On normal weighted Bergman type operators on mixed norm spaces

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As is well known, the classical Bergman operator projects the space $L^2(\Omega)$ over a domain Ω onto the holomorphic subspace $A^2(\Omega) \subset L^2(\Omega)$ consisting of the holomorphic functions. A lot of papers generalizes and extends this to various (weighted) spaces given on one- and multi-dimensional domains $\Omega \subset \mathbb{C}^n$. Usually, radial power functions appear as weight functions. Instead, for the first time, Shields and Williams [1] suggested so called normal weight functions in the unit disc, namely those weights having power majorants and minorants. As a consequence, some Bergman operators arise with the use of normal weights. A.I. Petrosyan [2], [3] introduced Bergman type operators on the unit ball $B \subset \mathbb{C}^n$ and obtained a sufficient condition for them to be bounded in the unweighted spaces $L^p(B)$.

In the present note, in the setting of the unit ball B of $\mathbb{C}^n$, the main result in [2], [3] is generalized in the three directions: first, all the values $1 \le p \le \infty$ are supposed, second, we discuss weighted spaces, and third, in place of the Bergman spaces, we consider more general mixed norm spaces $L(p, q, \beta)$ over the ball B and find those values of β under which general Bergman type operators become bounded on the spaces $L(p, q, \beta)$. At the same time, instead of the Schur test not applicable to our general case, we apply another method by modifying the well-known Hardy's inequalities.

References

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