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ON A CLASSIFICATION OF PLANE DOMAINS FOR BMOA

Dedicated to Professor Mitsuru Ozawa on the occasion of his 60th birthday

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1. Introduction. The space $BMOA$ is one which lies between the space AB of *bounded analytic functions* and the *Hardy class* H_p for any $p>0$. In this paper we are concerned with $BMOA$ for general domains and investigate the inclusion relations among the null classes O_{AB}, O_{BMOA} and O_p of plane domains corresponding to these spaces.

The space BMO of functions of *bounded mean oscillation* was first introduced by John and Nirenberg [7], in the context of functions defied in $\boldsymbol{R}^n$. Since then several people [1, 3, 5] investigated the space in various contexts and noticed that BMO has deep connections with conjugate harmonic functions and the dual of Hardy class H_1. We state the definition of BMO for functions defined on the unit circle T. Let u be an integrable function on T and I be a subarc of T. We denote by u_1 the average of u over I, that is,

$$u_I=\frac{1}{|I|}\int_I u(e^{it})dt\,,$$

where $|I|$ denotes the Lebesgue measure of I. We say that u is of bounded mean oscillation, $u\in BMO$, if

$$\sup_I \frac{1}{|I|}\int_I |u(e^{it})-u_I|\,dt<+\infty\,,$$

where the supremum is taken over all subarcs $I\subset T$. We denote by $BMOA$ the set of functions in BMO whose Poisson extensions to the unit disc D are analytic. It is known that $BMOA$ can be defined in an equivalent way which makes it conformally invariant.

Let f be an analytic function in D. We use the following notations:

$$\|f\|_p=\sup_{0<r<1}\left(\frac{1}{2\pi}\int_0^{2\pi}|f(re^{i\theta})|^p d\theta\right)^{1/p}, \qquad 0<p<\infty\,,$$

$$H_p(D)=\{f : f \text{ is analytic in } D \text{ and } \|f\|_p<+\infty\}\,, \tag{1.1}$$

and

$$T(f)=\sup_{0<r<1}\frac{1}{2\pi}\int_0^{2\pi}\log^+|f(re^{i\theta})|\,d\theta\,.$$

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