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Nota di contenuto	Preface; Contents; 1 Introduction; 1.1 History of RMT and Current Development; 1.1.1 A brief review of RMT; 1.1.2 Spectral Analysis of Large Dimensional Random Matrices; 1.1.3 Limits of Extreme Eigenvalues; 1.1.4 Convergence Rate of ESD; 1.1.5 Circular Law; 1.1.6 CLT of Linear Spectral Statistics; 1.1.7 Limiting Distributions of Extreme Eigenvalues and Spacings; 1.2 Applications to Wireless Communications; 1.3 Applications to Finance Statistics; 2 Limiting Spectral Distributions; 2.1 Semicircular Law; 2.1.1 The iid Case; 2.1.2 Independent but not Identically Distributed 2.2 Marcenko-Pastur Law 2.2.1 MP Law for iid Case; 2.2.2 Generalization to the Non-iid Case; 2.2.3 Proof of Theorem 2.11 by Stieltjes Transform; 2.3 LSD of Products; 2.3.1 Existence of the ESD of $S_n T_n$ ; 2.3.2 Truncation of the ESD of $T_n$ ; 2.3.3 Truncation,

Centralization and Rescaling of the X-variables; 2.3.4 Sketch of the Proof of Theorem 2.12; 2.3.5 LSD of F Matrix; 2.3.6 Sketch of the Proof of Theorem 2.14; 2.3.7 When T is a Wigner Matrix; 2.4 Hadamard Product; 2.4.1 Truncation and Centralization; 2.4.2 Outlines of Proof of the theorem; 2.5 Circular Law  
 2.5.1 Failure of Techniques Dealing with Hermitian Matrices 2.5.2 Revisit of Stieltjes Transformation; 2.5.3 A Partial Answer to the Circular Law; 2.5.4 Comments and Extensions of Theorem 2.33; 3 Extreme Eigenvalues; 3.1 Wigner Matrix; 3.2 Sample Covariance Matrix; 3.2.1 Spectral Radius; 3.3 Spectrum Separation; 3.4 Tracy-Widom Law; 3.4.1 TW Law for Wigner Matrix; 3.4.2 TW Law for Sample Covariance Matrix; 4 Central Limit Theorems of Linear Spectral Statistics; 4.1 Motivation and Strategy; 4.2 CLT of LSS for Wigner Matrix; 4.2.1 Outlines of the Proof  
 6.2.3 Random Matrix Channels 6.2.4 Linearly Precoded Systems; 6.3 Channel Capacity for MIMO Antenna Systems; 6.3.1 Single-Input Single-Output Channels; 6.3.2 MIMO Fading Channels; 6.4 Limiting Capacity of Random MIMO Channels; 6.4.1 CSI-Unknown Case; 6.4.2 CSI-Known Case; 6.5 Concluding Remarks; 7 Limiting Performances of Linear and Iterative Receivers; 7.1 Introduction; 7.2 Linear Equalizers; 7.2.1 ZF Equalizer; 7.2.2 Matched Filter (MF) Equalizer; 7.2.3 MMSE Equalizer; 7.2.4 Suboptimal MMSE Equalizer; 7.3 Limiting SINR Analysis for Linear Receivers; 7.3.1 Random Matrix Channels  
 7.3.2 Linearly Precoded Systems

Sommario/riassunto

The book contains three parts: Spectral theory of large dimensional random matrices; Applications to wireless communications; and Applications to finance. In the first part, we introduce some basic theorems of spectral analysis of large dimensional random matrices that are obtained under finite moment conditions, such as the limiting spectral distributions of Wigner matrix and that of large dimensional sample covariance matrix, limits of extreme eigenvalues, and the central limit theorems for linear spectral statistics. In the second part, we introduce some basic examples of applications of ra