

ON 2×2 OPERATOR MATRICES

SUNGEUN JUNG, YOENHA KIM AND EUNGIL KO

Abstract. In this paper, we show that some 2×2 operator matrices have scalar extensions. In particular, we focus on some 2-hyponormal operators and their generalizations. As a corollary, we get that such operator matrices have nontrivial invariant subspaces if their spectra have nonempty interiors in the complex plane.

Mathematics subject classification (2010): Primary 47A11, Secondary 47A15, 47B20.

Keywords and phrases: Subscalar operators, the property (β) , 2-hyponormal operators, invariant subspaces.

REFERENCES

- [1] A. ALUTHGE, *On p -hyponormal operators for $0 < p < 1$* , Int. Eq. Op. Th., **13** (1990), 307–315.
- [2] S. BROWN, *Hyponormal operators with thick spectrum have invariant subspaces*, Ann. of Math., **125** (1987), 93–103.
- [3] I. COLOJOARA AND C. FOIAS, *Theory of generalized spectral operators*, Gordon and Breach, New York, 1968.
- [4] J. B. CONWAY, *Subnormal operators*, Pitman, London, 1981.
- [5] J. ESCHMEIER, *Invariant subspaces for subscalar operators*, Arch. Math., **52** (1989), 562–570.
- [6] J. ESCHMEIER AND M. PUTINAR, *Bishop's condition (β) and rich extensions of linear operators*, Indiana Univ. Math. J., **37** (1988), 325–348.
- [7] P. R. HALMOS, *A Hilbert space problem book*, Springer-Verlag, Berlin Heidelberg New York, 1980.
- [8] I. B. JUNG, E. KO, AND C. PEARCY, *Aluthge transforms of operators*, Int. Eq. Op. Th., **37** (2000), 449–456.
- [9] I. B. JUNG, E. KO, AND C. PEARCY, *Spectral pictures of Aluthge transforms of operators*, Int. Eq. Op. Th., **40** (2001), 52–60.
- [10] I. B. JUNG, E. KO, AND C. PEARCY, *Sub- n -normal operators*, Int. Eq. Op. Th., **55** (2006), 83–91.
- [11] E. KO, *Algebraic and triangular n -hyponormal operators*, Proc. Amer. Math. Soc., **11** (1995), 3473–3481.
- [12] E. KO, H. NAM AND Y. YANG, *On totally $*$ -paranormal operators*, Czechoslovak Math. J., **56(131)** (2006), 1265–1280.
- [13] K. LAURSEN AND M. NEUMANN, *An introduction to local spectral theory*, Clarendon Press, Oxford, 2000.
- [14] R. LANGE AND S. WANG, *New approaches in spectral decomposition*, Contemp. Math. **128**, Amer. Math. Soc., 1992.
- [15] V. MATHACHE, *Operator equations and invariant subspaces*, Matematiche (Catania), **49** (1994), 143–147.
- [16] M. MARTIN AND M. PUTINAR, *Lectures on hyponormal operators*, Op. Th.: Adv. Appl. **39**, Birkhäuser-Verlag, Boston, 1989.
- [17] M. PUTINAR, *Hyponormal operators are subscalar*, J. Operator Theory, **12** (1984), 385–395.
- [18] M. PUTINAR, *Hyponormal operators are eigendistributions*, J. Operator Theory, **17** (1986), 249–273.
- [19] M. PUTINAR, *Quasimilarity of tuples with Bishop's property (β)* , Int. Eq. Op. Th., **15** (1992), 1047–1052.
- [20] H. RADJAVI AND P. ROSENTHAL, *On roots of normal operators*, J. Math. Anal. Appl., **34** (1971), 653–664.

- [21] H. RADJAVI AND P. ROSENTHAL, *Invariant subspaces*, Springer-Verlag, 1973.
- [22] A. UCHIYAMA AND K. TANAHASHI, *Some spectral properties which imply Bishop's property (β)* , Analysis Lecture of Kyoto Univ. Math. Institute, **1535** (2007), 143–148.