Operators and Matrices
Volume 12, Number 2 (2018), 301–319
doi:10.7153/oam-2018-12-20

PRODUCTS OF RADIAL DERIVATIVE AND WEIGHTED COMPOSITION OPERATORS FROM WEIGHTED BERGMAN–ORLICZ SPACES TO WEIGHTED–TYPE SPACES

ZHI-JIE JIANG AND XIAO-FENG WANG

Abstract. Let $H(\mathbb{B}^n)$ be the space of all holomorphic functions on the unit ball $\mathbb{B}^n$ of $\mathbb{C}^n$, φ a holomorphic self-map of $\mathbb{B}^n$, $u \in H(\mathbb{B}^n)$, and $\Re$ the radial derivative operator on $H(\mathbb{B}^n)$. Two operators on $H(\mathbb{B}^n)$ are defined by $\Re W_{u,\varphi} f(z) = \Re(u(z) f(\varphi(z)))$ and $W_{u,\varphi}\Re f(z) = u(z)\Re f(\varphi(z))$, which are called the products of radial derivative operators and weighted composition operators. In this paper, the boundedness and compactness of the operators $\Re W_{u,\varphi}$ and $W_{u,\varphi}\Re$ from weighted Bergman-Orlicz spaces to a class of weighted-type spaces are characterized.

Mathematics subject classification (2010): Primary 47B38, Secondary 47B33, 47B37.
Keywords and phrases: Weighted Bergman-Orlicz spaces, weighted composition operators, radial derivative operators, products of radial derivative and weighted composition operators, weighted-type spaces.

REFERENCES

[1] C. C. COWEN, B. D. MACCLUER, *Composition operators on spaces of analytic functions*, CRC Press, 1995.
[2] R. A. HIBSCHWEILER, N. PORTNOY, *Composition followed by differentiation between Bergman and Hardy spaces*, Rocky Mountain J. Math. **35** (3) (2005), 843–855.
[3] S. JANSON, *Generalizations of Lipschitz spaces and an application to Hardy spaces and bounded mean oscillation*, Duke Math. J. **47** (4) (1980), 959–982.
[4] Z. J. JIANG, S. STEVIĆ, *Compact differences of weighted composition operators from weighted Bergman spaces to weighted-type spaces*, Appl. Math. Comput. **217** (7) (2010), 3522–3530.
[5] Z. J. JIANG, *On a class of operators from weighted Bergman spaces to some spaces of analytic functions*, Taiwan. J. Math. Soc. **15** (5) (2011), 2095–2121.
[6] Z. J. JIANG, *Weighted composition operators from weighted Bergman spaces to some spaces of analytic functions on the upper half plane*, Util. Math. **93** (2014), 205–212.
[7] S. LI, S. STEVIĆ, *Composition followed by differentiation between Bloch type spaces*, J. Comput. Anal. Appl. **9** (2) (2007), 195–206.
[8] S. LI, S. STEVIĆ, *Weighted composition operators from Bergman-type spaces into Bloch spaces*, Proc. Indian Acad. Sci. Math. Sci. **117** (3) (2007), 371–385.
[9] S. LI, S. STEVIĆ, *Weighted composition operators from α-Bloch space to H^∞ on the polydisk*, Numer. Funct. Anal. Optimization. **28** (7) (2007), 911–925.
[10] S. LI, S. STEVIĆ, *Composition followed by differentiation from mixed norm spaces to α-Bloch spaces*, Sb. Math. **199** (12) (2008), 1847–1857.
[11] S. LI, S. STEVIĆ, *Weighted composition operators between H^∞ and α-Bloch spaces in the unit ball*, Taiwan. J. Math. Soc. **12** (2008), 1625–1639.
[12] S. LI, S. STEVIĆ, *Weighted composition operators from Zygmund spaces into Bloch spaces*, Appl. Math. Comput. **206** (2) (2008), 825–831.
[13] S. LI, S. STEVIĆ, *Composition followed by differentiation between H^∞ and α-Bloch spaces*, Houston J. Math. **35** (1) (2009), 327–340.
[14] S. LI, S. STEVIĆ, *Products of composition and differentiation operators from Zygmund spaces to Bloch spaces and Bers spaces*, Appl. Math. Comput. **217** (2010), 3144–3154.

Paper OaM-12-20

[15] S. LI, S. STEVIĆ, *Weighted differentiation composition operators from the logarithmic Bloch space to the weighted-type space*, Analele Stiint. Univ. Ovidius C. **24** (3) (2016), 223–240.
[16] S. OHNO, *Weighted composition operators between H^∞ and the Bloch space*, Taiwan. J. Math. Soc. **5** (3) (2001), 555–563.
[17] S. OHNO, *Products of composition and differentiation on Bloch spaces*, Bull. Korean Math. Soc. **46** (6) (2009), 1135–1140.
[18] B. SEHBA, S. STEVIĆ, *On some product-type operators from Hardy-Orlicz and Bergman-Orlicz spaces to weighted-type spaces*, Appl. Math. Comput. **233** (2014), 565–581.
[19] B. SEHBA, *Duality for large Bergman-Orlicz spaces and boundedness of Hankel operators*, `https://arxiv.org/pdf/1501.03416v1`.
[20] B. SEHBA, *Derivatives characterization of Bergman-Orlicz spaces and applications*, `https://arxiv.org/abs/1610.01954`.
[21] A. K. SHARMA, Z. ABBAS, *Weighted composition operators between weighted Bergman-Nevanlinna and Bloch-type spaces*, Appl. Math. Sci. **41** (4) (2010), 2039–2048.
[22] A. K. SHARMA, *Products of composition multiplication and differentiation between Bergman and Bloch type spaces*, Turkish. J. Math. **35** (2011), 275–291.
[23] S. STEVIĆ, *Essential norms of weighted composition operators from the α-Bloch space to a weighted-type space on the unit ball*, Abstr. Appl. Anal. **2008** (2008), Article ID 279691, 11 pages.
[24] S. STEVIĆ, *Norms of some operators from Bergman spaces to weighted and Bloch-type space*, Util. Math. **76** (2008), 59–64.
[25] S. STEVIĆ, *Norm of weighted composition operators from Bloch space to H^∞ on the unit ball*, Ars Combin. **88** (2008), 125–127.
[26] S. STEVIĆ, *On a new integral-type operator from the weighted Bergman space to the Bloch-type space on the unit ball*, Discrete Dyn. Nat. Soc. **2008** (2008), Article ID 154263, 14 pages.
[27] S. STEVIĆ, *Products of composition and differentiation operators on the weighted Bergman space*, Bull. Belg. Math. Soc. **16** (2009), 623–635.
[28] S. STEVIĆ, *On an integral-type operator from logarithmic Bloch-type and mixed-norm spaces to Bloch-type spaces*, Nonlinear Anal. TMA **71** (2009), 6323–6342.
[29] S. STEVIĆ, *Weighted differentiation composition operators from mixed-norm spaces to weighted-type spaces*, Appl. Math. Comput. **211** (2009), 222–233.
[30] S. STEVIĆ, *Weighted composition operators from weighted Bergman spaces to weighted-type spaces on the unit ball*, Appl. Math. Comput. **212** (2009), 499–504.
[31] S. STEVIĆ, *Norm of weighted composition operators from α-Bloch spaces to weighted-type spaces*, Appl. Math. Comput. **215** (2009), 818–820.
[32] S. STEVIĆ, *Norm and essential norm of composition followed by differentiation from α-Bloch spaces to H^∞*, Appl. Math. Comput. **207** (2009), 225–229.
[33] S. STEVIĆ, *On operator P^g_φ from the logarithmic Bloch-type space to the mixed-norm space on unit ball*, Appl. Math. Comput. **215** (2010), 4248–4255.
[34] S. STEVIĆ, *Composition followed by differentiation from H^∞ and the Bloch space to n-th weighted-type spaces on the unit disk*, Appl. Math. Comput. **216** (2010), 3450–3458.
[35] S. STEVIĆ, *Weighted iterated radial composition operators between some spaces of holomorphic functions on the unit ball*, Abstr. Appl. Anal. **2010** (2010), Article ID 801264, 14 pages.
[36] S. STEVIĆ, *Weighted differentiation composition operators from H^∞ and Bloch spaces to n-th weighted-type spaces on the unit disk*, Appl. Math. Comput. **216** (2010), 3634–3641.
[37] S. STEVIĆ, *Weighted differentiation composition operators from the mixed-norm space to the n-th weigthed-type space on the unit disk*, Abstr. Appl. Anal. **2010** (2010), Article ID 246287, 15 pages.
[38] S. STEVIĆ, R. P. AGARWAL, *Weighted composition operators from logarithmic Bloch-type spaces to Bloch-type spaces*, J. Inequal. Appl. **2009** (2009), Article ID 964814, 21 pages.
[39] S. STEVIĆ, Z. J. JIANG, *Differences of weighted composition operators on the unit polydisk*, Siberian Math. J. **52** (2) (2011), 454–468.
[40] S. STEVIĆ, A. K. SHARMA, *Iterated differentiation followed by composition from Bloch-type spaces to weighted BMOA spaces*, Appl. Math. Comput. **218** (2011), 3574–3580.
[41] S. STEVIĆ, A. K. SHARMA, A. BHAT, *Products of multiplication composition and differentiation operators on weighted Bergman spaces*, Appl. Math. Comput. **217** (2011), 8115–8125.
[42] S. STEVIĆ, A. K. SHARMA, A. BHAT, *Essential norm of multiplication composition and differentiation operators on weighted Bergman spaces*, Appl. Math. Comput. **218** (2011), 2386–2397.

[43] S. STEVIĆ, S. I. UEKI, *Weighted composition operators and integral-type operators between weighted Hardy spaces on the unit ball*, Discrete Dyn. Nat. Soc. **2009** (2009), Article ID 952831, 20 pages.
[44] W. YANG, W. YAN, *Generalized weighted composition operators from area Nevanlinna spaces to weighted-type spaces*, Bull. Korean Math. Soc. **48** (6) (2011), 1195–1205.
[45] K. ZHU, *Spaces of holomorphic functions in the unit ball*, Springer, New York, 2005.

Operators and Matrices
www.ele-math.com
oam@ele-math.com