

On the spectrum of noisy blown-up matrices

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We study the eigenvalues of large perturbed matrices. We consider an Hermitian pattern matrix P of rank k . We blow up P to get a large block-matrix B_n , add a random noise W_n to obtain the perturbed matrix $A_n = B_n + W_n$. Our aim is to find the eigenvalues of A_n . We prove that under certain conditions A_n has k 'large' eigenvalues which are called structural eigenvalues. We suggest a graphical method to distinguish the structural and the non-structural eigenvalues. Our results generalize some theorems of Bolla [1] and [2]

References

- [1] Bolla, M. Recognizing linear structure in noisy matrices. *Linear Algebra and its Applications*, **402** (2005), 228–244.
- [2] Bolla, M., Friedl, K. and Krámli, A. Singular value decomposition of large random matrices (for two-way classification of microarrays). *J. Multivariate Analysis*, **101** no. 2 (2010), 434–446.