

<<用S-Plus做金融数据统计分析>>

图书基本信息

书名：<<用S-Plus做金融数据统计分析>>

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前言

This book grew out of lectures notes written for a one-semester junior statistics course offered to the undergraduate students majoring in the Department of Operations Research and Financial Engineering at Princeton University. Tidbits of the history of this course will shed light on the nature and spirit of the book. The purpose of the course is to introduce the students to modern data analysis with an emphasis on a domain of application that is of interest to most of them: financial engineering. The prerequisites for this course are minimal, however it is fair to say that all of the students have already taken a basic introductory statistics course. Thus the elementary notions of random variables, expectation and correlation are taken for granted, and earlier exposure to statistical inference (estimation, tests and confidence intervals) is assumed. It is also expected that the students are familiar with a minimum of linear algebra as well as vector and matrix calculus. Because of my background, the course is both computational and mathematical in nature. Most problems considered are formulated in a rigorous manner. Mathematical facts are motivated by applications, stated precisely, justified at an intuitive level, but essentially never proven rigorously. The emphasis is more on the relevance of concepts and on the practical use of tools, rather than on their theoretical underpinnings.

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内容概要

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章节摘录

插图：The look of a histogram can change significantly when the number of bins and the origin of the bins are changed. The reader is encouraged to produce different histograms for the same data sample by setting the value of the parameter `nclass` to different integers. Remark. The commands given above (as well as most of the commands in this book) can be used both on a Unix/Linux platform and under Windows. There are many other ways to produce plots, especially under Windows. For example, one can select the columns of the variables to be plotted, and then click on the appropriate button of the 2-D plot palette. In fact, some of these alternative methods give plots of better quality. Nevertheless, our approach will remain to provide S-plus commands and function codes which can be used on any platform supported by S-Plus, and essentially with any version of the program. A good part of classical parametric estimation theory can be recast in the framework of density estimation: indeed, estimating the mean and the variance of a normal population is just estimating the density of a normal population. Indeed, a Gaussian distribution is entirely determined by its first two moments, and knowing its mean and variance is enough to determine the entire distribution. Similarly, estimating the mean of an exponential population is the same as estimating the density of the population since the exponential distribution is completely determined by its rate parameter, which in turn is determined by the mean of the distribution. We are not interested in these forms of parametric density estimation in this section. Instead, we concentrate on nonparametric procedures. Like most nonparametric function estimation procedures, the histogram relies on the choice of some parameters, two to be precise. Indeed, in order to produce a histogram, one has to choose the width of the bins, and the origin from which the bins are defined. The dependence of the histogram upon the choice of the origin is an undesirable artifact of the method. In order to circumvent this shortcoming, the notion of averaged histogram was introduced: one histogram is computed for each of a certain number of choices of the origin, and all these histograms are averaged out to produce a smoother curve expected to be robust to shifts in the origin. This estimate is called the ASH estimate of the density of the population, the three initials A, S and H standing for "average shifted histogram". See the Notes & Complements at the end of this chapter for references. Even though ASH estimates are free of the artificial dependence on the choice of the origin, they are still dependent on the particular choice of the bin width, the latter being responsible for the look of the final product: ragged curves from a choice of small bin widths, and smoother looking blocks from a choice of larger bin widths. The decisive influence of this parameter should be kept in mind as we inch our way toward the introduction of our favorite density estimation procedure.

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