

**Under Collatz conjecture the Collatz mapping has no
an asymptotic mixing property (mod 3)**

Gogi Pantsulaia

Abstract

By using properties of Markov homogeneous chains and Banach measure in \mathbb{N} , it is proved that a relative frequency of even numbers in the sequence of n -th coordinates of all Collatz sequences is equal to the number $\frac{2}{3} + \frac{(-1)^{n+1}}{3 \times 2^{n+1}}$. It is shown also that an analogous numerical characteristic for numbers of the form $3m + 1$ is equal to the number $\frac{3}{5} + \frac{(-1)^{n+1}}{15 \times 2^{2n}}$. By using these formulas it is proved that under Collatz conjecture the Collatz mapping has no an asymptotic mixing property (mod 3). It is constructed also an example of a real-valued function on the cartesian product N^2 of the set of all natural numbers N such that an equality its repeated integrals (with respect to Banach measure in N) implies that Collatz conjecture fails.