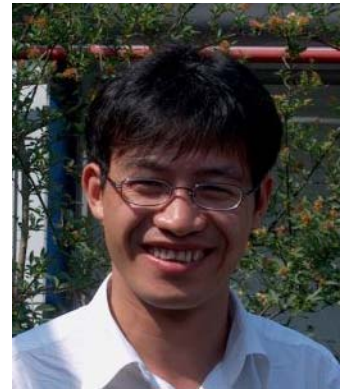


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*Major Research Interest: Large random matrices, multivariate analysis, applications of probability.*

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### Random matrices

Random matrices theory dates back to Wigner's work on nuclear physics in the 1950's. In quantum mechanics, the energy levels of a system are described by the eigenvalues of a Hermitian operator on a Hilbert space. Hence the limiting behavior of random matrices attracts interests among those working quantum mechanics and since then, random matrices theory has evolved a big subject with applications in many disciplines of science, engineering and finance. We are mainly concerned with asymptotic behavior of eigenvalues and eigenvectors of random matrices including sample covariance matrices, Wigner matrices and non-Hermitian matrices.

### Multivariate analysis

Much current research in statistics deals with very large data sets. Under these circumstances it becomes more difficult to use classical results from multivariate analysis. For example, the sample eigenvalues and eigenvectors are, respectively, consistent estimators of population eigenvalues and eigenvectors in fixed dimension. However, this is not the case for large dimension. In this field, the aim is to redevelop or adjust corresponding theories in multivariate analysis for large dimension.

### Applications of Probability

We have been interested in applications of probability, particularly in electrical engineering. Our current work includes developments of asymptotic properties of Signal-to-Interference ratio (SIR) and Sum Mutual Information of linear receivers in DS-CDMA or MIMO systems.

### Selected Publications

Pan, G. M, Zhou, Wang. (2008) . Asymptotic distribution of signal-to-interference ratio of reduced rank linear receiver. *Ann. Appl. Prob.* Vol. 18, No. 3, 1232-1270

Liang, Y. C., Pan, G. M and Bai, Z. D. (2007). Asymptotic performance of MMSE receivers for large systems using random matrices theory. *IEEE. Trans. Inform. Theory.* Vol. 53, No.11, 4173-4190.

Bai, Z. D., Miao, B. Q. and Pan, G. M. (2007). On asymptotics of eigenvectors of large sample covariance matrix. *Ann. Prob.* Vol. 35. No.4, 1532-1572.

Pan, G. M., Guo, M, H. and Liang , Y. C. (2007). Asymptotic performance of reduced-rank linear receivers with principal component filter. *IEEE. Trans. Inform. Theory.* Vol.53, No.3. 1148-1151.

Pan, G. M., Guo, M, H. and Zhou, W. (2007). Asymptotic distributions of the signal-to-interference ratios of LMMSE detection in multiuser communications. *Ann. Appl. Prob.* Vol.17, No.1. 181-206.