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Erratum : A new setting for potential theory (part 1)

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ERRATUM

"A NEW SETTING FOR POTENTIAL THEORY (part 1)"

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Mémoire de K. L. CHUNG & K. MURALI RAO

On p. 181, (26) should read as follows :

(26) $P_G P_K = P_K$.

Proof that (a) ⇒ (b) should be revised as follows.

Suppose Z is polar and K be given. Let L be compact, $L \subset K \cap Z^c$. By Proposition 1 of § 1, there exists h such that $h > 0$ everywhere and $Uh \leq 1$. Let $s = P_K Uh$, then $s = \lim_n \downarrow P_{D_n} Uh$ where $D_n \downarrow\downarrow K$. By Corollaries 1 and 4 of Theorem 2 (continued), we have

$$P_{D_n} Uh = U\mu_n \quad , \quad \lfloor\mu_n \subset \overline{D}_n \quad , \quad \mu_n(Z) = 0 \ .$$

Hence $s = \lim_n U\mu_n$, and $U\mu_n \leq P_{D_1} Uh < \infty$ for all n . Apply Theorem 2 (continued) under (c_1) to obtain $\{\mu_{n_j}\}$ converging vaguely to μ , such that $s = U\mu$ and $\mu(Z) = 0$, the last assertion by (6) of Theorem 2. We have $\lfloor\mu \subset K$ by vague convergence. Thus

$$s = U\mu \quad , \quad \lfloor\mu \subset K \quad , \quad \mu(Z) = 0 \ ,$$

and therefore $s = W\mu$. For any (open) $G \supset K$, we have then

$$P_G s = P_G W\mu = W\mu = s$$

where the second equation is due to the round property of w and the fact μ is supported by $K \subset G$. Thus by the argument on p. 70 of [5] :

.../...

$$0 = P_K Uh - P_G P_K Uh \geq E^{\cdot}\left\{\int_{T_K}^{T_G + T_K \circ \theta_{T_G}} h(X_t)dt \; ; \; T_G = T_K \; ; \; X(T_G) \in K \setminus K^r\right\}$$

which implies that

$$\forall x : \quad P^x\{T_G = T_K \; ; \; X(T_G) \in K \setminus K^r\} = 0 \; .$$

This implies easily that for any $f \in b\mathcal{E}_+$:

$$P_G P_K f = P_K f$$

which is (26).

N. B. The mistake was to suppose that $P_G P_K 1 = P_K 1$ implies $P_G P_K = P_K$. This was partly caused by a statement on p. 71 of [5] which apparently asserts that $P_G P_K \leq P_K$ in general. Dellacherie gave a trivial counter-example to the last assertion, which is left as an exercise.

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First display on p. 168 should read :

$$\lim_{t \to \infty} P^x\{T_K \circ \theta_t < \infty\} = 0 \; .$$
