

Colloquium

Gau-Wu Numbers of Direct Sums of Matrices

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In this talk, we consider the maximum number $k = k(A)$ for which there is a k -by- k compression of an n -by- n matrix A with all its diagonal entries in the boundary $\partial W(A)$ of the numerical range $W(A)$ of A . This number was recently introduced by Gau and Wu and we therefore call it the Gau–Wu number of the matrix A . If A is a normal or a quadratic matrix, then the exact value of $k(A)$ can be computed. For a matrix A of the form $B \oplus C$, we obtain a formula to compute the Gau–Wu number $k(A)$ in terms of the corresponding Gau–Wu numbers of B and C under certain conditions on B and C . In particular, we show that $k(A) = 2$ if and only if the numerical range of one summand, say, B is contained in the interior of the numerical range of the other summand C and $k(C) = 2$. For an irreducible matrix A , we can determine exactly when the value of $k(A)$ equals the size of A .

～本次演講亦歡迎大學部同學參加～