221. *Axiomatic Treatment of Fullsuperharmonic Functions and Submarkov Resolvents*

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In 1963, P. A. Meyer [6] proved under very mild assumptions that, for any harmonic space satisfying Brelot's axioms there exists a semigroup such that the excessive functions with respect to this semigroup are exactly the nonnegative superharmonic functions. Our aim in the present paper is to show, under the same kind of assumptions adopted by Meyer, that there exists a submarkov resolvent $(V_\lambda)_\lambda \geqq 0$ such that: a) the excessive functions with respect to this resolvent are exactly the nonnegative fullsuperharmonic functions in the theory of axiomatic fullharmonic structures developed by F. Y. Maeda [4]; b) for any continuous function f with compact support the function $\lambda V_\lambda f$ converges uniformly to f as λ tends to infinity; c) $Vf=V_0 f$ is a bounded continuous fullsuperharmonic function of potential type if f is a nonnegative Borel function.

1. **Preliminary results.** First we shall give a brief summary of some results of F. Y. Maeda. Let S' be a (not compact) harmonic space with countable basis satisfying Brelot's axioms 1. 2. 3 [2]. The space of all harmonic functions on an open set U and the cone of superharmonic functions on U are denoted by $\mathcal{H}(U)$ and $\mathcal{S}(U)$ respectively. Let $\mathcal{D}$ be the family of domains D is S' such that D is not relatively compact and the boundary ∂D of D is compact. Let $\mathcal{G}$ be the family of open sets in S' with compact boundary. We will assume that for each $D \in \mathcal{D}$ we are given a linear subspace $\tilde{\mathcal{H}}(D)$ of $\mathcal{H}(D)$ satisfying:

(I) If $D, D' \in \mathcal{D}$, $D' \subset D$ and $u \in \tilde{\mathcal{H}}(D)$, then $u|_{D'}$, the restriction of u on D', $\in \tilde{\mathcal{H}}(D')$.

(II) If $u \in \mathcal{H}(D)$ and if there exists a compact set K in S' such that $\mathring{K}$ (the interior of K) $\supset \partial D$ and $u|_{D-K} \in \tilde{\mathcal{H}}(D-K)$, then $u \in \tilde{\mathcal{H}}(D)$.

A domain $D \in \mathcal{D}$ is said to be *regular* if any continuous function f on ∂D has a unique continuous extension $\tilde{H}_f^D$ on $\bar{D}$ such that $\tilde{H}_f^D|_D \in \tilde{\mathcal{H}}(D)$, and $f \geqq 0$ implies $\tilde{H}_f^D \geqq 0$. A set $G \in \mathcal{G}$ is said to be *regular* if every component of G is either relatively compact and regular in the sense of [2] or not relatively compact and regular in the sense described above. We will assume the next axiom: