Positive Definite Matrices

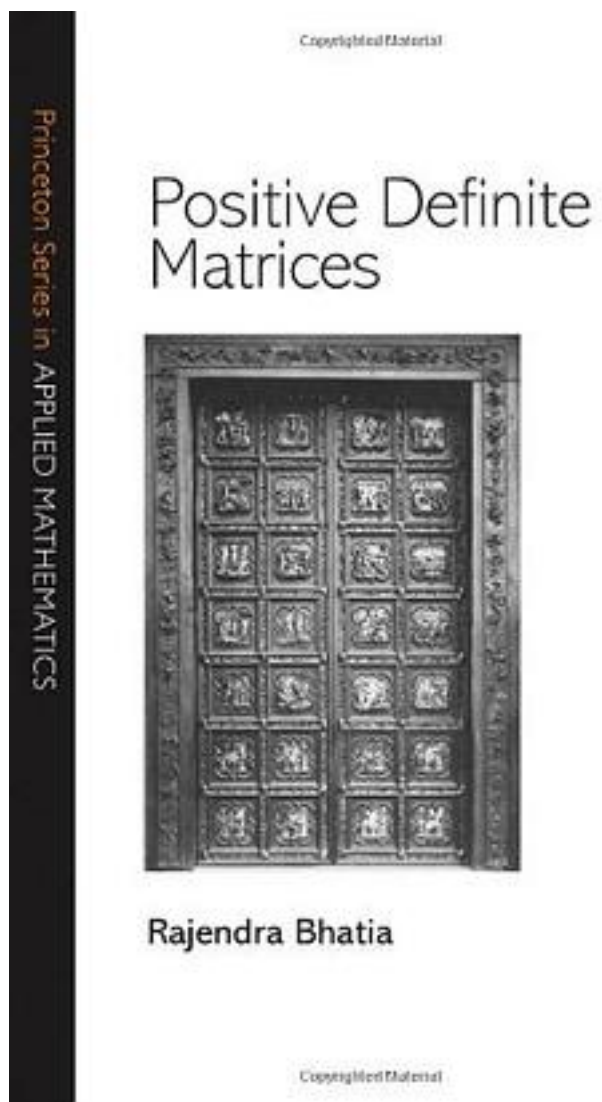Positive Definite
Matrices

Princeton Series in APPLIED MATHEMATICS

Rajendra Bhatia

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This book represents the first synthesis of the considerable body of new research into positive definite matrices. These matrices play the same role in noncommutative analysis as positive real numbers do in classical analysis. They have theoretical and computational uses across a broad spectrum of disciplines, including calculus, electrical engineering, statistics, physics, numerical analysis, quantum information theory, and geometry. Through detailed explanations and an authoritative and inspiring writing style, Rajendra Bhatia carefully develops general techniques that have wide applications in the study of such matrices. Bhatia introduces several key topics in functional analysis, operator theory, harmonic analysis, and differential geometry - all built around the central theme of positive definite matrices. He discusses positive and completely positive linear maps, and presents major theorems with simple and direct proofs. He examines matrix means and their applications, and shows how to use positive definite functions to derive operator inequalities that he and others proved in recent years. He guides the reader through the differential geometry of the manifold of positive definite matrices, and explains recent work on the geometric mean of several matrices. "Positive Definite Matrices" is an informative and useful reference book for mathematicians and other researchers and practitioners. The numerous exercises and notes at the end of each chapter also make it the ideal textbook for graduate-level courses.

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