

SOME SUBCLASSES OF BMOA AND
THEIR CHARACTERIZATION IN TERMS OF
CARLESON MEASURES

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ABSTRACT. We study a collection of subclasses of BMOA defined by means of a modified Garcia norm and show that these classes are equivalently defined by means of a modified Carleson measure. We extend a result of C. Fefferman on series with nonnegative coefficients to these classes and also compare them with the classes of mean Lipschitz functions. Finally, we show some clear differences between the analytic and meromorphic cases of these classes.

1. Introduction. Let $\Delta = \{z : |z| < 1\}$ be the unit disk in the complex plane \mathbf{C} and denote by $dxdy$ the usual area measure on Δ . The boundary of Δ will be denoted by $\partial\Delta$. For $z, w \in \Delta$ we let $g(z, w)$ be the Green's function of Δ with pole at w . The class of holomorphic functions on Δ will be denoted by A .

We are interested in the classical space BMOA of functions of bounded mean oscillation on Δ . There are several well-known equivalent definitions which can be found, for example, in [7] and [11]. The following is a variant of one of these definitions:

Definition. For $0 < p < \infty$, we say that $f \in Q_p$ if $f \in A$ and

$$\|f\|_{Q_p}^2 = \sup_{w \in \Delta} \iint_{\Delta} |f'(z)|^2 g^p(z, w) dx dy < \infty.$$

Moreover, if the above integrals tend to zero as $|w| \rightarrow 1$, then we say $f \in Q_{p,0}$.

These spaces, in their analytic and meromorphic forms, were introduced by the first author and his collaborators and have been studied in [2–6] and elsewhere. The key points (in the analytic case) are that

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