

Book Reviews

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BOOK REVIEWS — РЕЦЕНЗИИ

K. Sarkadi and I. Vincze: MATHEMATICAL METHODS OF STATISTICAL QUALITY CONTROL, Akadémiai Kiadó, Budapest 1974, p. 415.

The book is divided into three chapters and an appendix which contains twelve special statistical tables. Further 32 tables and 60 figures which enable to solve many problems of statistical quality control are in the text of the book.

In the first (introductory) chapter (pp. 11—25) the meaning of the concept of the statistical quality control is explained and it is referred to the mathematical methods used in it. With help of examples the following concepts are introduced: random variable, sample space, random vector, probability, statistical hypothesis, errors of the first and second kind.

The second chapter (pp. 26—226) contains the introduction to probability theory (conditional probability, independence of random events, marginal distribution, Bayes' theorem), random variable and its distribution (discrete and continuous random variable, random vector, joint distribution function, moments of the random variables, correlation coefficient, distribution function of some simple transformation of the random vector, the inequality of Chebyshev, law of large number, the most important distribution functions of the discrete and continuous random variables with their mean values and dispersions, the central limit theorem) the sample characteristics (the histogram, the order statistics, the sample mean and median, the sample dispersion, the empirical distributions, theorems of Kolmogorov and Smirnov, theorem of Glivenko) and introduction to mathematical statistics (parametric and nonparametric methods, problems of estimation, the point estimation, unbiasedness, efficiency, consistency, sufficiency, Rao-Cramér inequality, interval estimation, Bayes method of estimation, testing statistical hypotheses, errors of the first and second kind, the power function, OC-curve, lemma of Neyman and Pearson, randomized tests, consistency and unbiasedness of tests, u-test, t-test, F-test, Welch-test, Bardett-test, fundamentals of correlation and regression analysis, test of "goodness of fit", fundamentals of the theory of statistical decision functions, stochastic processes).

The third chapter (pp. 230—378) is engaged in the special procedures of statistical quality control. Concepts of the control by attributes and by variables are explained. Techniques for the collection of data, determination of the accuracy of the machine and statistical control during the production process are treated. In the control by attributes the utilization of control charts for the number and for the fraction of defectives and narrow-limit gaging is mentioned. An interesting part of this chapter is the theory of the choice of the intervals between two consecutive controls. Acceptance sampling schemes for one investigated parameter are explained in detail. Except for theory standards for double and multiple sampling, which are used in the practice, are treated and evaluation of the efficiency of sampling is made at the same time. A large table for sampling inspection by variables is given. Theory and application of Wald's sequential analysis in the statistical quality control in the cases of the binomial and Gaussian distribution is given. The acceptance plans in the case of stochastic relations between sample and lot are investigated. The chapter is finished by the introduction to the theory of reliability.

The book contains many examples which are very useful for application of the theory. Mainly in the third chapter there are comments showing expert knowledge of authors in this domain of problems and which enable the reader to avoid some possible failures in using of the methods of statistical quality control in the practise.

The book should be recommended not only to experts in statistical quality control but to students of university, technical university and to all persons directing the quality control in factories.

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J. Varga: PRAKTISCHE OPTIMIERUNG

(Verfahren und Anwendungen der linearen und nichtlinearen Optimierung.) Akadémiai Kiadó, Budapest 1974 (Gemeinschaftsausgabe mit R. Oldenbourg Verlag, München—Wien), 365 Seiten, 34 Abb.

Ein Lehrbuch, das mathematische Methoden der Produktionsplanung und Produktionsorganisation behandelt, die meist zur linearen Optimierung führen. Es hat 22 Kapitel: 1. Die äquivalenten Formen der linearen Modelle, 2. Die graphische Lösung von linearen Modellen, 3. Numerische Methoden zur Bestimmung der optimalen Lösung von linearen Modellen, 4. Primale Simplexmethode, 5. Die duale Simplexmethode, 6. Die Mischung von Simplexmethoden, 7. Modifizierte primale und duale Simplexmethode, 8. Modelle mit beschränkten Variablen, 9. Die Optimierung von einparametrischen linearen Modellen, 10. Schattenpreise, 11. Die Lösung nichtlinearer Modelle mit der Simplexmethode, 12. Die Lösung von Verteilungsproblemen mit der Distributionsmethode, 13. Produktions- und Verteilungsaufgaben, 14. Allgemeine Verteilungsaufgaben, 15. Die „Ungarische Methode“, 16. Optimierung an Graphen, 17. Die Methode des kritischen Weges, 18. Optimierung in der Industrie, 19. Optimierung in der Landwirtschaft, 20. Optimierung im Handel, 21. Optimierung im Transportwesen, 22. Die Lösungen der Aufgaben.

Der Schwerpunkt des Buches scheint nicht in strengen Beweisen theoretischer Ergebnisse, sondern in den Anwendungen zu sein. Das Buch enthält eine grosse Anzahl von numerischen Beispielen aus der Praxis. Man kann es allen Fachleuten, die sich mit den wirtschaftlichen Problemen der Produktion beschäftigen, empfehlen.

Miroslav Fiedler, Praha