

# Asymptotic results for jump probabilities associated to the multiple scan statistic

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**Abstract** The concept of pattern arises in many applications comprising experimental trials with two or more possible outcomes in each trial. A binary scan of type  $r/k$  is a special pattern referring to success–failure strings of fixed length  $k$  that contain at least  $r$ -successes, where  $r, k$  are positive integers with  $r \leq k$ . The multiple scan statistic  $W_{t,k,r}$  is defined as the enumerating random variable for the overlapping moving windows occurring until trial  $t$  which include a scan of type  $r/k$ . In the present work, we consider a sequence of independent binary trials with not necessarily equal probabilities of success and develop upper bounds for the probability of the event that the multiple scan statistic will perform a jump from  $\ell$  to  $\ell + 1$  (where  $\ell$  is a nonnegative integer) in a finite time horizon.

**Keywords** Multiple scan statistic · Upper bound · Demisubmartingale ·  $N$ -demisupermartingale · Demimartingale

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