Kink effective dynamics under FAST oscillations

#twokinks #1D #costantC

If C(t)'s oscillations are fast respect to the intrinsic time-scale of the system, we know from Fast oscillations 1D that the zeroth-order shape of an isolated kink is

$$m_0(x,t) = \sqrt{\bar{C}}\tanh(x\sqrt{\frac{\bar{C}}{2}})$$

As a consequence, we expect that (but I didn't check this on paper) the kink's dynamics, to leading order, is the same that you have if C was constant, but with $C \to \bar{C}$ (see here for a proof)

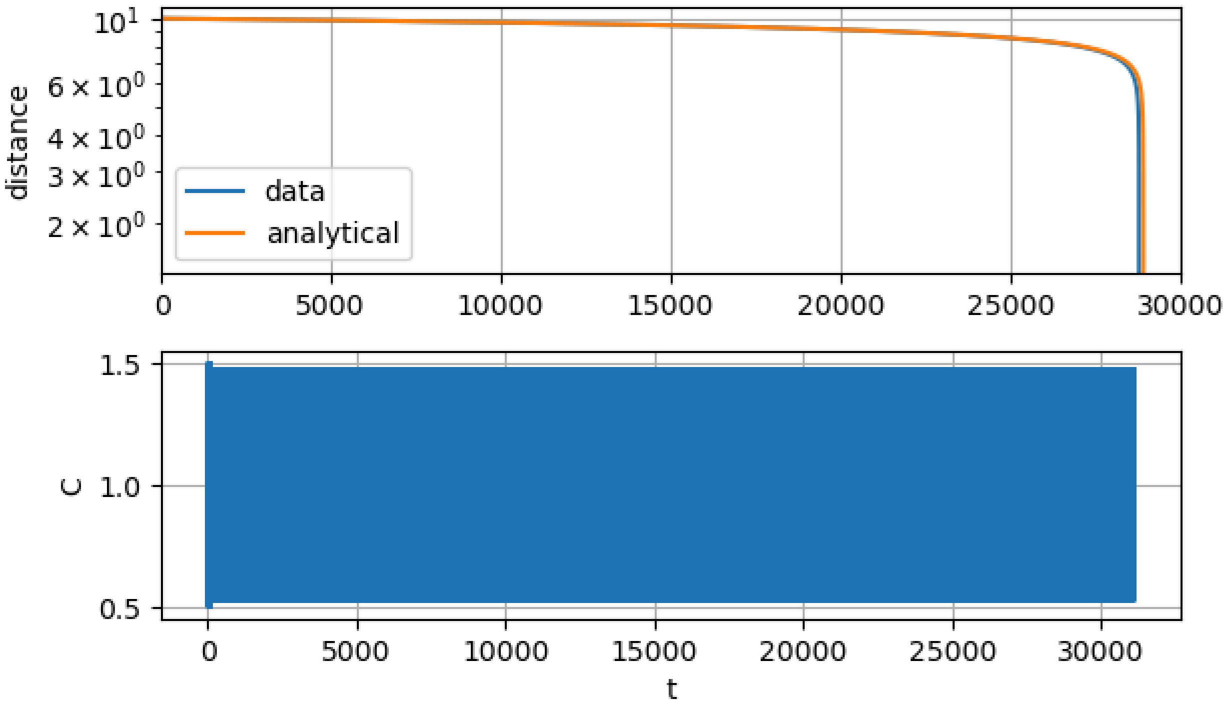
$$\dot{x_n}(t) = 16\bar{C}^{\frac{1}{2}} \frac{[e^{-2^{\frac{1}{2}}\bar{C}^{\frac{1}{2}}l_n} - e^{-2^{\frac{1}{2}}\bar{C}^{\frac{1}{2}}l_{n+1}}]}{\int_{\chi_{n-0.5}}^{\chi_{n+0.5}} d\chi \partial_\chi u_p(\chi)}$$

For two isolated kinks, at a distance $d \ll L$

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

Simulations

Two kinks at an initial distance d0=10
Analytical curve:
$$\partial_t d = -2*16<C>^{0.5}[e^{-2^{0.5}<C>^{0.5}d} - e^{-2^{0.5}<C>^{0.5}(L-d)}]/l_1$$



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