

图书基本信息

书名：<<高维随机矩阵的谱理论及其在无线通信和金融统计中的应用>>

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前言

大学最重要的功能是向社会输送人才。大学对于一个国家、民族乃至世界的重要性和贡献度，很大程度上是通过毕业生在社会各领域所取得的成就来体现的。中国科学技术大学建校只有短短的50年，之所以迅速成为享有较高国际声誉的著名大学之一，主要就是因为她培养出了一大批德才兼备的优秀毕业生。他们志向高远、基础扎实、综合素质高、创新能力强，在国内外科技、经济、教育等领域做出了杰出的贡献，为中国科大赢得了“科技英才的摇篮”的美誉。2008年9月，胡锦涛总书记为中国科大建校五十周年发来贺信，信中称赞说：半个世纪以来，中国科学技术大学依托中国科学院，按照全院办校、所系结合的方针，弘扬红专并进、理实交融的校风，努力推进教学和科研工作的改革创新，为党和国家培养了一大批科技人才，取得了一系列具有世界先进水平的原创性科技成果，为推动我国科教事业发展和社会主义现代化建设做出了重要贡献。据统计，中国科大迄今已毕业的5万人中，已有42人当选中国科学院和中国工程院院士，是同期（自1963年以来）毕业生中当选院士数最多的高校之一。其中，本科毕业生中平均每1,000人就产生1名院士和700多名硕士、博士，比例位居全国高校之首。还有众多的中青年才俊成为我国科技、企业、教育等领域的领军人物和骨干。在历年评选的“中国青年五四奖章”获得者中，作为科技界、科技创新型企业青年才俊代表，科大毕业生已连续多年榜上有名，获奖总人数位居全国高校前列。鲜为人知的是，有数千名优秀毕业生踏上国防战线，为科技强军做出了重要贡献，涌现出20多名科技将军和一大批国防科技中坚。

内容概要

本书讲述了随机矩阵谱理论的主要结果和前瞻研究，以及它在无线通信和现代金融风险理论中的应用。

书中前面讲解基本知识，后面分析重要范例，全面介绍了随机矩阵谱理论在这两个领域中的成果。

本书对其他需要高维数据分析的领域，能起到示范作用。

本书可作为统计学、计算机科学、现代物理、量子力学、无线通信、金融工程、经济学等领域本科生、研究生和工程技术人员学习随机矩阵理论的重要参考资料。

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章节摘录

In applications of the asymptotic theorems of spectral analysis of large di-mensional random matrices, two important problems arose after the LSD was found. The first is the bound on extreme eigenvalues; the second is the convergence rate of the ESD, with respect to sample size. For the first problem, the literature is extensive. The first success was due to Geman (1980), who proved that the largest eigenvalue of a sample covariance matrix converges almost surely to a limit under a growth condition on all the moments of the underlying distribution. Yin, Bai, and Krishnaiah (1988) proved the same result under the existence of the 4th order moment, and Bai, Silverstein, and Yin (1988) proved that the existence of the 4th order moment is also necessary for the existence of the limit. Bai and Yin (1988b) found the necessary and sufficient conditions for almost sure convergence of the largest eigenvalue of a Wigner matrix. By the symmetry between the largest and smallest eigenvalues of a Wigner matrix, the necessary and sufficient conditions for almost sure convergence of the smallest eigenvalue of a Wigner matrix were also found. Comparing to almost sure convergence of the largest eigenvalue of a sample covariance matrix, a relatively harder problem is to find the limit of the smallest eigenvalue of a large dimensional sample covariance matrix. The first attempt made in Yin, Bai, and Krishnaiah (1983) proved that the almost sure limit of the smallest eigenvalue of a Wishart matrix has a positive lower bound when the ratio of dimension to the degrees of freedom is less than $1/2$.

编辑推荐

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