

Commutators and Matrix Functions

Osman KAN¹, Süleyman SOLAK²

¹Mustafa Bağrıaçık Secondary School, TURKEY

²Necmettin Erbakan University, Education Faculty, TURKEY

Abstract

Commutator of two matrices is defined by $[A, B] = AB - BA$ where $A, B \in M_n(C)$ and plays an important role in many branches of science. Our aim in this study is to get some results related to $[f(A), f(B)]$ by using properties of matrix commutators and some special matrix functions.

Keywords

Matrix Commutators, Matrix Functions, Norms

References

- [1] Koenraad M.R. Audenaert, Variance bounds, with an application to norm bounds for commutators, (2010) *Lin. Alg. Appl.* 432(5), 1126-1143
- [2] Yan-Dong Wu and Xu-Qing Liu, A Short Note on the Frobenius Norm of the Commutator, (2010). *Russian in Matematicheskije Zametki*, Vol. 87, No. 6, pp. 935-940
- [3] A. Bottcher and D. Wenzel, How big can the commutator of two matrices be and how big is it typically?, (2005). *Linear Algebra Appl.* 403, 216-228
- [4] L. Laszlo, Proof of Bottcher and Wenzels conjecture on commutator norms for 3-by-3 matrices, (2007) *Linear Algebra Appl.* 422 (2-3), 659-663
- [5] A. Bottcher and D. Wenzel, The Frobenius norm and the commutator, (2008). *Linear Algebra Appl.* 429 (8-9), 1864-1885
- [6] Fuad Kittaneh, Inequalities for commutators of positive operators, (2007) *Journal of Functional Analysis* 250 1321-1343
- [7] Seak-Weng Vong and Xiao-Qing Jin, Proof of Bottcher and Wenzels conjecture, (2008) *Oper. Matrices* 2, 435-442
- [8] Nicholas J. Higham, Functions of Matrices, (2005) *Manchester Institute for Mathematical Sciences School of Mathematics eprint*, ISSN 1749-9097

- [9] Cleve Moler, Charles Van Loan, Nineteen Dubious Ways to Compute the Exponential of a Matrix, (2003) *SIAM REVIEW Vol. 45, No. 1, pp. 3000*
- [10] Mary Aprahamian and Nicholas J. Higham, Matrix Inverse Trigonometric and Inverse Hyperbolic Functions: Theory and Algorithms, (2016) *Manchester Institute for Mathematical Sciences School of Mathematics eprint, ISSN 1749-9097*
- [11] Nicholas J. Higham, Functions of Matrices: Theory and Computation, ISBN: 978-0-89871-646-7 (2008)