

WAITING TIME PROBLEMS FOR A TWO-DIMENSIONAL PATTERN*

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Abstract. We consider waiting time problems for a two-dimensional pattern in a sequence of i.i.d. random vectors each of whose entries is 0 or 1. We deal with a two-dimensional pattern with a general shape in the two-dimensional lattice which is generated by the above sequence of random vectors. A general method for obtaining the exact distribution of the waiting time for the first occurrence of the pattern in the sequence is presented. The method is an extension of the method of conditional probability generating functions and it is very suitable for computations with computer algebra systems as well as usual numerical computations. Computational results applied to computation of exact system reliability are also given.

Key words and phrases: Waiting time problem, two-dimensional pattern, probability generating function, discrete distribution, conditional distribution, reliability, consecutive system.

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