

STATISTICS AND PROBABILITY

2

2	RANDOM VARIABLES AND PROBABILITY DISTRIBUTIONS	11
3	EXAMPLES OF DISCRETE PROBABILITY DISTRIBUTIONS	25
4	EXAMPLES OF CONTINUOUS PROBABILITY DISTRIBUTIONS	37
5	MULTIDIMENSIONAL PROBABILITY DISTRIBUTIONS	51
6	EXAMPLES OF MULTIDIMENSIONAL PROBABILITY DISTRIBUTIONS ..	61
7	SUM OF INDEPENDENT RANDOM VARIABLES	73
8	PROBABILITY INEQUALITIES	81
9	STATISTICAL ESTIMATION	91
10	HYPOTHESIS TESTING	99

Probability and statistics are important mathematical tools used in the state-of-the-art machine learning methods, and are becoming indispensable subjects of science in the era of big data. [Part 2](#) of this book is devoted to providing fundamentals of probability and statistics.

[Chapter 2](#) overviews the basic notions of random variables and probability distributions. [Chapter 3](#) and [Chapter 4](#) illustrate examples of discrete and continuous probability distributions, respectively. [Chapter 5](#) introduces concepts used in multidimensional data analysis, and [Chapter 6](#) give examples of multidimensional probability distributions. [Chapter 7](#) discusses the asymptotic behavior of the sum of independent random variables, and [Chapter 8](#) shows various inequalities related to random variables. Finally, [Chapter 9](#) and [Chapter 10](#) cover fundamentals of statistical estimation and hypothesis testing, respectively.