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

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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  $\rho_1$  as a function of  $\alpha$  and  $\varphi$  spans every values in  $(-1, 1)$  and is monotonic quadratic in both  $\alpha$  and  $\varphi$ .

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

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**Keywords:**

[random number generation](#); [correlated uniform variates](#); [Markovian structure](#); [transform-expand-sample methods](#); [TES method](#)

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