Chapter 1 : Applied Nonparametric Statistical Methods: 4th Edition (Hardback) - Routledge

Applied Nonparametric Statistical Methods provides a very clear exposition of modern nonparametric methods. Many students and practitioners will find it an excellent resource and reference for nonparametric statistics.

Definitions[edit] The statistician Larry Wasserman has said that "it is difficult to give a precise definition of nonparametric inference". The first meaning of nonparametric covers techniques that do not rely on data belonging to any particular distribution. These include, among others: As such it is the opposite of parametric statistics. It includes nonparametric descriptive statistics , statistical models , inference and statistical tests. Order statistics , which are based on the ranks of observations, is one example of such statistics and these play a central role in many nonparametric approaches. For example, the hypothesis a that a normal distribution has a specified mean and variance is statistical; so is the hypothesis b that it has a given mean but unspecified variance; so is the hypothesis c that a distribution is of normal form with both mean and variance unspecified; finally, so is the hypothesis d that two unspecified continuous distributions are identical. It will have been noticed that in the examples a and b the distribution underlying the observations was taken to be of a certain form the normal and the hypothesis was concerned entirely with the value of one or both of its parameters. Such a hypothesis, for obvious reasons, is called parametric. Hypothesis c was of a different nature, as no parameter values are specified in the statement of the hypothesis; we might reasonably call such a hypothesis non-parametric. Hypothesis d is also non-parametric but, in addition, it does not even specify the underlying form of the distribution and may now be reasonably termed distribution-free. Notwithstanding these distinctions, the statistical literature now commonly applies the label "non-parametric" to test procedures that we have just termed "distribution-free", thereby losing a useful classification. The second meaning of non-parametric covers techniques that do not assume that the structure of a model is fixed. Typically, the model grows in size to accommodate the complexity of the data. In these techniques, individual variables are typically assumed to belong to parametric distributions, and assumptions about the types of connections among variables are also made. These techniques include, among others: Applications and purpose[edit] Non-parametric methods are widely used for studying populations that take on a ranked order such as movie reviews receiving one to four stars. The use of non-parametric methods may be necessary when data have a ranking but no clear numerical interpretation, such as when assessing preferences. In terms of levels of measurement , non-parametric methods result in ordinal data. As non-parametric methods make fewer assumptions, their applicability is much wider than the corresponding parametric methods. In particular, they may be applied in situations where less is known about the application in question. Also, due to the reliance on fewer assumptions, non-parametric methods are more robust. Another justification for the use of non-parametric methods is simplicity. In certain cases, even when the use of parametric methods is justified, non-parametric methods may be easier to use. Due both to this simplicity and to their greater robustness, non-parametric methods are seen by some statisticians as leaving less room for improper use and misunderstanding. The wider applicability and increased robustness of non-parametric tests comes at a cost: In other words, a larger sample size can be required to draw conclusions with the same degree of confidence. Non-parametric models[edit] Non-parametric models differ from parametric models in that the model structure is not specified a priori but is instead determined from data. The term non-parametric is not meant to imply that such models completely lack parameters but that the number and nature of the parameters are flexible and not fixed in advance. A histogram is a simple nonparametric estimate of a probability distribution. Kernel density estimation provides better estimates of the density than histograms. Nonparametric regression and semiparametric regression methods have been developed based on kernels , splines , and wavelets . Data envelopment analysis provides efficiency coefficients similar to those obtained by multivariate analysis without any distributional assumption. KNNs classify the unseen instance based on the K points in the training set which are nearest to it. A support vector machine with a Gaussian kernel is a nonparametric large-margin

classifier. Methods[edit] Non-parametric or distribution-free inferential statistical methods are mathematical procedures for statistical hypothesis testing which, unlike parametric statistics , make no assumptions about the probability distributions of the variables being assessed. The most frequently used tests include Andersonâ€"Darling test:

Chapter 2 : Chapman & Hall Statistics Texts Series by R. Mead

statistical concepts and an introduction to basic ideas of nonparametric or distribution- free methods. Designed experiments, including those with factorial treatment structures, are now the focus of an entire chapter.

Subjects Description While preserving the clear, accessible style of previous editions, Applied Nonparametric Statistical Methods, Fourth Edition reflects the latest developments in computer-intensive methods that deal with intractable analytical problems and unwieldy data sets. Reorganized and with additional material, this edition begins with a brief summary of some relevant general statistical concepts and an introduction to basic ideas of nonparametric or distribution-free methods. Designed experiments, including those with factorial treatment structures, are now the focus of an entire chapter. The text also expands coverage on the analysis of survival data and the bootstrap method. The new final chapter focuses on important modern developments, such as large sample methods and computer-intensive applications. Keeping mathematics to a minimum, this text introduces nonparametric methods to undergraduate students who are taking either mainstream statistics courses or statistics courses within other disciplines. By giving the proper attention to data collection and the interpretation of analyses, it provides a full introduction to nonparametric methods. Reviews â€¦ The greatest strength of this book is that it is written at a level that is perfectly understandable by readers with only a course or two of introductory-level statistics. As such, it is appropriate for use as either a textbook for a first course in nonparametric methods for undergraduate statistics majors or as a reference for practitioners in other fields. It is also quite suitable as a supplementary statistics textbook for graduate students â€¦. Key concepts are taught using worked-out examples from a variety of fields. The writing is very accessible and not weighted down by any mathematics beyond the grasp of the intended audience. Therefore, I believe that this book can serve its intended audience. Applied Nonparametric Statistical Methods is an exception. Sprent and Smeeton have taken an accessible and well-regarded work and expanded, reorganized, and improved on it. The authors take painstaking care to inculcate an understanding of the appropriate use of nonparametric methods, as well as an appreciation for their application over a wide range of fields. The examples are well chosen, and the variety should ensure that every reader finds at least some of the problems interesting. The combination of clear writing and comprehensive coverage make it an excellent introductory text. Overall, this is a solid choice for a first course in nonparametric statistics for undergraduates. The formal testing procedures are illustrated in a nice way with realistic examples leading to final conclusions, comments, and a discussionâ€¦ The book has a clear style with well-organized material. The book works well as a reference book for users of nonparametric methods in different research areas. It is also a good textbook for undergraduate courses in statistics as well as courses for students majoring in other disciplines. Applied Nonparametric Statistical Methods provides a very clear exposition of modern nonparametric methods. Many students and practitioners will find it an excellent resource and reference for nonparametric statistics.

Chapter 3 : Applied Nonparametric Statistical Methods - CRC Press Book

Applied Nonparametric Statistical Methods CAT# CX Series: Chapman & Hall/CRC Texts in this text introduces nonparametric methods to undergraduate students.

Chapter 4 : Nonparametric statistics - Wikipedia

Chapman & Hall/CRC texts in statistical science series QA The textbook is for undergraduate students making their first foray into nonparametric methods, either in a mainstream statistics course or in service courses for students majoring in other disciplines.

Chapter 5 : CRC Press Online - Series: Chapman & Hall/CRC Texts in Statistical Science

This book should be of interest to research workers in industry, pharmaceutical firms, and all who use basic statistical methods. It should also be a useful text for undergraduate students taking university and polytechnic courses.

Chapter 6 : Statistical significance - Wikipedia

While preserving the clear, accessible style of previous editions, Applied Nonparametric Statistical Methods, Fourth Edition reflects the latest developments in computer-intensive methods that deal with intractable analytical problems and unwieldy data sets.