LETTER TO THE EDITOR

Dear Editor,

The distribution of the maximum of i consecutive values of a process

In my paper 'An exponential Markovian stationary process' (*J. Appl. Prob.* **17** (1980), 1117–1120) the study of the distribution of the maximum of i consecutive values of the proposed process $\{x_i : i = 0, 1, 2, \cdots\}$ is done approximating

$$A = P[x_i \leqq L/(x_{i-1} \leqq L \cap \cdots \cap x_1 \leqq L)]$$

by

$$B = P[x_i \leqq L/x_{i-1} \leqq L]$$

but, in general terms, the Markovian property does not imply that B will be a good approximation of A because

$$A = \int_0^L \left[\int_0^L f(x_i/x_{i-1})dx_i\right] f[x_{i-1}/(x_{i-2} \leqq L \cap \cdots \cap x_1 \leqq L)]dx_{i-1}$$

where $f(x_i/x_{i-1})$ is a continuous function of x_{i-1}, $G_L(x_{i-1})$.

However, we expect that such an approximation will be acceptable for the proposed process because it has a special memory structure: $G_L(x_{i-1})$ is not a continuous function of x_{i-1} as it can just take two constant values

$$G_L(x_{i-1}) \begin{cases} = 1 \\ = P\left(y_i \leqq \dfrac{L}{K}\right) \quad \text{if } \dfrac{L}{K} < x_{i-1} \leqq L. \end{cases}$$

This was pointed out to me by Dr Michael R. Chernick of the Aerospace Corporation, P.O. Box 92957, Los Angeles, CA 90009, U.S.A., who has also shown numerically that the maximal relative deviation between the exact and the approximated c.d.f. for the maximum of i consecutive $\{x_i\}$ values with $i = 3$, $\lambda = 1$, $K = 3$ and $c = 2$ is just 10^{-2} with $L = 0.1$; 1.0; 1.5; 2.0; 3.0; 4.0; 5.0.

Instituto Superior
Técnico, Lisbon

Yours sincerely

L. VALADARES TAVARES