

NOTE ON SOME UPPER BOUNDS FOR THE CONDITION NUMBER

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Abstract. In this letter, some lower bounds for the smallest singular value of the nonsingular matrix are established. In addition, we also proposed some upper bounds on the condition number of a matrix which are the better than the bound proposed by Guggenheimer et al. [College Math. J. 26(1) (1995) 2-5]. To illustrate our bounds, some examples are also given.

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REFERENCES

- [1] H.W. GUGGENHEIMER, A.S. EDELMAN AND C.R. JOHNSON, *A simple estimate of the condition number of a linear system*, College Mathematics Journal **26**, 1 (1995), 2–5.
- [2] A.D. GÜNGÖR, *Erratum to “An upper bound for the condition number of a matrix in spectral norm”* [J. Comput. Appl. Math. 143 (2002) 141-144], Journal of Computational and Applied Mathematics **234**, 1 (2010), 316.
- [3] T.Z. HUANG, *Estimation of $\|A^{-1}\|_{\infty}$ and the smallest singular value*, Computers & Mathematics with Applications **55**, 6 (2008), 1075–1080.
- [4] J. K. MERIKOSKI, U. URPALA, A. VIRTANEN, T. Y. TAM AND F. UHLIG, *A best upper bound for the 2-norm condition number of a matrix*, Linear Algebra and its Applications **254**, 1-3 (1997), 355–365.
- [5] G. PIAZZA AND T. POLITI, *An upper bound for the condition number of a matrix in spectral norm*, Journal of Computational and Applied Mathematics **143**, 1 (2002), 141–144.
- [6] O. ROJO, *Further bounds for the smallest singular value and the spectral condition number*, Computers & Mathematics with Applications **38**, 7-8 (1999), 215–228.
- [7] Y.S. YU AND D.H. GU, *A note on a lower bound for the smallest singular value*, Linear Algebra and its Applications **253**, 1-3 (1997), 25–38.
- [8] L.M. ZOU AND Y. JIANG, *Estimation of the eigenvalues and the smallest singular value of matrices*, Linear Algebra and its Applications **433**, 6 (2010), 1203–1211.
- [9] L.M. ZOU, *A lower bound for the smallest singular value*, Journal of Mathematical Inequalities **6**, 4 (2012), 625–629.