

1. Record Nr.	UNINA9910437876603321
Autore	Burgisser Peter <1962->
Titolo	Condition : the geometry of numerical algorithms / / Peter Burgisser, Felipe Cucker
Pubbl/distr/stampa	Berlin ; ; Heidelberg, : Springer-Verlag, 2013
ISBN	9783642388965 3642388965
Edizione	[1st ed. 2013.]
Descrizione fisica	1 online resource (xxxi, 554 pages) : illustrations
Collana	Grundlehren der mathematischen Wissenschaften, A Series of Comprehensive Studies in Mathematics, , 0072-7830 ; ; 349
Altri autori (Persone)	CuckerFelipe <1958->
Disciplina	518
Soggetti	Numerical analysis Geometry Algorismes Anàlisi numèrica Àlgebra lineal Conjunts convexos Geometria estocàstica Anàlisi d'error (Matemàtica) Programació (Matemàtica) Llibres electrònics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	"ISSN: 0072-7830."
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Preface -- Overture: On the Condition of Numerical Problems and the Numbers that Measure It -- I Condition in Linear Algebra (Adagio): 1 Normwise Condition of Linear Equation Solving -- 2 Probabilistic Analysis -- 3 Error Analysis of Triangular Linear Systems -- 4 Probabilistic Analysis of Rectangular Matrices -- 5 Condition Numbers and Iterative Algorithms -- Intermezzo I: Condition of Structured Data -- II Condition in Linear Optimization (Andante): 6 A Condition Number for Polyhedral Conic Systems -- 7 The Ellipsoid Method -- 8 Linear Programs and their Solution Sets -- 9 Interior-point Methods -- 10 The Linear Programming Feasibility Problem -- 11 Condition and Linear Programming Optimization -- 12 Average Analysis of the RCC Condition Number -- 13 Probabilistic Analyses of the GCC Condition

Number -- Intermezzo II: The Condition of the Condition -- III
Condition in Polynomial Equation Solving (Allegro con brio): 14 A
Geometric Framework for Condition Numbers -- 15 Homotopy
Continuation and Newton's Method -- 16 Homogeneous Polynomial
Systems -- 17 Smale's 17th Problem: I -- 18 Smale's 17th Problem: II
-- 19 Real Polynomial Systems -- 20 Probabilistic Analysis of Conic
Condition Numbers: I. The Complex Case 4 -- 21 Probabilistic Analysis
of Conic Condition Numbers: II. The Real Case -- Appendix .

Sommario/riassunto

This book gathers threads that have evolved across different mathematical disciplines into seamless narrative. It deals with condition as a main aspect in the understanding of the performance ---regarding both stability and complexity--- of numerical algorithms. While the role of condition was shaped in the last half-century, so far there has not been a monograph treating this subject in a uniform and systematic way. The book puts special emphasis on the probabilistic analysis of numerical algorithms via the analysis of the corresponding condition. The exposition's level increases along the book, starting in the context of linear algebra at an undergraduate level and reaching in its third part the recent developments and partial solutions for Smale's 17th problem which can be explained within a graduate course. Its middle part contains a condition-based course on linear programming that fills a gap between the current elementary expositions of the subject based on the simplex method and those focusing on convex programming.
