STEVIĆ-SHARMA TYPE OPERATORS FROM H^{∞} INTO THE BLOCH SPACE

OINGHUA HU AND XIAOJING ZHOU*

Abstract. In this paper, we give some characterizations for the boundedness and compactness of some Stević-Sharma type operators called the polynomial differentiation composition operators from H^{∞} into the Bloch space on the unit disk.

Mathematics subject classification (2020): 30D45, 47B38.

Keywords and phrases: Stević-Sharma type operators, H^{∞} space, Bloch space, boundedness, compactness.

REFERENCES

- [1] D. C. CHANG, S. LI AND S. STEVIĆ, On some integral operators on the unit polydisk and the unit ball, Taiwanese J. Math. 11 (5) (2007), 1251–1286.
- [2] F. COLONNA, New criteria for boundedness and compactness of weighted composition operators mapping into the Bloch space, Cent. Eur. J. Math. 11 (2013), 55–73.
- [3] C. COWEN AND B. MACCLUER, Composition Operators on Spaces of Analytic Functions, CRC Press, Boca Raton, FL, 1995.
- [4] K. ESMAEILI AND M. LINDSTRÖM, Weighted composition operators between Zygmund type spaces and their essential norms, Integral Equations Oper. Theory 75 (2013), 473–490.
- [5] Q. Hu, L. Hu and S. Li, On a Stević-Sharma type operator from weighted-type spaces into Bloch-type spaces, Math. Inequal. Appl. 26 (1) (2023), 205–232.
 Q. Hu, S. Li and H. Wulan, New essential norm estimates of weighted composition operators from H[∞] into the Bloch space, Complex Var. Ellipt. Equ. 62 (2017), 600–615.
- [6] O. HYVÄRINEN, M. KEMPPAINEN, M. LINDSTRÖM, A. RAUTIO AND E. SAUKKO, The essential norm of weighted composition operators on weighted Banach spaces of analytic functions, Integral Equations Oper. Theory 72 (2012), 151–157.
- [7] O. HYVÄRINEN AND M. LINDSTRÖM, Estimates of essential norm of weighted composition operators between Bloch-type spaces, J. Math. Anal. Appl. 393 (2012), 38–44.
- [8] Z. JIANG, On Stević-Sharma operator from the Zygmund space to the Bloch-Orlicz space, Adv. Differ. Equ. 2015 (2015), Article no. 228.
- [9] S. LI AND S. STEVIĆ, Integral type operators from mixed-norm spaces to α-Bloch spaces, Integral Transforms Spec. Funct. 18 (7) (2007), 485–493.
- [10] S. LI AND S. STEVIĆ, Weighted composition operators from α-Bloch space to H[∞] on the polydisk, Numer. Funct. Anal. Optim. 28 (2007), 911–925.
- [11] S. LI AND S. STEVIĆ, Weighted composition operators from Bergman-type spaces into Bloch spaces, Proc. Indian Acad. Sci. Math. Sci. 117 (3) (2007), 371–385.
- [12] S. LI AND S. STEVIĆ, Composition followed by differentiation from mixed-norm spaces to α-Bloch spaces, Sb. Math. 199 (12) (2008), 1847–1857.
- [13] S. LI AND S. STEVIĆ, Composition followed by differentiation between H^{∞} and α -Bloch spaces, Houston J. Math. 35 (1) (2009), 327–340.
- [14] Y. LIU AND Y. YU, On a Stević-Sharma operator from Hardy spaces to the logarithmic Bloch spaces, J. Inequal. Appl. 2015 (2015), Article no. 22.
- [15] Y. LIU AND Y. YU, On an extension of Stević-Sharma operator from the general space to weighted-type spaces on the unit ball, Complex Anal. Oper. Theory 11 (2) (2017), 261–288.



- [16] K. MADIGAN AND A. MATHESON, Compact composition operators on the Bloch space, Trans. Amer. Math. Soc. 347 (1995), 2679–2687.
- [17] A. MONTES-RODRÍGUEZ, The essential norm of a composition operator on Bloch spaces, Pacific J. Math. 188 (1999), 339–351.
- [18] A. MONTES-RODRÍGUEZ, Weighed composition operators on weighted Banach spaces of analytic functions, J. London Math. Soc. 61 (2000), 872–884.
- [19] S. Ohno, Weighted composition operators between H[∞] and the Bloch space, Taiwanese J. Math. 5 (2001), 555–563.
- [20] S. Ohno, Products of composition and differentiation between Hardy spaces, Bull. Aust. Math. Soc. 73 (2) (2006), 235–243.
- [21] S. Ohno, Products of composition and differentiation on Bloch spaces, Bull. Korean Math. Soc. 46 (6) (2009), 1135–1140.
- [22] B. SEHBA AND 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.
- [23] A. SHARMA AND A. SHARMA, Boundedness, compactness and the Hyers-Ulam stability of a linear combination of differential operators, Complex Anal. Oper. Theory 14 (2020), Article no. 14.
- [24] S. STEVIĆ, Weighted differntiation composition operators from mixed-norm spaces to weighted-type spaces, Appl. Math. Comput. 211 (2009), 222–233.
- [25] S. STEVIĆ, Composition followed by differentiation from H^{∞} and the Bloch space to nth weighted-type spaces on the unit disk, Appl. Math. Comput. **216** (2010), 3450–3458.
- [26] S. STEVIĆ, Weighted differentiation composition operators from H[∞] and Bloch spaces to nth weighted-type spaces on the unit disk, Appl. Math. Comput. 216 (2010), 3634–3641.
- [27] S. STEVIĆ, Weighted differentiation composition operators from the mixed-norm space to the nth weighted-type space on the unit disk, Abstr. Appl. Anal. 2010 (2010), Article ID 246287.
- [28] 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.
- [29] S. STEVIĆ, On a new product-type operator on the unit ball, J. Math. Inequal. 16 (2022), 1675–1692.
- [30] S. STEVIĆ, C. HUANG AND Z. JIANG, Sum of some product-type operators from Hardy spaces to weighted-type spaces on the unit ball, Math. Methods Appl. Sci. 45 (2022), 11581–11600.
- [31] S. STEVIĆ AND A. SHARMA, On a product-type operator between Hardy and α-Bloch spaces of the upper half-plane, J. Inequal. Appl. **2018** (2018), Article No. 273.
- [32] S. STEVIĆ, A. 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.
- [33] S. STEVIĆ, A. SHARMA AND A. BHAT, Products of multiplication, composition and differentiation operators on weighted Bergman space, Appl. Math. Comput. 217 (2011), 8115–8125.
- [34] S. STEVIĆ, A. SHARMA AND R. KRISHAN, Boundedness and compactness of a new product-type operator from a general space to Bloch-type spaces, J. Inequal. Appl. 2016 (2016), Article No. 219.
- [35] S. STEVIĆ AND S. UEKI, Polynomial differentiation composition operators from H^p spaces to weighted-type spaces on the unit ball, J. Math. Inequal. 17 (2023), 365–379.
- [36] S. WANG, M. WANG AND X. GUO, Products of composition, multiplication and iterated differentiation operators between Banach spaces of holomorphic functions, Taiwanese J. Math. 24 (2020), 355–376.
- [37] H. WULAN, D. ZHENG AND K. ZHU, Compact composition operators on BMOA and the Bloch space, Proc. Amer. Math. Soc. 137 (2009), 3861–3868.
- [38] W. YANG, Products of composition and differentiation operators from $Q_K(p,q)$ spaces to Bloch-type spaces, Abstr. Appl. Anal. **2009** (2009), Article ID 741920.
- [39] F. ZHANG AND Y. LIU, On the compactness of the Stević-Sharma operator on the logarithmic Bloch spaces, Math. Inequal. Appl. 19 (2) (2016), 625–642.
- [40] R. ZHAO, Essential norms of composition operators between Bloch type spaces, Proc. Amer. Math. Soc. 138 (2010), 2537–2546.
- [41] K. Zhu, Operator Theory in Function Spaces, American Mathematical Society, Providence, RI, 2007.
- [42] X. Zhu, Products of differentiation, composition and multiplication from Bergman type spaces to Bers type space, Integ. Tran. Spec. Funct. 18 (2007), 223–231.
- [43] X. Zhu, Generalized weighted composition operators on weighted Bergman spaces, Numer. Funct. Anal. Opt. 30 (2009), 881–893.

- [44] X. Zhu, Volterra composition operators from weighted-type spaces to Bloch-type spaces and mixed norm spaces, Math. Inequal. Appl. 14 (1) (2011), 223–233.
- [45] X. Zhu, Generalized weighted composition operators on Bloch-type spaces, J. Ineq. Appl. 2015 (2015), 59–68.
- [46] X. Zhu, Essential norm of generalized weighted composition operators on Bloch-type spaces, Appl. Math. Comput. 274 (2016), 133–142.
- [47] X. Zhu, Essential norm and compactness of the product of differentiation and composition operators on Bloch type spaces, Math. Inequal. Appl. 19 (1) (2016), 325–334.
- [48] X. Zhu, Generalized weighted composition operators on weighted Bergman spaces, II, Math. Ineq. Appl. 22 (2019), 1055–1066.
- [49] X. ZHU, Q. HU AND D. QU, Polynomial differentiation composition operators from Besov-type spaces into Bloch-type spaces, Math. Meth. Appl. Sci. (2023), 1–22, doi:10.1002/mma.9647.