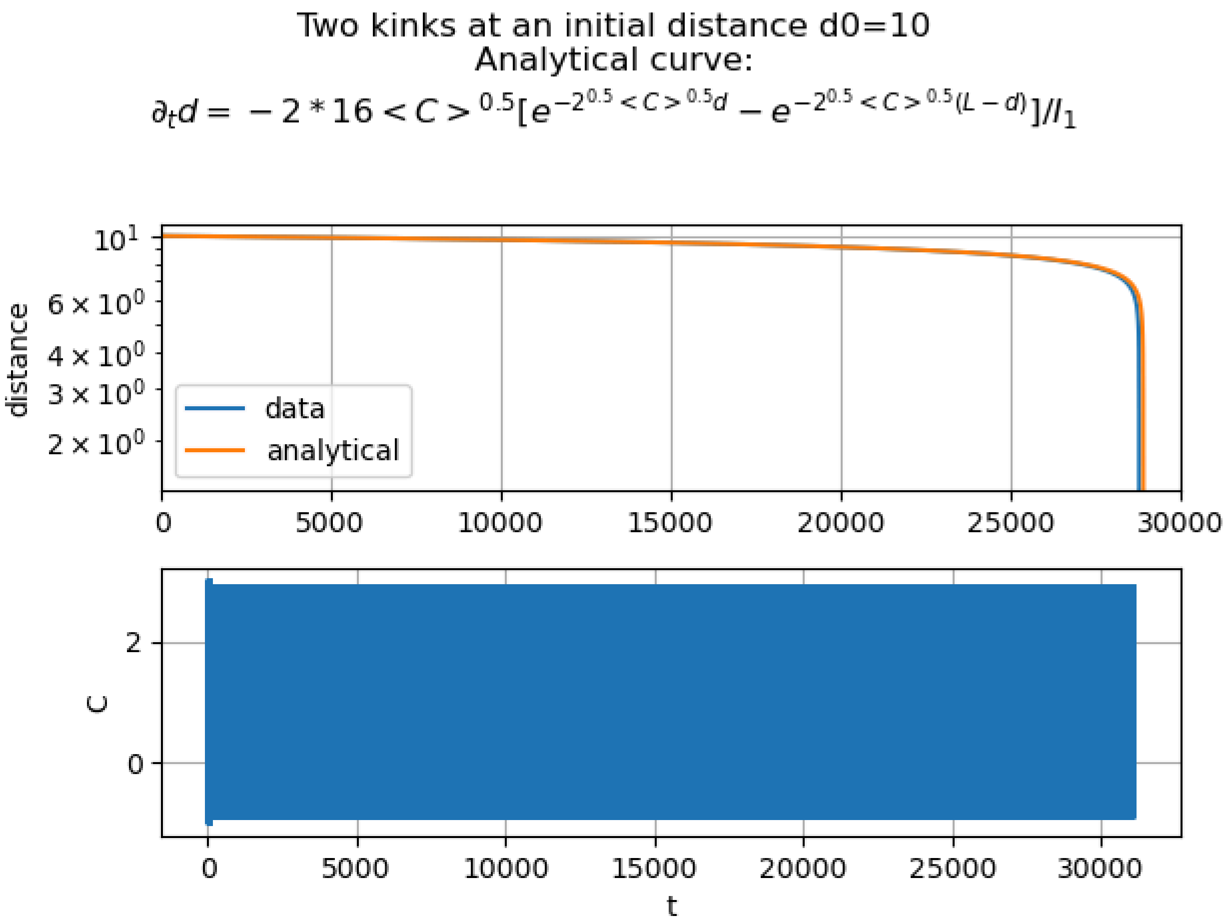
1D Fast oscillations (Numerical)

Kink dynamics

Consider a system with only two kinks. According to the kink's dynamics model, their distance decays as

$$\dot{d}(t) \simeq -24\sqrt{2}\bar{C}^{\frac{1}{2}}[e^{-2^{\frac{1}{2}}\bar{C}^{\frac{1}{2}}d} - e^{-2^{1/2}\bar{C}^{1/2}(L-d)}]$$

where L is the size of the simulation box.



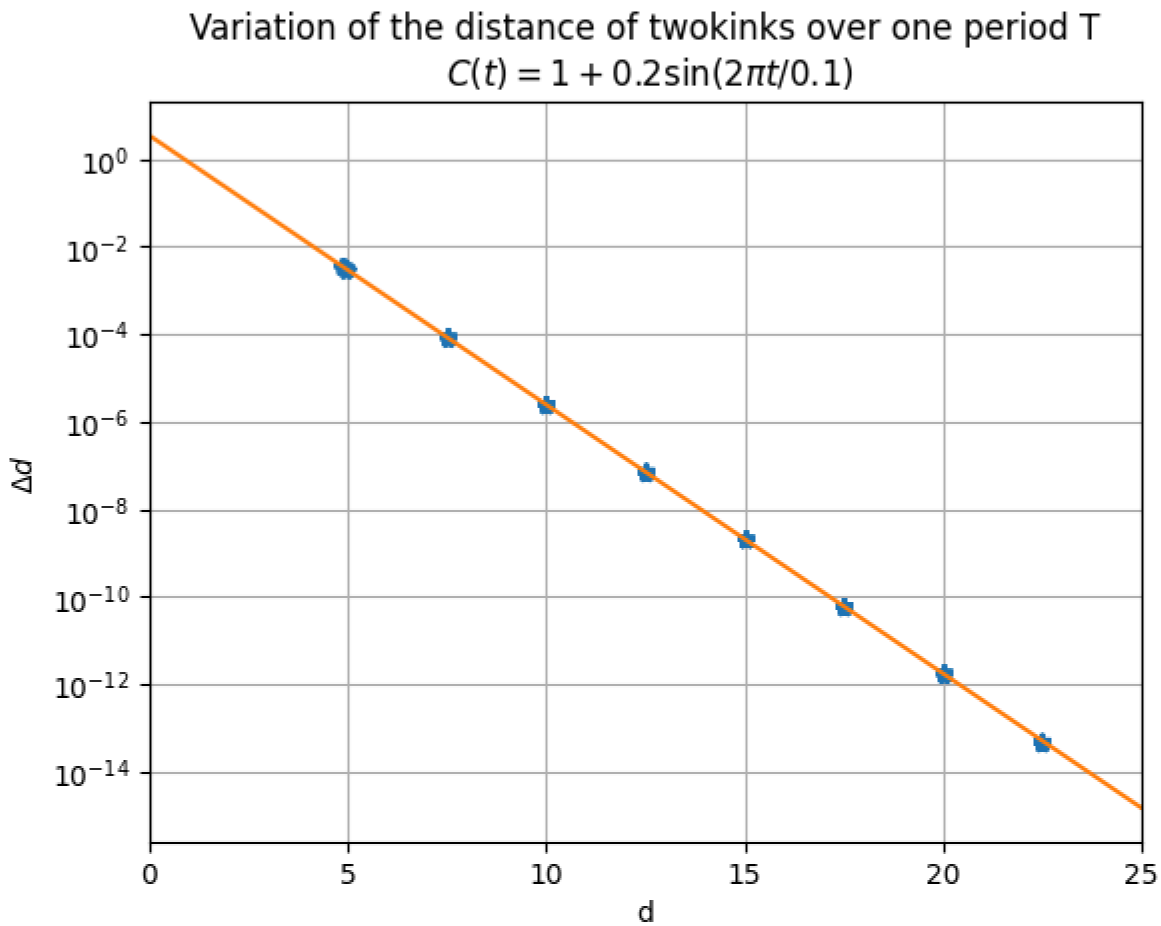
The variation of the distance over a period (assuming the distant to be constant inside the integrand)

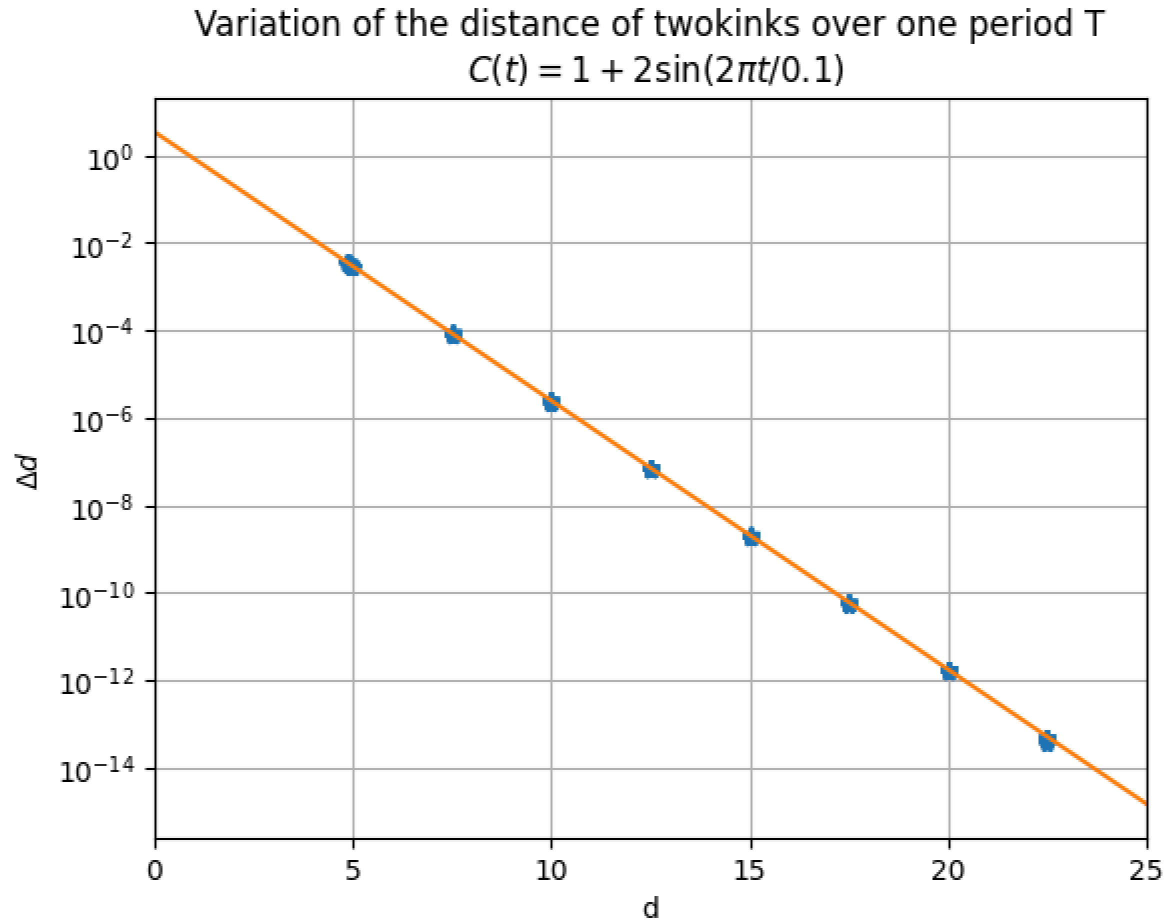
$$\Delta d(d) = \int_0^T (\partial_t d) dt$$

Simulations

In the following simulations

- The **orange** line: is the kinks dynamics model's prediction.
- The **blue** dots: are the experimental values (simulations)
  To **collect the data**
- Simulation of $\sim 10^2 T$ seconds were launched for many values of the initial distance d_0
- The quantity Δd has been calculated considering data with $t > 10T$, to cancel the influence of the initial state's preparation.
- The value displayed on the x-axis is the distance at the beginning of the period.





The model matches the simulations both in the case where $A \ll \bar{C}$ and $A \gg \bar{C}$, as expected.

Linear dynamics

$$\ell = \frac{2\pi}{< q^2 >^{1/2}} \sim t^{1/2}$$

$$\tau_{linear} \sim \bar{C}^{-1}$$