

1077-03-2911

**Iraj Kalantari** and **Mojtaba Moniri\*** (m-moniri@wiu.edu), Department of Mathematics,  
Western Illinois University, 1 University Circle, Macomb, IL 61455. *Beatty Sequences and  
Exponential Complexity Issues*. Preliminary report.

We prove results of the following type with implications to algorithms for binary expansions and Beatty sequences of certain low complexity real numbers. Consider two double sequences  $(p_n, q_n)_{n \in \mathbb{N}}$  defined by  $p_0 = 200$ ,  $q_0 = 500$ ,  $p_{n+1} = p_n - 0.1(q_n - 500)$ , and  $q_{n+1} = q_n + 0.2(p_n - 100)$ ; and  $(r_n, s_n)_{n \in \mathbb{N}}$  defined by  $r_0 = 1$ ,  $s_0 = 10$ ,  $r_{n+1} = 2r_n s_n$ , and  $s_{n+1} = s_n^2 - 2r_n^2$ . Then for all  $n \in \mathbb{N}$ , the cardinality of  $\{i \leq 2^n \mid (q_i - 500)(q_{i+1} - 500) < 0\}$  is odd if and only if  $r_n s_n < 0$ . (Received September 22, 2011)