Mathematical
Inequalities
& Applications
Volume 26, Number 4 (2023), 951–963
doi:10.7153/mia-2023-26-58

GENERALIZED INTEGRATION OPERATORS FROM WEIGHTED BERGMAN SPACES INTO GENERAL FUNCTION SPACES

XIANGLING ZHU

Abstract. This article studies the boundedness of the inclusion mapping from weighted Bergman spaces A^p_α into a class of tent type space $\mathcal{T}^{p,n}_s(\mu)$. As an application, the boundedness, compactness and essential norm of generalized integral operators $T^{n,k}_g$ and $S^{n,0}_g$ from A^p_α to general function spaces are also investigated.

Mathematics subject classification (2020): 30H20, 47B38.
Keywords and phrases: Weighted Bergman space, generalized integral operator, Carleson measure.

REFERENCES

[1] A. ALEMAN AND J. CIMA, *An integral operator on H^p and Hardy's inequality*, J. Anal. Math. 85 (2001), 157–176.
[2] A. ALEMAN AND A. SISKAKIS, *An integral operator on H^p*, Complex Variables Theory Appl. 28 (1995), 149–158.
[3] A. ALEMAN AND A. SISKAKIS, *Integration operators on Bergman spaces*, Indiana Univ. Math. J. 46 (1997), 337–356.
[4] K. ATTELE, *Interpolating sequences for the derivatives of Bloch functions*, Glasgow Math. J. 34 (1992), 35–41.
[5] R. AULASKARI, D. STEGENGA AND J. XIAO, *Some subclasses of BMOA and their characterization in terms of Carleson measures*, Rocky Mountain J. Math. 26 (1996), 485–506.
[6] K. AVETISYAN AND S. STEVIĆ, *Extended Cesàro operators between different Hardy spaces*, Appl. Math. Comput. 207 (2009), 346–350.
[7] N. CHALMOUKIS, *Generalized integration operators on Hardy spaces*, Proc. Amer. Math. Soc. 148 (2020), 3325–3337.
[8] D. 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.
[9] J. DU, S. LI AND D. QU, *The generalized Volterra integral operator and Toeplitz operator on weighted Bergman spaces*, Mediterr. J. Math. (2022) 19:263, https://doi.org/10.1007/s00009-022-02161-9.
[10] J. GARNETT, *Bounded Analytic Functions*, Academic Press, New York, 1981.
[11] P. LI, J. LIU AND Z. LOU, *Integral operators on analytic Morrey spaces*, Sci. China Math. 57 (2014), 1961–1974.
[12] S. LI, J. LIU AND C. YUAN, *Embedding theorems for Dirichlet type spaces*, Canad. Math. Bull. 63 (2020), 106–117.
[13] 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.
[14] S. LI AND S. STEVIĆ, *Riemann-Stieltjes operators on Hardy spaces in the unit ball of $\mathbb{C}^n$*, Bull. Belg. Math. Soc. Simon Stevin 14 (4) (2007), 621–628.
[15] S. LI AND S. STEVIĆ, *Compactness of Riemann-Stieltjes operators between $F(p,q,s)$ and α-Bloch spaces*, Publ. Math. Debrecen 72 (1–2) (2008), 111–128.
[16] S. LI AND S. STEVIĆ, *Riemann-Stieltjes operators between different weighted Bergman spaces*, Bull. Belg. Math. Soc. Simon Stevin 15 (4) (2008), 677–686.

Paper MIA-26-58

[17] S. LI AND S. STEVIĆ, *Cesàro type operators on some spaces of analytic functions on the unit ball*, Appl. Math. Comput. 208 (2009), 378–388.
[18] S. LI AND S. STEVIĆ, *Integral-type operators from Bloch-type spaces to Zygmund-type spaces*, Appl. Math. Comput. 215 (2009), 464–473.
[19] S. LI AND H. WULAN, *Volterra type operators on Q_K spaces*, Taiwanese J. Math. 14 (2010), 195–211.
[20] M. LINDSTRÖM, D. NORRBO AND S. STEVIĆ, *On compactness of operators from Banach spaces of holomorphic functions to Banach space*, J. Math. Inequal. 17 (2023) to appear.
[21] X. LIU, S. LI AND R. QIAN, *Volterra type operators and Carleson embedding on Campanato spaces*, J. Nonlinear Var. Anal. 5 (2021), 141–153.
[22] J. PAU AND R. ZHAO, *Carleson measures, Riemann-Stieltjes and multiplication operators on a general family of function spaces*, Integral Equations and Operator Theory 78 (2014), 483–514.
[23] C. POMMERENKE, *Schlichte funktionen und analytische funktionen von beschränkten mittlerer Oszillation*, Comm. Math. Helv. 52 (1977), 591–602.
[24] R. QIAN AND S. LI, *Volterra type operators on Morrey type spaces*, Math. Inequal. Appl. 18 (2015), 1589–1599.
[25] R. QIAN AND X. ZHU, *Embedding Hardy spaces H^p into tent spaces and generalized integration operators*, Ann. Polon. Math. 128 (2022), 143–157.
[26] R. QIAN AND X. ZHU, *Volterra integral operator from weighted Bergman spaces to general function spaces*, Math. Inequal. Appl. 25 (2022), 985–998.
[27] J. RÄTTYÄ, *On some complex function spaces and classes*, Ann. Acad. Sci. Fenn. Math. Diss. 124 (2001), 1–73.
[28] J. RÄTTYÄ, *n-th derivative characterizations, mean growth of derivatives and $F(p,q,s)$*, Bull. Australian Math. Soc. 68 (2003), 405–421.
[29] 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.
[30] C. SHEN, Z. LOU AND S. LI, *Embedding of $BMOA_{\log}$ into tent spaces and Volterra integral operators*, Comput. Methods Funct. Theory 20 (2020), 217–234.
[31] Y. SHI AND S. LI, *Essential norm of integral operators on Morrey type spaces*, Math. Inequal. Appl. 19 (2016), 385–393.
[32] S. STEVIĆ, *Boundedness and compactness of an integral operator on a weighted space on the polydisc*, Indian J. Pure Appl. Math. 37 (6) (2006), 343–355.
[33] S. STEVIĆ, *Boundedness and compactness of an integral operator on mixed norm spaces on the polydisc*, Siberian Math. J. 48 (3) (2007), 559–569.
[34] 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.
[35] S. STEVIĆ, *Products of integral-type operators and composition operators from the mixed norm space to Bloch-type spaces*, Siberian Math. J. 50 (4) (2009), 726–736.
[36] S. STEVIĆ, *On an integral-type operator from Zygmund-type spaces to mixed-norm spaces on the unit ball*, Abstr. Appl. Anal. 2010, Article ID 198608, (2010), 7 pages.
[37] 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.
[38] S. STEVIĆ, *On some integral-type operators between a general space and Bloch-type spaces*, Appl. Math. Comput. 218 (2011), 2600–2618.
[39] S. STEVIĆ AND S. UEKI, *Integral-type operators acting between weighted-type spaces on the unit ball*, Appl. Math. Comput. 215 (2009), 2464–2471.
[40] K. STROETHOFF, *Besov-type characterizations for the Bloch space*, Bull. Austral. Math. Soc. 39 (1989), 405–420.
[41] R. ZHAO, *On α-Bloch functions and VMOA*, Acta. Math. Sci. 16 (1996), 349–360.
[42] R. ZHAO, *On a general family of function spaces*, Ann. Acad. Sci. Fenn. Math. Diss. No. 105 (1996), 1–56.
[43] K. ZHU, *Operator Theory in Function Spaces*, second edition, Math. Surveys and Monographs, 138 (2007).