Deviation from kink dynamics

#1D #twokinks

We've found that, if the oscillations are slow and positive, the deviation from the model for kinks dynamics (with **no** mass **M**) must be of order $\sim \epsilon^2$ (or smaller).

$$\partial_t d = f(C(t), d) + O(\epsilon^2)$$

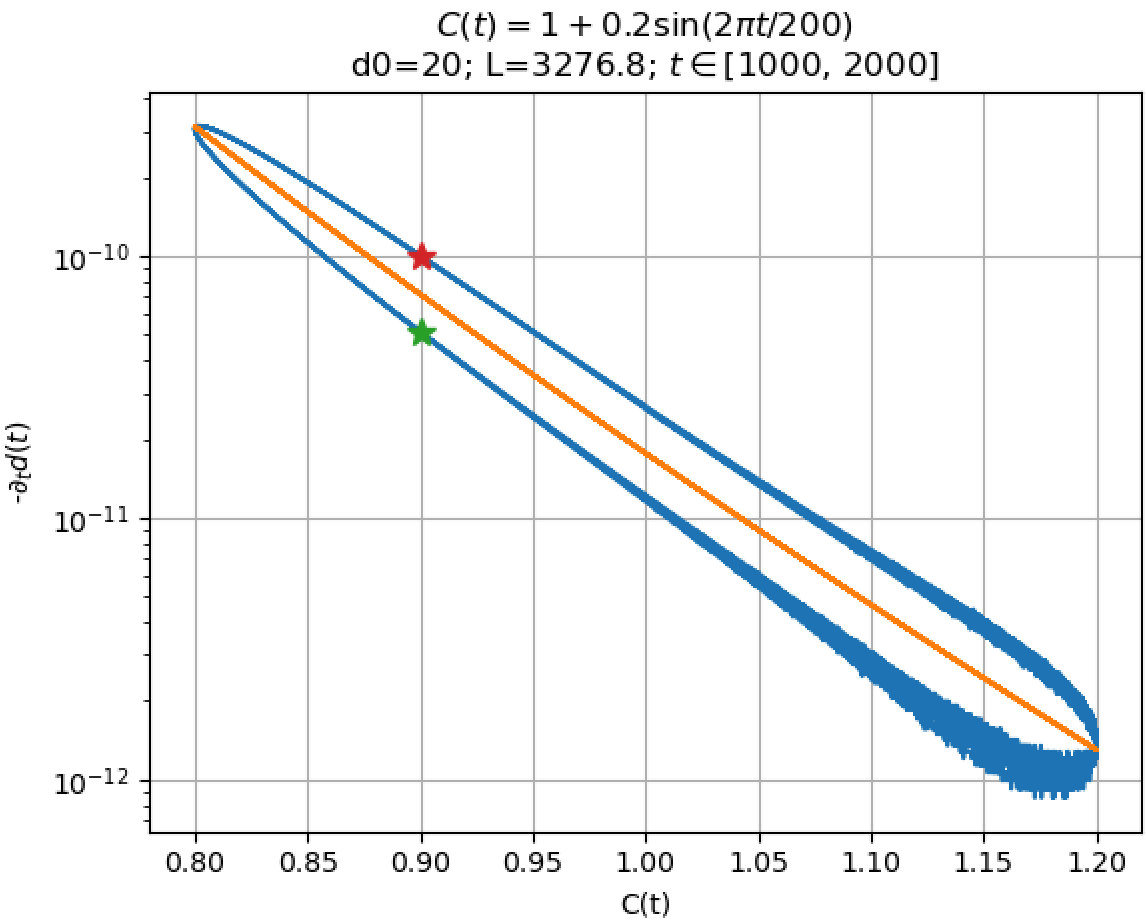
To check this, we have to measure the deviation of the experimental value of $\partial_t d$ from $f(C(t), d)$ for different values of $T \sim \epsilon^{-1}$.
Notice: As the term $O(\epsilon^2)$ will depend, somehow, on C, d we should make those measurement at fixed values of C and d.

Resumee

The correction to the kink dynamics scales **linearly** in $\frac{1}{T}$ instead than quadratically $\frac{1}{T^2}$

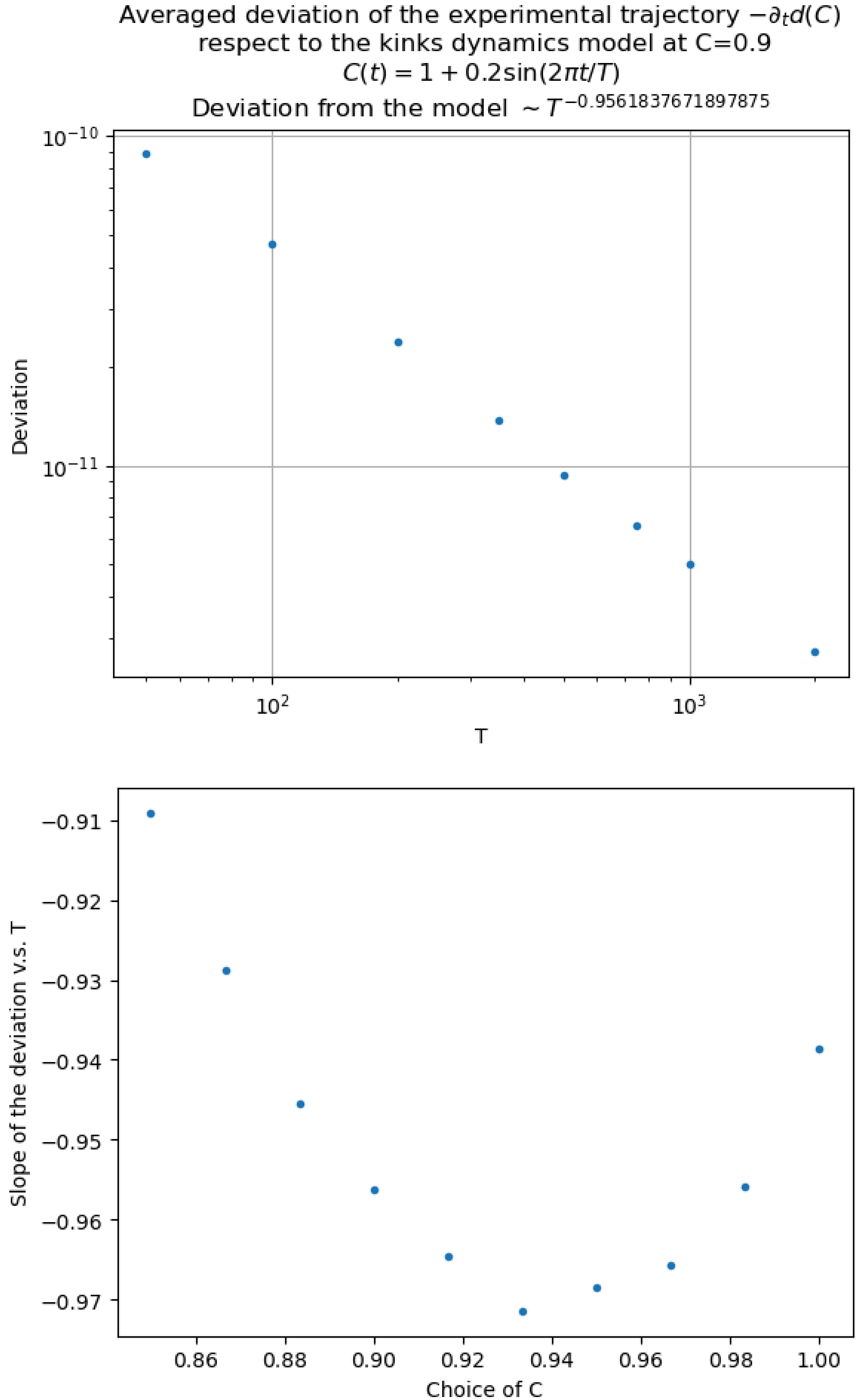
Measure of the deviation

We measure the deviation by considering the trajectory $(-\partial_t d, C)(t)$ and we measure the deviation at a fixed value $C = \tilde{C}$. As we have two distances of the experimental trajectory from the model, we compute their **average**. We compute it by considering the part of the trajectory associated to a period different from the first one, to eliminate the initial dynamics (we choose the 3rd period).



Power-law decay

There is a power law relation of the variation with $\frac{1}{T}$, **but the power is 1, instead of 2 as expected!**



Averaged deviation of the experimental trajectory $-\partial_t d(C)$
respect to the kinks dynamics model at C=0.9
$C(t) = 1 + 0.2\sin(2\pi t/T)$
Deviation from the model $\sim T^{-0.9561837671897875}$
Deviation
10^{-10}
10^{-11}
10^2
10^3
T
Slope of the deviation v.s. T
−0.91
−0.92
−0.93
−0.94
−0.95
−0.96
−0.97
0.86
0.88
0.90
0.92
0.94
0.96
0.98
1.00
Choice of C

Conclusion

We verified that the deviation from the kink dynamics model is $\sim T^{-1}$ **instead** of $\sim T^{-2}$ as expected.