Runs Up Runs Down

Step-1: Define the hypothesis for uniformity.

H_0 = R_i ~ independently

H_1 = R_i ~ independently

Step-2: Write down the sequence of runs up & runs down.

Step-3: Count the total no of runs(a) present in the sequence.

Step-4: Count the mean & variance of a

$$\mu_a = \frac{2N-1}{3} \qquad \sigma_a^2 = \frac{16N-29}{90}$$

Step-5: Standard normal statistics,

$$Z_0 = \frac{a-\mu_a}{\sigma_a}, \; Z_0 \sim N[0,1]$$

Step-6: Determine critical value $+Z_{\alpha/2}, -Z_{\alpha/2}$

Step-7: If $-Z_{\alpha/2} \leq Z_0 \leq Z_{\alpha/2}$ → **H_0 isn't rejected.**