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ON THE SET OF REGULAR BOUNDARY POINTS

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Introduction

Let X be a $\mathcal{P}$-harmonic space with a countable base in the sense of the axiomatics of Constantinescu and Cornea [3], U an open set of X and U_{reg} the set of regular boundary points of U. If X is a connected Brelot space, it is known that U_{reg} is dense on $\partial\bar{U}$ (see e.g. Hervé [4], Ikegami [6]). This is not valid for more general hamonic spaces. We prove two results related to this question. Assuming that the space has a base of regular sets, we obtain a necessary condition (by means of absorbent sets) for the case that U_{reg} is not dense on $\partial\bar{U}$.

1. Preliminaries

Let X be a $\mathcal{P}$-harmonic space with a countable base in the sense of Constantinescu and Cornea [3] and U an open set of X. We denote the set of regular (resp. irregular) points of ∂U by U_{reg} (resp. U_{ir}). If U is relatively compact and $M\subset\partial U$ with $\mu_x^U(M)=0$ for all $x\in U$, M is called *negligible*. Since X has a countable base, if M is negligible, $\bar{H}_{\chi_M}^U(x)=\mu_x^U(M)=0$ for all $x\in U$ (cf. [2, Satz 4.1.7]).

REMARK 1.1. Let $y\in\partial U$. A strictly positive hyperharmonic function u defined on the intersection of U and an open neighbourhood V of y is called a barrier at y if

$$\lim_{U\cap V\ni z\to y} u(z) = 0\,.$$

Then $y\in U_{reg}$ if and only if there exists a barrier at y. This follows from [3, Proposition 2.4.7], [3, Theorem 6.3.3] and [3, Proposition 7.2.2]. Thus $y\in U_{reg}$ implies that for every open subset U' of U with $y\in\partial U'$, we have $y\in U'_{reg}$.

A relatively compact open set U is called a *Keldyš set*, if U_{ir} is negligible [8, Proposition 2].

The following result was proved by Lukeš and Netuka [9, Theorem 3]: Let U be an open set of X. If K is an arbitrary compact set of U, there is a Keldyš set V with $K\subset V\subset\bar{V}\subset U$.