

# Longest runs in coin tossing. Recursive formulae, asymptotic theorems, computer simulations

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## Abstract

The coin tossing experiment is studied. The length of the longest head run can be studied by asymptotic theorems ([2]), by recursive formulae ([3]) or by computer simulations ([1]). The aim of the paper is to compare numerically the asymptotic results, the recursive formulae, and the simulation results. Moreover, we consider also the longest run (i.e. the longest pure heads or pure tails). We compare the distribution of the longest head run and that of the longest run. We consider both fair and biased coins.

## References

- [1] BINSWANGER, K., EMBRECHTS, P., Longest runs in coin tossing. *Insurance Math. Econom.* Vol. 15 no. 2-3 (1994) , 139–149.
- [2] FÖLDES A., The limit distribution of the length of the longest head-run. *Period. Math. Hungar.* Vol. 10 no. 4, (1979), 301–310.
- [3] SCHILLING, M. F., The Longest Run of Heads. *The College Mathematics Journal* Vol. 21 no.3, (1990).

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