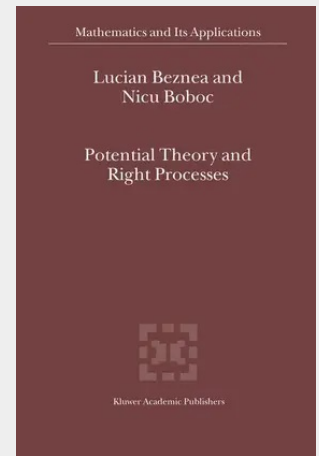


Potential Theory and Right Processes

The developments in the recent years of the potential theory emphasized a class of functions larger than that of excessive functions (i.e. the positive superharmonic functions from the classical potential theory associated with the Laplace operator), namely the strongly supermedian functions. It turns out that a positive Borel function will be strongly supermedian if and only if it is the infimum of all its excessive majorants. Apparently, these functions have been introduced by J.F. Mertens and then they have been studied mainly by P.A. Meyer, G. Mokobodzki, D. Feyel and recently by P.J. Fitzsimmons and R.K. Gettoor. The aim of this book is among other things to develop a potential theory appropriate to this new class of functions. Although our methods are analytical, we present also the probabilistic counterparts from the Markov processes theory. The natural frame in which this theory is settled is given by a sub-Markovian resolvent of kernels on a Radon measurable space. After a possible extension of the space, such a resolvent becomes that one associated with a right process on a Radon topological space, not necessarily locally compact and without existing a reference measure. Intimately related to the excessive functions we present certain basic tools of the theory: the Ray topology and compactification, the fine carrier and the reduction operation on measurable sets. We examine different types of negligible sets with respect to a finite measure: the $\mathcal{P}$ -polar, $\mathcal{P}$ -semipolar and $\mathcal{P}$ -mince sets. We take advantage of the cone of potentials structure for both excessive functions and measures.

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