BLOCK IMBEDDING AND INTERLACING RESULTS
FOR NORMAL MATRICES

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Abstract. A pair of matrices is said to be imbeddable precisely when one is an isometric projection of the other on a suitable subspace. The concept of imbedding has been the subject of extensive study. Particular emphasis has been placed on relating the spectra of the matrices involved, especially when both matrices are Hermitian or normal. In this paper, the notion of block imbedding is introduced and shown to be intimately connected to an extension of interlacing for eigenvalues of normal matrices. Thus, a generalization of a classic Theorem of K. Fan and G. Pall is obtained, which is then applied to yield bounds on the number of eigenvalues of a block imbeddable pair in a closed, convex set. Moreover, a wide class of normal matrices, for which block imbedding applies, is indicated. Finally, comments and links on the necessary imbedding conditions of D. Carlson and E.M. de Sa, and J.P. Queiro and A.L. Duarte are provided.

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