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TES: A class of methods for generating autocorrelated uniform variates. (English)

Zbl 0764.65002

ORSA J. Comput. 3, No. 4, 317-329 (1991).

This paper introduces a new class of simple generation methods for Markovian sequences of random variables with uniform marginals, called transform-expand-sample (TES). A basic TES method is a nonlinear autoregressive scheme with modulo-1 arithmetic; each is determined by a transformation and two parameters $\alpha \in [0, 1]$ and $\varphi \in [-1, 1]$.

The first autocorrelation of TES sequences is analytically computed and it is shown that, for two fundamental TES methods, the resulting lag-1 autocorrelation ρ_1 as a function of α and φ spans every values in $(-1, 1)$ and is monotonic quadratic in both α and φ .

On the other hand, higher autocorrelations are investigated empirically by simulation. The sample paths of TES are cyclical and exhibit discontinuity in the neighborhood of point 0 due to wraparound. So, transformations of TES methods are presented to make the sample paths more continuous-looking while preserving their marginal uniformity.

Reviewer: [K.Uosaki \(Tottori\)](#)

MSC:

65C10 Random number generation in numerical analysis

Cited in **1** Review
Cited in **11** Documents

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random number generation; correlated uniform variates; Markovian structure; transform-expand-sample methods; TES method

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