Wang, Jian; **Fang, Xiang**

On Baernstein's theorem on the upper half-space and polydiscs. (Chinese) Zbl 0621.32012

Acta Math. Sin. 29, 393-398 (1986).

Let ϕ (t) be a non-negative strictly increasing subadditive function on [0,∞) with ϕ (t)$\to \infty$ as $t \to \infty$. Let Q be a fixed cube in $\mathbb{R}^n$ with sides parallel to the coordinate axes. Denote $BMO_\phi(Q)$ for the set of all functions f such that ϕ ($|f(x)|$) is locally integrable on Q, with $\|f\|^\phi_{BMO} = \sup_{I\subseteq Q} \frac{1}{|I|}\int_I \phi(|f(x) - f(I)|)dx < \infty$, where I is a subcube with sides parallel to sides of Q, $|I|$ the Lebesgue measure of I and f(I) the average of f over I. $BMO_t(Q)$ is the usual BMO(Q) when ϕ (t)$\equiv t$. *A. Baernstein* introduced [Aspects of contemporary complex analysis, Proc. instr. Conf. Durham/Engl. 1979, 3-36 (1980; Zbl 0492.30026)] the set BMOA of functions with bounded mean oscillation over the unit circle T whose Poisson extensions to the unit disc Δ are analytic, and proved a theorem which established the equivalence between the set of all normalized hyperbolic translates of a function analytic in Δ to be bounded in the Nevanlinna class and the exponential decrease of the distribution of the function. In this paper the authors extend this theorem to the set $BMOH_\phi(\mathbb{R}^{n+1}_+)$ of all harmonic functions on $\mathbb{R}^{n+1}_+$ from the Poisson integral of functions in $BMO_\phi(\mathbb{R}^n)$ and the set $BMOH_\phi(\Delta^n)$ on polydiscs Δ^n derived from the functions in $BMO_\phi(T^n)$ over the characteristic boundary T^n of Δ^n.

Reviewer: S.H.Tung

MSC:

32A35 H^p-spaces, Nevanlinna spaces of functions in several complex variables
32A30 Other generalizations of function theory of one complex variable (should also be assigned at least one classification number from Section 30-XX)
30D50 Blaschke products, etc. (MSC2000)
31B05 Harmonic, subharmonic, superharmonic functions in higher dimensions
42B30 H^p-spaces

Keywords:

upper half-space; BMOA; bounded mean oscillation; harmonic functions; Poisson integral; polydiscs; characteristic boundary