

# INFORMATION- THEORETIC ASPECTS OF POST'S CONSTRUCTION OF A SIMPLE SET

AMS Notices 19 (1972), p. A-712

Abstract 72T-E85. GREGORY J. CHAITIN, Mario Bravo 249, Buenos Aires, Argentina. *Information-theoretic aspects of Post's construction of a simple set.* Preliminary report.

The complexity of a finite binary string is taken to be the number of bits in the shortest program for computing it on the standard universal computer. Define as follows two functions  $P$  and  $Q$  from the natural numbers into the sets of finite binary strings.  $P(n)$  is the set containing the first string output by any program such that the length of the string is greater than  $n +$  the length of the program.  $Q(n)$  is the set of the finite binary strings  $S$  such that  $(n +$  the complexity of  $S)$  is less than the length of  $S$ .  $P(n)$  is a version of Post's original construction of a simple set. Thus for all  $n$ ,  $P(n)$  is a simple set.  $Q(n)$  is based entirely on information-theoretic concepts.

*Theorem.* There is a  $c$  such that for all  $n$ ,  $P(n + c)$  is contained in  $Q(n)$ , and  $Q(n)$  is contained in  $P(n)$ .

*Corollary.* For all  $n$ ,  $Q(n)$  is a simple set.

(Received June 19, 1972.)