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An extension of Sharkovsky's theorem to periodic difference equations. (English)

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The following system is studied:

$$x(n+1) = F(n, x(n)) \quad (1)$$

such that $F(n+p, x) = F(n, x)$, p is a given positive integer. Geometric cycles of (1) are investigated. A simpler method for constructing p -periodic difference equations with r -periodic geometric cycles are given. A new ordering of positive integers (p -Sharkovsky ordering) is introduced. Both the Sharkovsky theorem and its converse are generalized to the system (1) [cf. *A. N. Sharkovskij*, Ukr. Math. Zh. 16, 61–71 (1964; Zbl 0122.17504)].

Reviewer: **Ahmed Hegazi (Mansoura)**

MSC:

39A11 Stability of difference equations (MSC2000)

39A12 Discrete version of topics in analysis

37C27 Periodic orbits of vector fields and flows

Cited in **29** Documents

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Sharkovsky theorem; geometric cycles; skew-product dynamical systems; periodic orbits

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