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LOCALIZATION OF THE EIGENVALUES OF A MATRIX THROUGH ITS SPREAD

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Abstract. The spread of a given matrix A is the largest distance between its eigenvalues. We can localize the eigenvalues of the matrix A using its spread. In the present work we propose a refinement of Samuelson's inequality. Also, we give some lower and upper bounds for the multiplication of the spread of two different matrices A and B. In the particular case when $A = B$, we reobtain some known results.

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Key words. Frobenius norm, inequality of Samuelson, spread of matrix, trace of matrix.

REFERENCES

[1] B.C. Arnold, *Schwarz, regression, and extreme deviance*, Amer. Statist., **28** (1974), 22–23.

[2] E.R. Barnes and A.J. Hoffman, *Bounds for the spectrum of normal matrices*, Linear Algebra Appl., **201** (1994), 79–90.

[3] A. Brauer and A.C. Mewborn, *The greatest distance between two characteristic roots of a matrix*, Duke Math. J., **26** (1959), 653–661.

[4] M.L. Buzano, *Generalizzazione della diseguaglianza di Cauchy-Schwarz* (in Italian), Rend. Semin. Mat. Univ. Politec. Torino, **31** (1974), 405–409.

[5] E. Deutsch, *On the spread of matrices and polynomials*, Linear Algebra Appl., **22** (1978), 49–55.

[6] S. S. Dragomir, *Inequalities for the Numerical Radius of Linear Operators in Hilbert Spaces*, Springer, New York, 2013.

[7] E. Jiang and X. Zhan, *Lower bounds for the spread of a Hermitian matrix*, Linear Algebra Appl., **256** (1997), 153–163.

[8] L. Mirsky, *The spread of a matrix*, Mathematika, **3** (1956), 127–130.

[9] R. Sharma and R. Kumar, *Remark on upper bounds for the spread of a matrix*, Linear Algebra Appl., **438** (2013), 4359–4362.

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