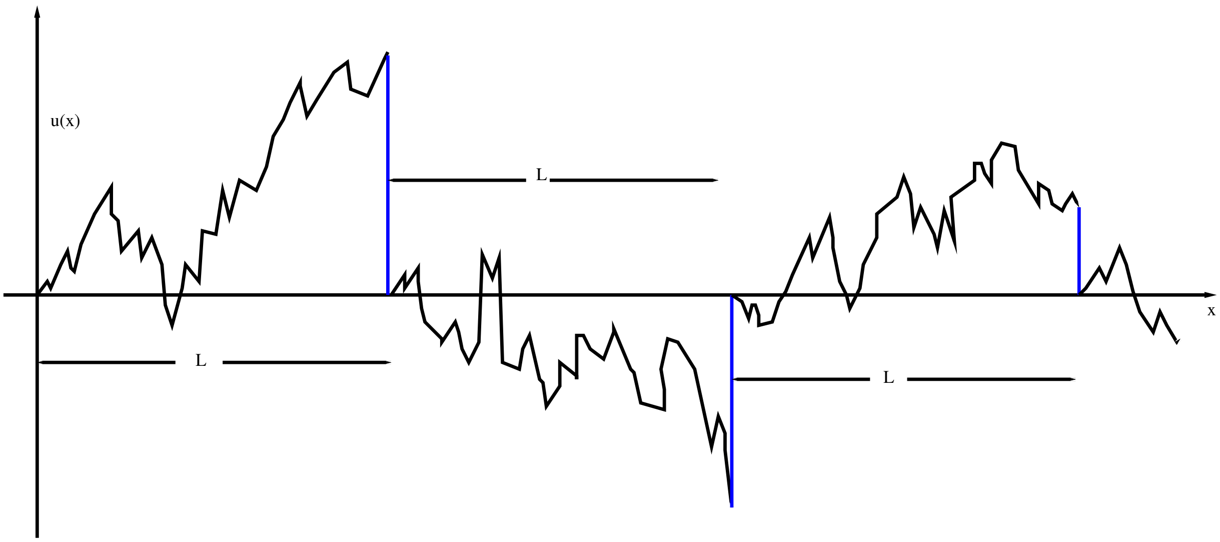
Exercises 03

Consider the following 1D signal $u(x)$: At $x = 0$, $u(0) = 0$. For $0 < x < L$, u a Brownian walk so that after a distance x the probability $P[\delta u]$ where $\delta u(x) = u(x) - u(0)$ is given by:

$$P[\delta u(x)] = \frac{1}{N} e^{-\frac{(\delta u)^2}{\sigma x}}$$

At distance $x = L$ u is set to zero $u(nL) = 0$ and a new Brownian walk begins up until $x = 2L$ where u is set again to zero, and so on. A realisation of this proces is shown bellow.



- Calculate the exponents ζ_p such that $S_p(r) \equiv \langle (u(x+r) - u(x))^p \rangle \propto r^{\zeta_p}$, (for $r \ll L$)