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Joint Distributions of Waiting Time Random Variables for Patterns

Sigeo Aki¹⁾ and Katuomi Hirano²⁾

1) *Department of Mathematics, Faculty of Engineering Science, Kansai University*

2) *The Institute of Statistical Mathematics, Research Organization of Information and Systems, Department of Statistical Science, School of Multidisciplinary Sciences, The Graduate University for Advanced Studies*

Abstract: Exact joint distributions of waiting times for two patterns in a sequence of l -th order time-homogeneous Markov dependent trials are studied, where the patterns are not necessarily assumed to be distinct from each other. We prove that exact joint probability generating functions, which are regarded as expectations of the corresponding random variables, are derived through calculating the conditional expectation based on conditioning by the sooner waiting time and the pattern which comes sooner. We also give illustrative numerical examples in order to demonstrate the performance of our results.

Key words: Conditional expectation, discrete distribution theory, discrete pattern, generalized probability generating function, waiting time

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