

RANK-ONE PERTURBATIONS OF NORMAL OPERATORS AND HYPONORMALITY

IL BONG JUNG AND EUN YOUNG LEE

Abstract. Let $T = N + u \otimes v$ be a rank-one perturbation of a normal operator N acting on a separable, infinite dimensional, complex Hilbert space \mathcal{H} . It is proved that the hyponormality of T is equivalent to the normality of T . Some characterizations of hyponormality[normality] of T are obtained.

Mathematics subject classification (2010): Primary 47B20, 47A63; Secondary 47A55.

Keywords and phrases: Normal operator, hyponormal operator, rank-one perturbation, commutator.

REFERENCES

- [1] W. DONOGHUE, *On the perturbation of spectra*, Comm. Pure Appl. Math. **18** (1965), 559–579.
- [2] E. EXNER, I. B. JUNG, E. Y. LEE, AND M. R. LEE, *Gaps of operators via rank-one perturbations*, J. Math. Anal. Appl. **376** (2011), 576–587.
- [3] C. FOIAS, I. B. JUNG, E. KO, AND C. PEARCY, *On rank-one perturbations of normal operators*, J. Funct. Anal. **253** (2007), 628–646.
- [4] C. FOIAS, I. B. JUNG, E. KO, AND C. PEARCY, *On rank-one perturbations of normal operators, II*, Indiana Univ. Math. J. **57** (2008), 2745–2760.
- [5] C. FOIAS, I. B. JUNG, E. KO, AND C. PEARCY, *Spectral decomposability of rank-one perturbations of normal operators*, J. Math. Anal. Appl. **375** (2011), 602–609.
- [6] E. IONASCU, *Rank-one perturbations of diagonal operators*, Integr. Equat. Oper. Th. **39** (2001), 421–440.
- [7] T. FURUTA, *Invitation to Linear Operators*, Taylor & Francis Inc., London/New York, 2001.
- [8] S. JITOMIRSKAYA AND B. SIMON, *Operators with singular continuous spectrum, III; almost periodic Schrödinger operators*, Comm. Math. Phys. **165** (1994), 201–205.
- [9] E. KO AND J. E. LEE, *On rank-one perturbations of unilateral shift*, Commun. Kor. Math. Soc. **26** (2011), 79–88.
- [10] C. PEARCY, *Some Recent Developments in Operator Theory*, C.B.M.S. Regional Conference Series in Mathematics, No. 36, Amer. Math. Soc., Providence, Rhode Island, 1978.
- [11] R. DEL RIO, N. MAKAROV AND B. SIMON, *Operators with singular continuous spectrum, II; rank one operators*, Comm. Math. Phys. **165** (1994), 59–67.
- [12] J. G. STAMPFLI, *One-dimensional perturbations of operators*, Pacific J. Math., **115** (1984), 481–491.
- [13] J. WEIDMANN, *Linear Operators in Hilbert Spaces*, Springer-Verlag, Berlin, Heidelberg, New York, 1980.