Statements on oscillatory driving of the Allen Cahn (TDGL) equation

Coarsening cannot be stopped by oscillations

Statement
Depending on the dimension of the system, if C is constant, there is coarsening with law

- 1D: $\ell \sim \log t$
- 2D: $\ell \sim t^{1/2}$
  oscillations do not affect these laws: there is still coarsening with that time dependence.
  From our simulations
- 1D: The weak interaction between two kinks can be enhanced (faster decay of the distance) but the distance will still decay as an exponential, not faster (e.g. power law): just an effect on the prefactor.
- 2D: MBC in an isolated domain is not affected by oscillations.
  From our theory
  If the oscillations are "fast" or "small and strictly positive" up to first order
- 1D: Our model confirms that the distance between two kinks still decays exponentially fast, just with a different prefactor.
- 2D: The MBC is not affected by the oscillations
  Interestingly
  If we use the model for kink dynamics under slow and positive oscillations if the oscillation can take negative values (and we assume there is no interaction when $C(t) < 0$) we wrongly predict a power-law decay of the distance of two kinks.

but we can accelerate it significatively in 1D

Even if the distance between two kinks decays still exponentially fast (and not as power-law as predicted by the kinks dynamics model) we can **significatively** accelerate this process (reduce the decay time **of orders of magnitude**).
This with slow oscillations where the minimum value is positive and close to zero or negative.
Question: In 2D, **the deviation from MBC**, is affected as significatively as in 1D by negative oscillations?

Selecting the typical lenght of domains

Ref: Linear regime

Statement

In a 1D system, we can choose the value of ℓ at the ened of the linear regime, by properly choosing C. Then this value increases slowly in time ($\ell \sim \log t$).

Problem

We don't have a formula that relates ℓ to the average size of the domains.