

ESSENTIAL NORM OF THE WEIGHTED DIFFERENTIATION COMPOSITION OPERATOR BETWEEN BLOCH-TYPE SPACES

CUI CHEN AND YU-XIA LIANG

Abstract. We give some characterizations for the boundedness and compactness of weighted differentiation composition operator $D_{\varphi,u}^m$ between different Bloch spaces, and also estimate the essential norms of the operator, complementing some recent results in the literature.

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REFERENCES

- [1] C. C. COWEN AND B. D. MACCLUER, *Composition Operators on Spaces of Analytic Functions*, CRC Press, Boca Raton, FL, 1995.
- [2] Z. S. FANG AND Z. H. ZHOU, *Essential norms of composition operators between Bloch type spaces in the polydisk*, Arch. Math., **99**, (2012), 547–556.
- [3] Z. S. FANG AND Z. H. ZHOU, *New characterizations of the weighted composition operators between Bloch type spaces in the polydisk*, Canad. Math. Bull., **57**, 4 (2014), 794–802.
- [4] O. HYVÄRINEN, M. KEMAPPAINEN, M. LINDSTRÖM, A. RAUTIO AND E. SAUKKO, *The essential norms of weighted composition operators on weighted Banach spaces of analytic function*, Integr. Equ. Oper. Theory, **72**, (2012), 151–157.
- [5] O. HYVÄRINEN AND M. LINDSTRÖM, *Estimates of essential norms of weighted composition operators between Bloch-type spaces*, J. Math. Anal. Appl., **393**, (2012), 38–44.
- [6] S. LI AND S. STEVIĆ, *Composition followed by differentiation between Bloch type spaces*, J. Comput. Anal. Appl., **9**, 2 (2007), 195–205.
- [7] S. LI AND S. STEVIĆ, *Composition followed by differentiation from mixed-norm spaces to α -Bloch spaces*, Sb. Math., **199**, 12 (2008), 1847–1857.
- [8] S. LI AND S. STEVIĆ, *Composition followed by differentiation between H^∞ and α -Bloch spaces*, Houston J. Math., **35**, 1 (2009), 327–340.
- [9] S. LI AND S. STEVIĆ, *Weighted differentiation composition operators from the logarithmic Bloch space to the weighted-type space*, An. Stiint. Univ. "Ovidius" Constanta Ser. Mat., **24**, 3 (2016), 223–240.
- [10] Y. X. LIANG AND Z. H. ZHOU, *Essential norms of the product of differentiation and composition operators between Bloch-type spaces*, Arch. Math., **100**, 4, (2013), 347–360.
- [11] Y. X. LIANG AND Z. H. ZHOU, *New estimate of essential norm of composition followed by differentiation between Bloch-type spaces*, Banach J. Math. Anal., **8**, (2014), 118–137.
- [12] Y. LIU AND Y. YU, *Weighted differentiation composition operators from mixed-norm to Zygmund spaces*, Numer. Func. Anal. Opt., **31**, 8 (2010), 936–954.
- [13] B. D. MACCLUER AND R. ZHAO, *Essential norms of weighted composition operators between Bloch-type spaces*, Rocky Mountain J. Math., **33**, (2003), 1437–1458.
- [14] J. S. MANHAS AND R. ZHAO, *New estimates of essential norms of weighted composition operators between Bloch type spaces*, J. Math. Anal. Appl., **389**, (2012), 32–47.
- [15] 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.

- [16] S. STEVIĆ, *Norm and essential norm of composition followed by differentiation from α -Bloch spaces to H_{μ}^{∞}* , Appl. Math. Comput., **207**, (2009), 225–229.
- [17] S. STEVIĆ, *On a new integral-type operator from the Bloch space to Bloch-type spaces on the unit ball*, J. Math. Anal. Appl., **354**, (2009), 426–434.
- [18] S. STEVIĆ, *Products of composition and differentiation operators on the weighted Bergman space*, Bull. Belg. Math. Soc. Simon Stevin, **16**, (2009), 623–635.
- [19] S. STEVIĆ, *Weighted differentiation composition operators from mixed-norm spaces to weighted-type spaces*, Appl. Math. Comput., **211**, (2009), 222–233.
- [20] 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.
- [21] 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**, 12 (2010), 3634–3641.
- [22] S. STEVIĆ, *Weighted differentiation composition operators from the mixed-norm space to the n th weighted-type space on the unit disk*, Abstr. Appl. Anal., **15**, (2010), Article ID 246287.
- [23] 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.
- [24] S. STEVIĆ, *Characterizations of composition followed by differentiation between Bloch-type spaces*, Appl. Math. Comput., **218**, (2011), 4312–4316.
- [25] S. STEVIĆ, *Weighted radial operator from the mixed-norm space to the n th weighted-type space on the unit ball*, Appl. Math. Comput., **218**, (2012) 9241–9247.
- [26] S. STEVIĆ, A. K. SHARMA AND A. BHAT, *Essential norm of products of multiplication composition and differentiation operators on weighted Bergman spaces*, Appl. Math. Comput., **218**, (2011), 2386–2397.
- [27] S. STEVIĆ, A. K. SHARMA AND A. BHAT, *Products of multiplication composition and differentiation operators on weighted Bergman spaces*, Appl. Math. Comput., **217**, (2011), 8115–8125.
- [28] Y. WU AND H. WULAN, *Products of differentiation and composition operators on the Bloch Space*, Collect. Math., **63**, (2012), 93–107.
- [29] H. WULAN, D. ZHENG AND K. ZHU, *Compact composition operators on BMOA and the Bloch space*, Proc. Amer. Math. Soc., **137**, (2009), 3861–3868.
- [30] Y. YU AND Y. LIU, *The essential norm of a generalized composition operator between Bloch-type spaces and Q_K type spaces*, Complex Anal. Oper. Th., **6**, (2012) 1231–1240.
- [31] H. G. ZENG AND Z. H. ZHOU, *Essential norm estimate of a composition operator between Bloch-type spaces in the unit ball*, Rocky Mountain J. Math., **42**, 3 (2012), 1049–1071.
- [32] R. ZHAO, *Essential norms of composition operators between Bloch type spaces*, Proc. Amer. Math. Soc., **138**, (2010), 2537–2546.
- [33] Z. H. ZHOU, J. H. SHI, *Compactness of composition operators on the Bloch space in classical bounded symmetric domains*, Michigan Math. J., **50**, (2002), 381–405.
- [34] X. L. ZHU, *Generalized weighted composition operators on Bloch-type spaces*, J. Inequal. Appl., 2015, **59** (2015), 1–9.
- [35] X. L. ZHU, *Essential norm of generalized weighted composition operators on Bloch-type spaces*, Appl. Math. Comput., **274**, 1 (2016), 133–142.