ANNALES SCIENTIFIQUES
DE L'UNIVERSITÉ DE CLERMONT-FERRAND 2
Série Mathématiques

JOSEPH GLOVER

Markov processes and their last exit distributions

Annales scientifiques de l'Université de Clermont-Ferrand 2, tome 71, série *Mathématiques*, n° 20 (1982), p. 107

<http://www.numdam.org/item?id=ASCFM_1982__71_20_107_0>

© Université de Clermont-Ferrand 2, 1982, tous droits réservés.

L'accès aux archives de la revue « Annales scientifiques de l'Université de Clermont-Ferrand 2 » implique l'accord avec les conditions générales d'utilisation (http://www.numdam.org/conditions). Toute utilisation commerciale ou impression systématique est constitutive d'une infraction pénale. Toute copie ou impression de ce fichier doit contenir la présente mention de copyright.

NUMDAM
Article numérisé dans le cadre du programme
Numérisation de documents anciens mathématiques
http://www.numdam.org/

MARKOV PROCESSES AND THEIR LAST EXIT DISTRIBUTIONS

Joseph GLOVER
University of ROCHESTER (U.S.A.)

In a forthcoming paper [1], we prove the following result.

Theorem. Let $(X(t), P^x)$ and $(Y(t), Q^x)$ be two (canonically defined) transient Hunt processes on E. Assume for each compact set K contained in E that $P^x(f(X_{L(K)-}); L(K)>0) = Q^x(f(Y_{L(K)-}); L(K)>0)$ for all bounded functions f on E, where L(K) is the last time the process is in K. Then Y is equivalent to a time change of X by the inverse of a strictly increasing continuous additive functional.

Let (q_k) be a collection of points dense in E, and let $B_r(q_k)$ be the open ball of radius r about q_k. If we let L(r,k) be the last time the process is in $B_r(q_k)$, and if we set $A(t) = \sum_j 2^{-j} \int_0^1 1_{\{0<L(r,k)\leq t\}} dr$, then A(t) is a raw additive functional of X and Y and the hypothesis of the theorem implies that $P^x \int f(X_{t-})\, dA(t) = Q^x \int f(Y_{t-})\, dA(t)$. Let B(t) (resp. C(t)) denote the dual predictable projection of A(t) for the process $(X(t), P^x)$ (resp. $(Y(t), Q^x)$. It is not difficult to show that B(t) (resp. C(t)) is a strictly increasing continuous additive functional of X (resp. Y), which implies that $P^x \int f(X(t))dB(t) = Q^x \int f(Y(t))\, dC(t)$. Thus if we let T(t) (resp. S(t)) denote the right continuous inverse of B(t) (resp. C(t)), then $P^x \int f(X(T(t)))\, dt = Q^x \int f(Y(S(t)))\, dt$. Therefore, the resolvents of the processes $(X(T(t)), P^x)$ and $(Y(S(t)), Q^x)$ agree, so the processes have the same joint distributions. The main result follows.

This result can also be interpreted (with natural auxiliary hypotheses) as a statement in potential theory involving equilibrium measures.

[1] J. Glover. Markov Processes with Identical Last Exit Distributions. (to appear, Zeitschrift fur Wahrscheinlichkeitstheorie verw. Geb.).