

THE DISTRIBUTION OF FIRST OCCURRENCE OF PATTERNS OF OUTCOMES OF BERNOULLI EXPERIMENTS

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ABSTRACT

Let X_1, X_2, \dots be a sequence of independent Bernoulli random variables. For any fixed integer $K \geq 1$, let $\underline{x}_K = (x_1, x_2, \dots, x_K)$ be any one of the 2^K vectors each of whose components is 0 or 1. We study the first occurrence of the pattern \underline{x}_K in X_1, X_2, \dots , and characterise the factors that explain why some sequences \underline{x}_K are more likely to occur before other sequences of the same length. Explicit formulae and a simple recursion are derived for the distribution of the first occurrence of the vector \underline{x}_K in the sequence X_1, X_2, \dots .