ISOLATION AMONGST COMPOSITION OPERATORS ON $L^p(\mu)$–SPACES $(1 \leqslant p \leqslant \infty)$

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Abstract. In this paper we show that each composition operator is isolated in $comp(L^p)$ $(1 \leqslant p \leqslant \infty)$ under the norm topology. We also prove that while each composition operator is non-isolated in $comp(\ell^p)$ $(1 \leqslant p < \infty)$ under the strong operator topology, every composition operator is isolated in $comp(L^\infty)$ under the strong operator topology.

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REFERENCES

[1] S. BANACH, *Théorie des opérations linéaires*, 2nd ed., Reprint, New York, Chelsea Publishing Co.

[2] E. BERKSON, *Composition operators isolated in the uniform operator topology*, Proc. Amer. Math. Soc., 81 (1981), 231–232.

[3] P. BOURDON, *Components of linear-fractional composition operators*, J. Math. Anal. Appl. 279 (2003), no. 1, 228245.

[4] H. CHANDRA, *Isolation amongst composition operators on the disc algebra*, J. Indian Math. Soc., 67 (2000), 43–52.

[5] S. CHENG, J. DAI, *Composition operators and Gleason's problem on weighted Fock spaces*, Ann. Funct. Anal., 13 (2022), no. 1, Paper No. 6, 23 pp.

[6] CARL C. COWEN, *Linear fractional composition operators on H^2*, Integral equations and operator theory, 11.2 (1988), 151–160.

[7] CARL C. COWEN, B. MACCLUER, *Composition operators on spaces of analytic functions*, CRC Press. Boca Raton, 1995.

[8] I. K. DAUGAVET, *A property of completely continuous operators in the space C*, Usp. Mat. Nauk 18 (1963), 157–158.

[9] E. FLYTZANIS, L. KANAKIS, *Measure preserving composition operators*, Journal of functional analysis, 73.1 (1987), 113–121.

[10] M. R. JABBARZADEH, *Weighted composition operators between L^p-spaces*, Bull. Korean Math. Soc. 42 (2005), 369–378.

[11] M. R. JABBARZADEH, E. POURREZA, *A note on weighted composition operators on L^p-spaces*, Bull. Iranian Math. Soc. 29 (2003), 47–54.

[12] B. O. KOOPMAN, *Hamiltonian system and transformations in Hilbert space*, Proc. Nat. Acad. Sci., USA 17 (1931), 315–318.

[13] R. KUMAR, *Weighted composition operators between two L^p-spaces*, Mat. Vesnik 61 (2009), 111–118.

[14] J. LAMPERTI, *On the isometries of certain function-spaces*, Pacific J. Math. 8 (1958), 459–466.

[15] C. O. LO, *Compact-type weighted composition operators between L^p-spaces*, Banach J. Math. Anal. 14 (2020), 1421–1442.

[16] C. O. LO, A. W. K. LOH, *Compact weighted composition operators between L^p-spaces*, Bull. Aust. Math. Soc. 102 (2020), 151–161.

[17] B. D. MACCLUER, *Components in the space of composition operators*, Integral equation and operator theory, 12 (1989).

[18] E. A. NORDGREN, *Composition operators*, Canad. J. Math., 20 (1968), 442–449.

[19] E. A. NORDGREN, *Composition operators on Hilbert spaces*, in Hilbert Space Operators (Proc. Conf., Calif. State Univ., Long Beach, Calif., 1977), pp. 3763, Lecture Notes in Math., 693, Springer, Berlin, 1978.

[20] E. A. NORDGREN, PETER ROSENTHAL, F. S. WINTROBE, *Invertible composition operators on H^p*, Journal of functional analysis, 73.2 (1987), 324–344.

[21] J. V. RYFF, *Subordinate H^p functions*, Duke J. Math. 33 (1966) 347–354.

[22] J. H. SHAPIRO, *Composition operators and classical function theory*, Springer-Verlag, 1993.

[23] J. H. SHAPIRO, C. SUNDBERG, *Isolation amongst composition operators*, Pacific J. pf Math, 1990.

[24] R. K. SINGH, *Composition operators induced by rational functions*, Proceedings of the American Mathematical Society, 59 (2) (1976), 329–333.

[25] R. K. SINGH, J. S. MANHAS, *Composition operators on function spaces*, North-Holland, New York, 1993.

[26] R. K. SINGH AND S. D. SHARMA, *Composition operators on a functional Hilbert space*, Bull. Austral. Math. Soc. 20 (1979) 377–384.

[27] R. K. SINGH, A. KUMAR, *Multiplication operators and composition operators with closed ranges*, Bull. Aust. Math. Soc, 16 (1977), 247–252.

[28] H. TAKAGI, *Compact weighted composition operators on L^p*, Proc. Amer. Math. Soc, 116 (1992), 505–511.

[29] H. TAKAGI, K. YOKOUCHI, *Multiplication and composition operators between two L^p-spaces*, Function spaces (Edwardsville, IL, 1998), Contemp. Math., 232, Amer. Math. Soc., Providence, RI, 1999, 321–338.

[30] H. TAKAGI, K. YOKOUCHI, *Composition operators between L^p-spaces, The structure of spaces of analytic and harmonic functions and the theory of operators on them*, Kyoto Univ. Res. Inst. Math. Sci. Kokyuroku 946 (1996), 18–24 [in Japanese].

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