

GENERALIZED COMPOSITION OPERATORS FROM ZYGMUND TYPE SPACES TO Q_K SPACES

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Abstract. Let φ be an analytic self-map of \mathbb{D} and $g \in H(\mathbb{D})$. The boundedness and compactness of generalized composition operators

$$(C_\varphi^g f)(z) = \int_0^z f'(\varphi(\xi))g(\xi)d\xi, z \in \mathbb{D}, f \in H(\mathbb{D})$$

from Zygmund type spaces to Q_K spaces are investigated.

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REFERENCES

- [1] C. C. COWEN AND B. D. MACCLUER, *Composition operators on spaces of analytic functions*, CRC Press, Boca Roton, 1995.
- [2] J. H. SHAPIRO, *Composition Operators and Classical Function Theory*, Universitext: Tracts in Mathematics. Springer-Verlag, New York, 1993.
- [3] S. LI AND S. STEVIĆ, *Generalized composition operators on Zygmund spaces and Bloch type spaces*, J. Math. Anal. Appl. **338** (2008), 1282–1295.
- [4] S. STEVIĆ, *Generalized composition operators from logarithmic Bloch spaces to mixed-norm spaces*, Util. Math. **77** (2008), 167–172.
- [5] S. STEVIĆ AND AJAY K. SHARMA, *Generalized composition operators on weighted Hardy spaces*, Appl. Math. Comput. **218**, 17 (2012), 8347–8352.
- [6] F. ZHANG AND Y. LIU, *Generalized composition operators from Bloch type spaces to Q_K type spaces*, J. Funct. Spaces Appl. **8**, 1 (2010), 55–66.
- [7] S. STEVIĆ, *On an integral operator from Zygmund spaces to the Bloch-type space on the unit ball*, Glasg. Math. J. **51** (2009), 275–287.
- [8] S. STEVIĆ, *Integral-type operators from a mixed norm space to a Bloch-type space on the unit ball*, Siberian Math. J. **50**, 6 (2009), 1098–1105.
- [9] S. STEVIĆ, *On an integral operator between Bloch-type spaces on the unit ball*, Bull. Sci. Math. **134**, 4 (2010), 329–339.
- [10] S. STEVIĆ AND SEI-ICHIRO UEKI, *On an integral-type operator between weighted-type spaces and Bloch-type spaces on the unit ball*, Appl. Math. Comput. **217**, 7 (2010), 3127–3136.
- [11] S. STEVIĆ AND SEI-ICHIRO UEKI, *Integral-type operators acting between weighted-type spaces on the unit ball*, Appl. Math. Comput. **215**, 7 (2009), 2464–2471.
- [12] S. LI AND S. STEVIĆ, *Volterra-type operators on Zygmund spaces*, J. Inequal. Appl. **2007**, Art. ID 32124, 10 pp.
- [13] S. LI AND S. STEVIĆ, *Products of Volterra type operator and composition operator from H^∞ and Bloch spaces to Zygmund spaces*, J. Math. Anal. Appl. **345**, 1 (2008), 40–52.
- [14] S. LI AND S. STEVIĆ, *Weighted composition operators from Zygmund spaces into Bloch spaces*, Applied Mathematics and Computation **206**, 2 (2008), 825–831.
- [15] B. CHOE, H. KOO AND W. SMITH, *Composition operators on small spaces*, Integr. Equ. Oper. Theory **56** (2006), 357–380.

- [16] K. ESMAEILI AND M. LINDSTRÖM, *Weighted composition operators between Zygmund type spaces and their essential norms*, Integr. Equ. Oper. Theory **75** (2013), 473–490.
- [17] S. YE AND Q. HU, *Weighted composition operators on the Zygmund space*, Abstract and Applied Analysis **2012** (2012), Article ID 462482.
- [18] P. L. DUREN, *Theory of H^p Spaces*, San Diego: Pure and Applied Mathematics **38**, Academic Press, 1970.
- [19] X. FU AND S. LI, *Composition operators from Zygmund spaces into Q_K spaces*, J. Inequal. Appl. **2013**, 175 (2013).
- [20] Y. REN, *An integral-type operator from $Q_K(p, q)$ spaces to Zygmund-type spaces*, Appl. Math. Comput. **236** (2014), 27–32.
- [21] R. ZHAO, *On a general family of function space*, Ann. Acad. Sci. Fenn. Math. Diss., 1996.
- [22] M. ESSÉN, H. WULAN AND J. XIAO, *Several function theoretic characterization of Q_K spaces*, J. Funct. Anal. **230** (2006), 78–115.
- [23] H. WULAN, *Compactness of the composition operators from the Bloch space to Q_K spaces*, Acta Math. Sin. **21** (2005), 1415–1424.
- [24] S. LI, *On an integral-type operator from the Bloch space into $Q_K(p, q)$ spaces*, Filomat **26** (2012), 125–133.
- [25] S. STEVIĆ, *On an integral operator on the unit ball in \mathbb{C}^n* , J. Inequal. Appl. **1** (2005), 81–88.
- [26] S. STEVIĆ, *On an integral-type operator from Zygmund-type spaces to mixed-norm spaces on the unit ball*, Abstr. Appl. Anal. **2010**, Art. ID 198608, 7 pp.
- [27] S. YAMASHITA, *Gap series and α -Bloch functions*, Yokohama Math. J. **28** (1980), 31–36.
- [28] A. ZYGMUND, *Trigonometric series*, Cambridge University Press, London, 1959.