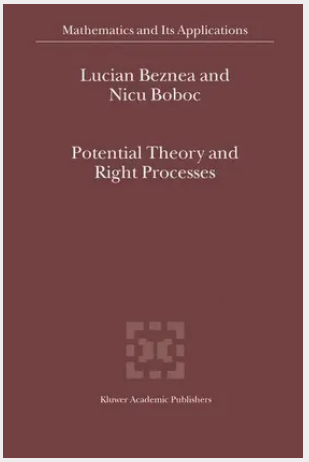
Beznea / Boboc

Potential Theory and Right Processes



The developmentsin the recent yearsof the potential theoryemphasized a classof functions larger than that of excessive functions (i.e. the positive superharmonic functionsfromtheclassicalpotentialtheoryassociatedwiththeLaplaceoperator), namely the strongly supermedian functions. It turns out that a positive Borel function will be strongly supermedian if and only if it is the in?mum 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. Getoor. The aimofthis bookisamongothersto developa potential theoryappropriate 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 necessary 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 compacti?cation, the ?ne carrier and the reduction operation on measurable sets. We examine di?erent types of negligible sets with respect to a ?nite measure ?:the ?-polar, ? -semipolar and ?-mince sets. We take advantage of the cone of potentials structure for both excessive functions and measures.

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