

Comparing Methods Of Measurement Why Plotting Difference

The angle of repose--the maximum angle that allows a heap of soil to remain stable without failing--is an important property of soils and affects the safety and costs of projects such as slopes or retaining walls. But several methods have been proposed to measure it, which might produce confusion in practice and research. The angles of repose obtained using six different methods for six different sands are compared here in order to quantify and explain the differences and determine some of the factors that influence the angle's value. The results show that the highest values are obtained with the ASTM International and Cornforth methods, followed by scoop deposition (6 % smaller), the Santamarina and Cho dry method (12 % smaller), and the cone lifting method (35 % smaller). Both the cone lifting method and the Santamarina and Cho wet method produce segregation of the finer particles for sands having a specific gravity greater than 2.7 and a difference of extreme void ratios larger than 0.3.

Presents statistical methodologies for analyzing common types of data from method comparison experiments and illustrates their applications through detailed case studies Measuring Agreement: Models, Methods, and Applications features statistical evaluation of agreement between two or more methods of measurement of a variable with a primary focus on continuous data. The authors view the analysis of method comparison data as a two-step procedure where an adequate model for the data is found, and then inferential techniques are applied for appropriate functions of parameters of the model. The presentation is accessible to a wide audience and provides the necessary technical details and references. In addition, the authors present chapter-length explorations of data from paired measurements designs, repeated measurements designs, and multiple methods; data with covariates; and heteroscedastic, longitudinal, and categorical data. The book also: • Strikes a balance between theory and applications • Presents parametric as well as nonparametric methodologies • Provides a concise introduction to Cohen's kappa coefficient and other measures of agreement for binary and categorical data • Discusses sample size determination for trials on measuring agreement • Contains real-world case studies and exercises throughout • Provides a supplemental website containing the related datasets and R code Measuring Agreement: Models, Methods, and Applications is a resource for statisticians and biostatisticians engaged in data analysis, consultancy, and methodological research. It is a reference for clinical chemists, ecologists, and biomedical and other scientists who deal with development and validation of measurement methods. This book can also serve as a graduate-level text for students in statistics and biostatistics.

S. Panchapakesan has made significant contributions to ranking and selection and has published in many other areas of statistics, including order statistics, reliability theory, stochastic inequalities, and inference. Written in his honor, the twenty invited articles in this volume reflect recent advances in these areas and form a tribute to Panchapakesan's influence and impact on these areas. Featuring theory, methods, applications, and extensive bibliographies with special emphasis on recent literature, this comprehensive reference work will serve researchers, practitioners, and graduate students in the statistical and applied mathematics communities.

Methods of Measurement for Semiconductor Materials, Process Control, and Devices

Measurement Technology for Micro-Nanometer Devices

Measurement and Statistics on Science and Technology

Comparing Methods of Coding Student Behavior in Collaborative Group Work

Quarterly report

Psychology in Advertising

This User's Guide is a resource for investigators and stakeholders who develop and review observational comparative effectiveness research protocols. It explains how to (1) identify key considerations and best practices for research design; (2) build a protocol based on these standards and best practices; and (3) judge the adequacy and completeness of a protocol. Eleven chapters cover all aspects of research design, including: developing study objectives, defining and refining study questions, addressing the heterogeneity of treatment effect, characterizing exposure, selecting a comparator, defining and measuring outcomes, and identifying optimal data sources. Checklists of guidance and key considerations for protocols are provided at the end of each chapter. The User's Guide was created by researchers affiliated with AHRQ's Effective Health Care Program, particularly those who participated in AHRQ's DECIDE (Developing Evidence to Inform Decisions About Effectiveness) program. Chapters were subject to multiple internal and external independent reviews. More more information, please consult the Agency website: www.effectivehealthcare.ahrq.gov)

This book provides a practical guide to analysis of simple and complex method comparison data, using Stata, SAS and R. It takes the classical Limits of Agreement as a starting point, and presents it in a proper statistical framework. The model serves as a reference for reporting sources of variation and for providing conversion equations and plots between methods for practical use, including prediction uncertainty. Presents a modeling framework for analysis of data and reporting of results from comparing measurements from different clinical centers and/or different methods. Provides the practical tools for analyzing method comparison studies along with guidance on what to report and how to plan comparison studies and advice on appropriate software. Illustrated throughout with computer examples in R. Supported by a supplementary website hosting an R-package that performs the major part of the analyses needed in the area. Examples in SAS and Stata for the most common situations are also provided. Written by an acknowledged expert on the subject, with a long standing experience as a biostatistician in a clinical environment and a track record of delivering training on the subject. Biostatisticians, clinicians, medical researchers and practitioners involved in research and analysis of measurement methods and laboratory investigations will benefit from this book. Students of statistics, biostatistics, and the chemical sciences will also find this book useful.

How do we objectively measure scientific activities? What proportion of economic activities should a society devote to research and development? How can public-sector and private-sector research best be directed to achieve social goals? Governments and researchers from industrial countries have been measuring science and technology for more than eighty years. This book provides the first comprehensive account of the attempts to measure science and technology activities in Western countries and the successes and shortcomings of statistical systems. Godin guides readers through the historical moments that led to the development of statistics on science and technology and also examines the socio-political dynamics behind social measurement. This enlightening account will be of interest to students and academics investigating science measurement as well as policy makers working in this burgeoning field.

Measuring Agreement

Exercise Science, Physical Education, Coaching, Athletic Training & Health

The Interpretation of Numerical Data

Measurement and Monitoring

Methodology and Applications

Comparing Methods Necessary for High-stakes Decisions

The accurate measurement of temperature is a vital parameter in many fields of engineering and scientific practice. Responding to emerging trends, this classic reference has been fully revised to include coverage of the latest instrumentation and measurement methods. Featuring: Brand new chapters on computerised temperature measuring systems, signal conditioning and temperature measurement in medicine Sections on noise thermometers, the development of photoelectric and multi-wavelength pyrometers and the latest IEC (International Electrotechnical Commission) standards Coverage of fibre optic thermometers, imaging of temperature fields and measurement in hazardous areas Examination of virtual instruments in temperature measurement, and new methods for thermometer calibration Many numerical examples, tables and diagrams Practising instrument engineers, graduate students and researchers in the fields of mechanical, electrical and electronic engineering and in other industrial areas will welcome this balanced approach to both the theory and practice of temperature measurement.

This book provides an updated account of the regression techniques employed in comparing analytical methods and to test the biases of one method relative to others – a problem commonly found in fields like analytical chemistry, biology, engineering, and medicine. Methods comparison involves a non-standard regression problem; when a method is to be tested in a laboratory, it may be used on samples of suitable reference material, but frequently it is used with other methods on a range of suitable materials whose concentration levels are not known precisely. By presenting a sound statistical background not found in other books for the type of problem addressed, this book complements and extends topics discussed in the current literature. It highlights the applications of the presented techniques with the support of computer routines implemented using the R language, with examples worked out step-by-step. This book is a valuable resource for applied statisticians, practitioners, laboratory scientists, geostatisticians, process engineers, geologists and graduate students.

This undergraduate statistical quality assurance textbook clearly shows how real projects, cases and data sets how statistical quality control tools are used in practice. Among the topics covered is a practical evaluation of measurement effectiveness for both continuous and discrete data. Gauge Reproducibility and Repeatability methodology (including confidence intervals for Repeatability, Reproducibility and the Gauge Capability Ratio) is thoroughly developed. Process capability indices and corresponding confidence intervals are also explained. In addition to process monitoring techniques, experimental design and analysis for process improvement are carefully presented. Factorial and Fractional Factorial arrangements of treatments and Response Surface methods are covered. Integrated throughout the book are rich sets of examples and problems that help readers gain a better understanding of where and how to apply statistical quality control tools. These large and realistic problem sets in combination with the streamlined approach of the text and extensive supporting material facilitate reader understanding. Second Edition Improvements Extensive coverage of measurement quality evaluation (in addition to ANOVA Gauge R&R methodologies) New end-of-section exercises and revised-end-of-chapter exercises Two full sets of slides, one with audio to assist student preparation outside-of-class and another appropriate for professors' lectures Substantial supporting material Supporting Material Seven R programs that support variables and attributes control chart construction and analyses, Gauge R&R methods, analyses of Fractional Factorial studies, Propagation of Error analyses and Response Surface analyses Documentation for the R programs Excel data files associated with the end-of-chapter problem sets, most from real engineering settings

Proceedings of the 8th Materials Research Symposium Held at the National Bureau of Standards, Gaithersburg, Maryland, September 20-24, 1976

The Sight-Size Cast

Advances in Ranking and Selection, Multiple Comparisons, and Reliability

Cochran's Method for Comparing Scales of Measurement: Techniques and Applications

Advances in Environmental Measurement Methods for Asbestos

Measurement Error in Progress Monitoring Data

Within The Sight-Size Cast is everything you ever wanted to know about Sight-Size cast drawing and painting, impressionistic seeing, and the ways in which many of the ateliers that stem from R. H. Ives Gammell and Richard Lack teach their students. You can learn how to see through Sight-Size with Darren Rousar's book, The Sight-Size Cast.

A fully comprehensive examination of state-of-the-art technologies for measurement at the small scale • Highlights the advanced research work from industry and academia in micro-nano devices test technology • Written at both introductory and advanced levels, provides the fundamentals and theories • Focuses on the measurement techniques for characterizing MEMS/NEMS devices

A clear and concise introduction and reference for anyone new to the subject of statistics.

Defining the Unit of Measurement in Observational Data

Electronic Instrumentation and Measurement

Anterior Open-bite

Heteroscedastic Models for Method Comparison Data

1920 to the Present

Basics, Measurement, Control, Capability, and Improvement

This book is devoted to the problems of measuring electrical parameters of microwave devices, circuits and systems by comparing the measured values of a quantity with known values of the quantity as represented by a reference microwave standard. The author has tried to cover quite a wide group of microwave measuring techniques in the study, since up to now comparison measurements have appeared only in periodicals, handbooks of microwave measuring techniques or in various manuals describing the standard measuring procedures. This broad-based approach offers the possibility of abstracting the principles which are common to all partial comparison techniques and their modifications, as well as deriving the general rules for the optimum design, set-up and use of corresponding measurement networks.

This book presents the main methods and techniques for measuring and monitoring the accuracy of geometrical parameters of precision Computer Numerically Controlled (CNC) and automated machines, including modern coordinate measuring machines (CMMs). Highlights include: • Standard methods and means of testing, together with methods newly developed and tested by the authors; • Various parameters, such as straightness, perpendicularity, flatness, pitch, yaw, and roll, as well as the principal processes for measurement of these parameters; • Lists and tables of geometrical accuracy parameters, together with diagrams of arrangements for their control and evaluation of measurement results; • Special methods and some original new devices for measurement and monitoring, information measuring systems (consisting of laser interferometers, photoelectric raster encoders or scales, etc.), and methods for the measurement and testing of circular scales, length scales, and encoders; • Methods for measuring small lengths, gaps, and distances between two surfaces; • Examples showing the suitability of mechatronic methods for high accuracy correction of machines; and • Particular attention is given to the analysis of ISO written standards of accuracy control, terms and definitions, and methods for evaluation of the measurement results during performance verification.

A complete theory of measurement from the principles of establishing the reality images to measurement procedures is presented in this book. A precise mathematical model of errors is presented with the use of various applications to interpret measurement results. Axioms are formulated which provide a deduction theory of measurement. The variety of problems addressed by modern science results in a diversity of models of physical and metrological phenomena, and leads to the view that there is not now, and may never be, a uniform theory of measurement. There is a need, however, to establish a foundation common to all measurements and studies, and this is the author's main aim allied to attempts to create a universal theory of measurement. The purpose of measurement is discussed. Many practical examples illustrating the methodology of modelling, calibration and the analysis of the results of measurement are reviewed. The book is designed for physicists, analytical and physical chemists and engineers involved with the work of metrology. A knowledge of physics, probability and statistics and the principles of metrology is a prerequisite for understanding this work.

Comparing Clinical Measurement Methods

Comparing Methods of Measurement with Analysis of Covariance and Mean Structures

Measurement of the Isotopic Enrichment of Uranium by a Direct Comparison Mass Spectrometer Method

Army Personnel Tests and Measurement

Microwave Measurement by Comparison Methods

Quantitative Comparison of In Situ Soil CO2 Flux Measurement Methods

Method comparison studies compare a new method of measuring a continuous variable with an established method that serves as a reference. Both methods have the same unit of measurement and none of them is considered error free. The major goals in these studies are to quantify the degree of similarity and agreement between the two methods. The motivation behind the comparison is that if two methods agree well, the cheaper, simpler, or the less invasive among them can be preferred or both can be used interchangeably. Such studies are common in biomedical sciences with medical devices, assays, measurement protocols, or clinical observers serving as methods. The most popular design for conducting these studies is the paired measurements design, which leads to one measurement by each method on every subject. These paired measurements method comparison data are often analyzed by modeling them using the classical measurement error model or a special case of it, a mixed-effects model. Motivated by real applications, this dissertation makes two contributions toward modeling and analysis of these data. First, we develop a segmented measurement error model assuming equal error variances. This model extends the classical measurement error model to allow a piecewise linear relationship between the measurements. The changepoint at which the transition takes place is treated as an unknown parameter in the model. We provide an expectation conditional maximization (ECM) algorithm to fit the model and propose segmented-specific evaluation of similarity and agreement using appropriate extensions of the existing measures. Bootstrapping and large-sample theory of maximum likelihood estimators are used to perform the relevant inferences. We are also able to obtain an explicit expression for the Hessian matrix that is needed for this purpose. The proposed methodology is evaluated by simulation and is illustrated by analyzing a dataset containing measurements of digoxin concentration. This work is also generalized to allow unequal error variances in the segmented model. Second, we develop a Bayesian approach that uses informative priors for error variances within a mixed-effect model framework. This approach allows taking advantage of information about error variances that may be available from previous studies, potentially leading to their improved estimation. Half-normal and hierarchical half-normal distributions are used as prior distributions for error variances and data from previous studies are used to estimate the hyperparameters of these distributions. We discuss strategies for posterior simulation to estimate the model parameters and their functions. The proposed methodology is compared with its likelihood-based counterpart in a simulation study. It is illustrated by analyzing a dataset containing oxygen saturation measurements.

This book takes a learner-oriented approach as it strives to make complex material understandable and usable. By understanding the underlying principles of measurement and evaluation, readers will then be able to apply those principles and concepts in a variety of physical activity and health-related settings. Practical exercises and applications demonstrate the usefulness of measurement and evaluation, reinforce key points, and make readers active participants in their own education. The book is divided into three parts. Part One introduces the measurement process, showing readers the relevance of measurement and evaluation to their personal and professional lives, and including examples and statistics related to such concepts as validity, reliability, and objectivity. The two chapters in Part Two further help readers understand numbers and assist those who need to use more advanced statistical calculations. Part Three presents measurement and evaluation applications in various settings, such as measuring physical fitness; measuring exercise, physical activity, and health; measuring in competitive sports and coaching; measuring and evaluating knowledge and assigning grades; and measuring in research. Throughout, discussions and examples show the relevance and application of measurement and evaluation in various professions, including physical therapy, athletic training, fitness/wellness management, exercise and sport psychology, exercise science, coaching, and physical education.

Support for the use of progress monitoring results for high-stakes decisions is emerging in the literature, but few studies support the reliability of the measures for this level of decision-making. What little research exists is limited to oral reading fluency measures, and their reliability for progress monitoring (PM) is not supported. This dissertation explored methods rarely applied in the literature for summarizing and analyzing progress monitoring results for medium- to high-stakes decisions. The study was conducted using extant data from 92 "low performing" third graders who were progress monitored using mathematics concept and application measures. The results for the participants in this study identified 1) the number of weeks needed to reliably assess growth on the measure; 2) if slopes differed when results were analyzed with parametric or nonparametric analyses; 3) the reliability of growth; and 4) the extent to which the group did or did not meet parametric assumptions inherent in the ordinary least square regression model. The results indicate reliable growth from static scores can be obtained in as few as 10 weeks of progress monitoring. It was also found that within this dataset, growth through parametric and nonparametric analyses was similar.

These findings are limited to the dataset analyzed in this study but provide promising methods not widely known among practitioners and rarely applied in the PM literature.

Comparison of Five Methods Used to Measure Hardness

Measurement in Medicine

Statistical Methods for Quality Assurance

A Practical Guide

Models, Methods, and Applications

Quarterly Report, January 1 to March 31, 1971

The book Electronic Instrumentation and Measurement has been written for the students of BE/BTech in Electronics and Communication Engineering, Electrical and Electronics Engineering, and Electronic Instrumentation Engineering. It explains the performance, operation and applications of the most important electronic measuring instruments, techniques and instrumentation methods that include both analog and digital instruments. The book covers a wide range of topics that deal with the basic measurement theory, measurement techniques, such as analog meter movements, digital instruments, power and energy measurement meters, AC and DC bridges, magnetic measurements, cathode ray oscilloscope, display devices and recorders, and transducers. It also explains generation and analysis of signals along with DC and AC potentiometers, and transformers. Key Features • Complete coverage of the subject as per the syllabi of most universities • Relevant illustrations provide graphical representation for in-depth knowledge • A large number of mathematical examples for maximum clarity of concepts • Chapter objectives at the beginning of each chapter for its overview • Chapter-end summary and exercises for quick review and to test your knowledge • A comprehensive index in alphabetical form for quick access to finer topics

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Method comparison studies for evaluating agreement between two methods of measuring a continuous response are common in health related disciplines. The data collected in these studies are generally analyzed assuming that the variability of response remains constant over the measurement range. However, it is often the case that this variability depends on the magnitude of measurement. Failing to take such heteroscedasticity into account may result in misleading conclusions as the extent of agreement in this case is not constant. The goal of this dissertation is to overcome this limitation by developing a methodology to analyze heteroscedastic method comparison data. We assume that the measurements are replicated. However, the design of the study need not be balanced.

The Statistical Evaluation of Measurement Errors

Methods and Standards for Environmental Measurement

A Comparison of One-sided Variables Acceptance Sampling Methods when Measurements are Subject to Error

Measurement and Evaluation in Physical Activity Applications

Developing a Protocol for Observational Comparative Effectiveness Research: A User's Guide

Design and Analysis of Reliability Studies

The major findings are that the LRT2 method generally yields smaller maximum consumer risks than the other three methods. (In some special cases, the David method yields smaller values.) This result is true across a variety of different combinations of plan parameters. Additionally, variations on the David and MLE methods are developed and compared for the situation where the measurement error variance is unknown, but can be estimated. Plans are developed for two different approaches to estimating the error variance. It is not clear which method is more useful because neither method out-performs the other in all situations.

This comprehensive new volume focuses on the latest research advances in measurement methods, monitoring strategies, data interpretation, and quality assurance for asbestos in bulk building materials, as well as ambient, indoor and workplace air, water, and settled dust. [Ed]

Concerned with statistical problems of assessing the dependability, precision and bias of measurements. Using a practical approach, it features enough theoretical material enabling users of relevant techniques to understand why and how the vast array of concepts and methods can be applied. Coverage includes analysis of variance, linear regression and chi-square tests for two-way contingency tables.

Precision Measurement and Calibration: Electricity

Selected NBS papers on temperature

A Comparison of Measurement Methods

Precision Measurement and Calibration

Contributions to Modeling and Analysis of Method Comparison Data

Comparison of Methods for the Measurement of the Angle of Repose of Granular Materials