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### SigWinR; the SigWin-detector updated and ported to R

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ADDITIONAL FILE 1 TO SIGWINR; THE SIGWIN-DETECTOR  
UPDATED AND PORTED TO R

The formula describing the probability that a sample of size  $S$  from a sequence of ranks with length  $N$  has median  $r$ . The derivation of the equation for odd window size can be found in Inda et al.

- $N$  : sequence length
- $S$  : window size
- $r$  : median of values in windows
- $\hat{f}(r)$  : probability sample of size  $S$  from  $N$  elements has median  $r$

If  $S$  is odd:

$$\hat{f}(r) = \frac{\binom{r-1}{W} \binom{N-r}{W}}{\binom{N}{S}} \text{ where } W = \frac{s-1}{2}$$

If  $S$  is even the median is defined as the mean of the middle two elements of the ordered sequence.

$$\hat{f}(r) = \sum_{d=d_{Min}}^{d_{Max}} \frac{\binom{r-d-1}{W} \binom{N-d-r}{W}}{\binom{N}{S}} \text{ where } W = \frac{s-2}{2}$$

The values of  $d_{Min}$  and  $d_{Max}$  depend on the value of  $r$ :

If  $r$  is integer (the middle elements are both even or both odd):

$$\begin{aligned} d_{Min} &= 1 \\ d_{Max} &= \min(N - r - w, r - w - 1) \end{aligned}$$

If  $r$  is non-integer (there is an even and an odd middle element):

$$\begin{aligned} d_{Min} &= 1/2 \\ d_{Max} &= \min(N - r + 1/2 - w, r + 1/2 - w - 1) \end{aligned}$$