

1. Record Nr.	UNINA9911019177203321
Autore	Alfassi Zeev B
Titolo	Statistical treatment of analytical data / / Zeev B. Alfassi, Zvi Boger, Yigal Ronen
Pubbl/distr/stampa	Oxford, : Blackwell Science, 2005
ISBN	9786610213399 9781280213397 1280213396 9781444305357 1444305352 9781405148146 1405148144
Descrizione fisica	1 online resource (272 p.)
Altri autori (Persone)	BogerZvi RonenYigal <1940->
Disciplina	543.0727
Soggetti	Chemometrics Chemistry - Statistical methods
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Statistical Treatment of Analytical Data; Contents; Preface; 1 Introduction; 1.1 Statistics and quality assurance, control and assessment; 1.2 References; 2 Statistical measures of experimental data; 2.1 Mean and standard deviation; 2.2 Graphical distributions of the data - bar charts or histograms; 2.3 Propagation of errors (uncertainties); 2.4 References; 3 Distribution functions; 3.1 Confidence limit of the mean; 3.2 Measurements and distribution functions; 3.3 Mathematical presentation of distribution and; 3.4 Continuous distribution functions; 3.5 Discrete distribution functions 3.6 References 4 Confidence limits of the mean; 4.1 Confidence limits; 4.2 The Central Limit Theorem - the distribution of means; 4.3 Confidence limit of the mean; 4.4 Confidence limits of the mean of small samples; 4.5 Choosing the sample size; 5 Significance test; 5.1 Introduction; 5.2 Comparison of an experimental mean with an expected; 5.3 Comparison of two samples; 5.4 Paired t-test; 5.5

Comparing two variances - the F-test; 5.6 Comparison of several means; 5.7 The chi-squared (χ^2) test; 5.8 Testing for normal distribution - probability paper; 5.9 Non-parametric tests; 5.10

References

6 Outliers 6.1 Introduction; 6.2 Dixon's Q-test; 6.3 The rule of huge error; 6.4 Grubbs test for outliers; 6.5 Youden test for outlying laboratories; 6.6 References; 7 Instrumental calibration - regression analysis; 7.1 Errors in instrumental analysis vs. classical 'wet chemistry' methods; 7.2 Standards for calibration curves; 7.3 Derivation of an equation for calibration curves; 7.4 Least squares as a maximum likelihood estimator; 7.5 Tests for linearity; 7.6 Calculation of the concentration; 7.7 Weighted least squares linear regression; 7.8 Polynomial calibration equations
7.9 Linearization of calibration curves in nuclear measurements 7.10 Non-linear curve fitting; 7.11 Fitting straight-line data with errors in both coordinates; 7.12 Limit of detection; 7.13 References; 8 Identification of analyte by multi-measurement analysis; 8.1 References; 9 Smoothing of spectra signals; 9.1 Introduction; 9.2 Smoothing of spectrum signals; 9.3 Savitzky and Golay method (SG method); 9.4 Studies in noise reduction; 9.5 Extension of SG method; 9.6 References; 10 Peak search and peak integration; 10.1 A statistical method; 10.2 First derivative method
10.3 Second derivative method 10.4 Computer - visual separation of peaks; 10.5 Selection of the fitting interval and integration; 10.6 References; 11 Fourier Transform methods; 11.1 Fourier Transform methods in spectroscopy; 11.2 Mathematics of Fourier Transforms; 11.3 Discrete Fourier Transforms; 11.4 Fast Fourier Transforms (FFT); 11.5 References; 12 General and specific issues in uncertainty analysis; 12.1 Introduction; 12.2 The uncertainty era; 12.3 Uncertainties and the laws of nature; 12.4 The creation of the universe and the law of energy and mass
12.5 Statistical and systematic uncertainties

Sommario/riassunto

Statistical techniques have assumed an integral role in both the interpretation and quality assessment of analytical results. In this book the range of statistical methods available for such tasks are described in detail, with the advantages and disadvantages of each technique clarified by use of examples. With a focus on the essential practical application of these techniques the book also includes sufficient theory to facilitate understanding of the statistical principles involved.

Statistical Treatment of Analytical Data is written for professional analytical chemists in
