

1054-37-106

**Matthew Nicol\*** (nicol@math.uh.edu), Mathematics Department, University of Houston, Cullen Boulevard, Houston, TX 77204-3008, and **Chinmaya Gupta** (ccgupta@math.uh.edu) and **William Ott** (ott@math.uh.edu). *A Borel-Cantelli lemma for nonuniformly expanding dynamical systems*. Preliminary report.

Let  $(A_n)_{n=1}^{\infty}$  be a sequence of sets in a probability space  $(X, \mathcal{B}, \mu)$  such that  $\sum_{n=1}^{\infty} \mu(A_n) = \infty$ . The classical Borel-Cantelli lemma states that if the sets  $A_n$  are independent, then  $\mu(\{x \in X : x \in A_n \text{ for infinitely many values of } n\}) = 1$ . We present analogous dynamical Borel-Cantelli lemmas for certain sequences of sets  $(A_n)$  in  $X$  (including nested balls) for a class of deterministic dynamical systems  $T : X \rightarrow X$  that admit invariant probability measures. Our results apply to a class of Gibbs-Markov maps and one-dimensional nonuniformly expanding systems modeled by Young towers. We discuss some applications of our results to the extreme value theory of deterministic dynamical systems. (Received September 09, 2009)