

CHAPTER OVERVIEW

3: Distributions

Recall that a *probability distribution* is just another name for a [probability measure](#). Most distributions are associated with [random variables](#), and in fact every distribution *can* be associated with a random variable. In this chapter we explore the basic types of probability distributions (discrete, continuous, mixed), and the ways that distributions can be defined using density functions, distribution functions, and quantile functions. We also study the relationship between the distribution of a random vector and the distributions of its components, conditional distributions, and how the distribution of a random variable changes when the variable is transformed.

In the advanced sections, we study convergence in distribution, one of the most important types of convergence. We also construct the abstract integral with respect to a positive measure and study the basic properties of the integral. This leads in turn to general (signed measures), absolute continuity and singularity, and the existence of density functions. Finally, we study various vector spaces of functions that are defined by integral pro

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