Zbl 362.60044

Erdős, Paul; Revesz, P.

On the length of the longest head-run. (In English)

Top. Inf. Theory, Keszthely 1975, Colloq. Math. Soc. Janos Bolyai 16, 219-228 (1977).

[For the entire collection see Zbl 349.00030.]

Let $X_1, X_2, \ldots$ be a sequence of i.i.d.r.v.'s with $P(X_1 = 0) = P(X_1 = 1) = 1/2$, further put $S_n = X_1 + X_2 + \cdots + X_n, I(N, k) = \max_{0 \le i \le N-k}(S_{i+k} - S_i)$ and let Z_N be the largest integer for which $I(N, Z_N) = Z_N$ that is Z_N is the length of the longest head run. The main result says: for any $\varepsilon > 0$ there exists a r.v. $N_0 = N_0(\varepsilon, \omega)$ such that $Z_N \ge [\log N - \log\log\log N + \log\log e - 2 - \varepsilon]$ for all $N \ge N_0$ but for any $\varepsilon > 0$ there exists a sequence $N_1 = N_1(\omega, \varepsilon) < N_2 = N_2(\omega, \varepsilon) < \ldots$ such that $Z_{N_i} \le [\log N_i - \log\log\log N_i + \log\log e - 1 + \varepsilon]$ (i = 1,2,...). The base of the log is 2.

Classification:

60F15 Strong limit theorems

60C05 Combinatorial probability