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Attracting period 3 implies all natural periods for multidimensional maps

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We present the method from [1] for finding a wide variety of periodic orbits for multidimensional maps with an attracting n-periodic orbit. The set of periods is induced by the Sharkovskii ordering '$\lhd$' of natural numbers:

$$3 \lhd 5 \lhd 7 \lhd \cdots \lhd 2 \cdot 3 \lhd 2 \cdot 5 \lhd \cdots \lhd 2^2 \cdot 3 \lhd 2^2 \cdot 5 \lhd \cdots \lhd 2^k \lhd 2^{k-1} \lhd \cdots \lhd 2^2 \lhd 2 \lhd 1.$$

As an example, we prove the existence of n-periodic orbits for all $n \in \mathbb{N}$ in the Rössler system with a 3-periodic orbit, the existence of n-periodic orbits for all $n \in \mathbb{N} \setminus \{3\}$ in a similar system with a 5-periodic orbit, *etc.* We also expect that this method works for DDEs (joint work in progress with R. Szczelina). The proofs are computer-assisted with the use of CAPD library for C++.

[1] A. Gierzkiewicz, P. Zgliczyński, From the Sharkovskii theorem to periodic orbits for the Rössler system, *J. Differential Equations*, **314**(2022), 733–751.