The Annals of Applied Probability
2007, Vol. 17, Nos. 5/6, 1808–1810
DOI: 10.1214/07-AAP458
Main article DOI: 10.1214/105051607000000032

CORRECTION

PERFECT SIMULATION FOR A CLASS OF POSITIVE RECURRENT MARKOV CHAINS

Ann. Appl. Probab. **17** (2007) 781–808

BY STEPHEN B. CONNOR AND WILFRID S. KENDALL

University of Warwick

In [1] we introduced a class of positive recurrent Markov chains, named tame chains. A perfect simulation algorithm, based on the method of dominated CFTP, was then shown to exist in principle for such chains. The construction of a suitable dominating process was flawed, in that it relied on an incorrectly stated lemma ([1], Lemma 6). This claimed that a geometrically ergodic chain, subsampled at a stopping time σ, satisfies a geometric Foster–Lyapunov drift condition with coefficients not depending on σ. This is true if σ is a stopping time independent of the chain, but *not* if this independence does not hold. Reference [1], Lemma 6 is therefore false as stated.

We now indicate a corrected construction of a dominating process. As described in [1], Section 3.1, the process D is defined by starting with a process Y and pausing it using a function S. In the following modified construction this is simplified by taking $S = F$, where F is the function taming X. We restate [1], Theorem 16, and give a shorter proof, which avoids the faulty Lemma 6 but pays a price in terms of consequences for the perfect simulation algorithm of Section 3.3. The discussion of tameness (Section 4) is unaffected.

THEOREM 16. *Suppose X satisfies the weak drift condition $PV \le V + b\mathbf{1}_C$, and that X is tamed with respect to V by the function*

$$F(z) = \begin{cases} \lceil \lambda z^{\delta} \rceil, & z > d', \\ 1, & z \le d', \end{cases}$$

with the resulting subsampled chain X' satisfying a drift condition $PV \le \beta V + b'\mathbf{1}_{[V \le d']}$, with $\log \beta < \delta^{-1} \log(1-\delta)$. Then there exists a stationary ergodic process D which dominates $V(X)$ at the times $\{\sigma_n\}$ when D moves.

PROOF. Suppose that $D_{\sigma_n} = z$, and that $V(X_{\sigma_n}) = V(x) \le z$. We wish to show that $D_{\sigma_{n+1}}$ can dominate $V(X_{\sigma_{n+1}})$, where $\sigma_{n+1} = \sigma_n + F(z)$ is the time at which D next moves. Domination at successive times σ_j at which D moves then follows inductively. For simplicity in the calculations below we set $\sigma_n = 0$.

First choose $\beta^* > \beta$ such that

$$\log \beta < \log \beta^* < \delta^{-1} \log(1-\delta). \tag{1}$$