

1. Record Nr.	UNINA9910876860903321
Autore	Rencher Alvin C. <1934->
Titolo	Linear models in statistics // Alvin C. Rencher and G. Bruce Schaalje
Pubbl/distr/stampa	Hoboken, N.J., : Wiley-Interscience, c2008
ISBN	1-281-22163-5 9786611221638 0-470-19261-5 0-470-19260-7
Edizione	[2nd ed.]
Descrizione fisica	1 online resource (690 p.)
Altri autori (Persone)	SchaaljeG. Bruce
Disciplina	519.5/35
Soggetti	Linear models (Statistics)
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 (p. 653-661) and index.
Nota di contenuto	LINEAR MODELS IN STATISTICS; CONTENTS; Preface; 1 Introduction; 1.1 Simple Linear Regression Model; 1.2 Multiple Linear Regression Model; 1.3 Analysis-of-Variance Models; 2 Matrix Algebra; 2.1 Matrix and Vector Notation; 2.1.1 Matrices, Vectors, and Scalars; 2.1.2 Matrix Equality; 2.1.3 Transpose; 2.1.4 Matrices of Special Form; 2.2 Operations; 2.2.1 Sum of Two Matrices or Two Vectors; 2.2.2 Product of a Scalar and a Matrix; 2.2.3 Product of Two Matrices or Two Vectors; 2.2.4 Hadamard Product of Two Matrices or Two Vectors; 2.3 Partitioned Matrices; 2.4 Rank; 2.5 Inverse 2.6 Positive Definite Matrices 2.7 Systems of Equations; 2.8 Generalized Inverse; 2.8.1 Definition and Properties; 2.8.2 Generalized Inverses and Systems of Equations; 2.9 Determinants; 2.10 Orthogonal Vectors and Matrices; 2.11 Trace; 2.12 Eigenvalues and Eigenvectors; 2.12.1 Definition; 2.12.2 Functions of a Matrix; 2.12.3 Products; 2.12.4 Symmetric Matrices; 2.12.5 Positive Definite and Semidefinite Matrices; 2.13 Idempotent Matrices; 2.14 Vector and Matrix Calculus; 2.14.1 Derivatives of Functions of Vectors and Matrices; 2.14.2 Derivatives Involving Inverse Matrices and Determinants 2.14.3 Maximization or Minimization of a Function of a Vector 3 Random Vectors and Matrices; 3.1 Introduction; 3.2 Means, Variances, Covariances, and Correlations; 3.3 Mean Vectors and Covariance

Matrices for Random Vectors; 3.3.1 Mean Vectors; 3.3.2 Covariance Matrix; 3.3.3 Generalized Variance; 3.3.4 Standardized Distance; 3.4 Correlation Matrices; 3.5 Mean Vectors and Covariance Matrices for Partitioned Random Vectors; 3.6 Linear Functions of Random Vectors; 3.6.1 Means; 3.6.2 Variances and Covariances; 4 Multivariate Normal Distribution; 4.1 Univariate Normal Density Function  
4.2 Multivariate Normal Density Function  
4.3 Moment Generating Functions; 4.4 Properties of the Multivariate Normal Distribution; 4.5 Partial Correlation; 5 Distribution of Quadratic Forms in  $y$ ; 5.1 Sums of Squares; 5.2 Mean and Variance of Quadratic Forms; 5.3 Noncentral Chi-Square Distribution; 5.4 Noncentral F and t Distributions; 5.4.1 Noncentral F Distribution; 5.4.2 Noncentral t Distribution; 5.5 Distribution of Quadratic Forms; 5.6 Independence of Linear Forms and Quadratic Forms; 6 Simple Linear Regression; 6.1 The Model; 6.2 Estimation of  $(0)$ ,  $(1)$ , and  $(2)$   
6.3 Hypothesis Test and Confidence Interval for  $(1)$   
6.4 Coefficient of Determination; 7 Multiple Regression: Estimation; 7.1 Introduction; 7.2 The Model; 7.3 Estimation of  $\beta$  and  $(2)$ ; 7.3.1 Least-Squares Estimator for  $\beta$ ; 7.3.2 Properties of the Least-Squares Estimator; 7.3.3 An Estimator for  $(2)$ ; 7.4 Geometry of Least-Squares; 7.4.1 Parameter Space, Data Space, and Prediction Space; 7.4.2 Geometric Interpretation of the Multiple Linear Regression Model; 7.5 The Model in Centered Form; 7.6 Normal Model; 7.6.1 Assumptions; 7.6.2 Maximum Likelihood Estimators for  $\beta$  and  $(2)$   
7.6.3 Properties of  $\beta$  and  $(2)$

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## Sommario/riassunto

The essential introduction to the theory and application of linear models—now in a valuable new edition. Since most advanced statistical tools are generalizations of the linear model, it is necessary to first master the linear model in order to move forward to more advanced concepts. The linear model remains the main tool of the applied statistician and is central to the training of any statistician regardless of whether the focus is applied or theoretical. This completely revised and updated new edition successfully develops the basic theory of linear models for regression, analysis of vari

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