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"Markov chain must have a beginning". In memory of Prof. Loo-Keng Hua. (English)

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J. Math. Res. Expo. 6, No. 1, 1-3 (1986).

Let W denote the class of uniformly bounded r-tuples (generalizing $V = class$ of r-valued probability distributions), and let $P = (p_{ij})_{1 \le i,j \le r}$ be a finite stochastic matrix. Clearly $P : W \to W$, and $v \in W$ is said to have a history of length n in W, if there exists $u \in W$ such that $P^n u = v$. Further v is said to be periodic with period d under P if $vP^d = v$.

Proposition 1 states that there exists an integer d (period) with the following property. If $v \in W$ and if v has an arbitrarily long history in W then v is periodic with period d. A similar (periodless) continuous time version is given in Proposition 2. The reader will find this note probably tantalizing. What happens if P^{-1} exists? Why is step (6) (there may be an omission) correct, and how does this relate to the interpretation of d as the lcm of the periods of positive recurrent states in the $W = V$ case?

It must be added that there are several misprints and syntax error in this paper, and that the author's style, so well-known also for his clarity, is here not easy to recognize. The note, written in honour of his late former teacher Loo-Keng Hua, was written and edited under time pressure.

Reviewer: F.Th.Bruss

MSC:

60J10 Markov chains (discrete-time Markov processes on discrete state spaces)

Cited in **1** Review

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stochastic matrix; periodic; positive recurrent states

Biographic references:

Hua, Loo-Keng