

A NOTE ON THE MAXIMAL NUMERICAL RANGE

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Abstract. We show that the maximal numerical range of an operator has a non-empty intersection with the boundary of its numerical range if and only if the operator is normaloid. A description of this intersection is also given.

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REFERENCES

- [1] JOR-TING CHAN AND KONG CHAN, *An observation about normaloid operators*, Operators and Matrices **11** (2017), 885–890.
- [2] J. B. CONWAY, *The theory of subnormal operators*, Mathematical Surveys and Monographs, vol. 36, American Mathematical Society, Providence, RI, 1991.
- [3] HWA-LONG GAU AND PEI YUAN WU, *Numerical ranges and compressions of S_n -matrices*, Operators and Matrices **7** (2013), no. 2, 465–476.
- [4] K. E. GUSTAFSON AND D. K. M. RAO, *Numerical range. The field of values of linear operators and matrices*, Springer, New York, 1997.
- [5] P. R. HALMOS, *A Hilbert space problem book, second ed.*, Springer-Verlag, New York, 1982, Encyclopedia of Mathematics and its Applications, 17.
- [6] A. N. HAMED AND I. M. SPITKOVSKY, *On the maximal numerical range of some matrices*, Electron. J. Linear Algebra **34** (2018), 288–303.
- [7] F. HAUSDORFF, *Der Wertvorrat einer Bilinearform*, Math. Z. **3** (1919), 314–316.
- [8] J. G. STAMPFLI, *The norm of a derivation*, Pacific J. Math. **33** (1970), 737–747.
- [9] O. TOEPLITZ, *Das algebraische Analogon zu einem Satze von Fejér*, Math. Z. **2** (1918), no. 1–2, 187–197.
- [10] HAI-YAN ZHANG, YAN-NI DOU, MEI-FENG WANG AND HONG-KE DU, *On the boundary of numerical ranges of operators*, Appl. Math. Lett. **24** (2011), no. 5, 620–622.