture and in chapter 2 of [1]. This theory enroots the foundations of probability theory in set theory and measure theory. It is therefore useful to summarize the interpretation of basic concepts in set and probability theory.

2 The table

Notation	Interpretation in set theory	Interpretation in probability theory
ω	Element, point.	Outcome, elementary event.
Ω	Set of points.	Space of the elementary events, certain event.
$\mathcal{F}$	σ-algebra of the subsets.	σ-algebra of the events.
$F \in \mathcal{F}$	A set of points.	An event: $\omega \in F$ implies the occurrence of F.
$F^c = \Omega/F$	Complementary set i.e. the set of points ω not belonging to F.	The event that F does not occur.
$F_1 \cup F_2$	Union of the sets F_1 and F_2 i.e. the set of points ω belonging either to F_1 or to F_2.	The event that *at least* F_1 or F_2 occurrs.
$F_1 \cap F_2$	Intersection of the sets F_1 and F_2 i.e. the set of points ω *simultaneously* belonging to F_1 and F_2.	The event that F_1 and F_2 simultaneously occurr.
$\emptyset$	The empty set.	The impossible event.
$F_1 \cap F_2 = \emptyset$	F_1 and F_2 do not intersect.	The *simultaneous* occurence of F_1 and F_2 is impossible i.e. F_1 and F_2 are *mutually exclusive*.
$F_1 + F_2$	Union of non intersecting sets F_1 and F_2.	Occurence of one out of two mutually exclusive events.
$F_1 \setminus F_2$	Difference of F_1 and F_2: points belonging to F_1 but not to F_2. It is valid to "subtract" members of a set that are not in the set as the operation has no effect.	The event that F_1 occurrs but not F_2.
$F_1 \triangle F_2 \equiv (F_1 \setminus F_2) \cup (F_2 \setminus F_1)$.	Symmetric difference of F_1 and F_2 i.e. the set of elements which are in one of the sets, but not in both.	Event that either F_1 or F_2 occurred but not. both simultaneously.
$\cup_{n=1}^{\infty} F_n$	Infinite union of elements of $\{F_n\}_{n=1}^{\infty}$.	event that one of the $F_n{}_{n=1}^{\infty}$ occurred.
$\sum_{n=1}^{\infty} F_n$	Infinite union of elements of the sequence of non-intersecting sets $\{F_n\}_{n=1}^{\infty}$.	Event that one of the *mutually exclusive* events $\{F_n\}_{n=1}^{\infty}$ occurrs.
$\cap_{n=1}^{\infty} F_n$	Intersection of the elements of $\{F_n\}_{n=1}^{\infty}$.	All the events $\{F_n\}_{n=1}^{\infty}$ *simultaneously* occurr.
$F_n \uparrow F$.	The increasing sequence of sets F_k converges to F: i.e. $F_n \subset F_{n'}$ For any $n \leq n'$ and $F = \cup_{n=1}^{\infty} F_n$.	The increasingly *likely* sequence of sets F_n converges to F.
$F_n \downarrow F$	The decreasing sequence of sets F_n converges to F, i.e. $F_{n'} \subset F_n$ for any $n \leq n'$ and $F = \cap_{n=1}^{\infty} F_n$.	The increasingly *unlikely* sequence of sets F_n converges to F.
$\limsup F_n$.	The set $\cap_{n=1}^{\infty} \cup_{k=n}^{\infty} F_k$.	F_n *i.o.* the event that infinitely many of the $\{F_n\}_{n=1}^{\infty}$ occurr.
$\liminf F_n$	The set $\cup_{n=1}^{\infty} \cap_{k=n}^{\infty} F_k$.	The event that all the events $\{F_n\}_{n=1}^{\infty}$ occurr with the eventual exception of a *finite number* of them.

References

[1] L.C. Evans, *An Introduction to Stochastic Differential Equations*, lecture notes, http://math.berkeley.edu/~evans/. 1

[2] A. N. Shiryaev, *Probability*, 2nd Ed. Springer (1996), http://books.google.com/ 1