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We need to calculate the structure factor of the system. This can calculated by finding the Fourier Transform of the order parameter ϕ and then finding $\langle\phi(\boldsymbol{k})\phi(-\boldsymbol{k})\rangle$, or $\langle\phi(\boldsymbol{k})\phi(\boldsymbol{k}+\boldsymbol{k_0})\rangle$ for some Fourier space element k_0 (basically the Fourier analogue of calculating the Correlation Function $\langle\phi(\boldsymbol{x})\phi(\boldsymbol{x}+\boldsymbol{r})\rangle$, where $\boldsymbol{k_0}$ and $\boldsymbol{r}$ are arbitrary vectors in Fourier and real space). I'm not clear on which equation to use.

Once we have the structure factor S, we can plot it against k for various times t, and we'll find that they produce different decay curves. For larger t, we'll find that the decay curve is steeper. If we scale the k axis by $t^{1/2}$ or $t^{-1/2}$ (I'm not sure which yet), all the curves will fall onto each other.

From this, we should be able to extract the dynamic scaling exponent, which has a value of $z = 2$.

$\nabla\phi$ can discretised along a square grid with separation Δx in each direction.

$$\nabla\phi \approx \frac{\Delta\phi}{\Delta x^2}\frac{\phi_{i+1,j} + \phi i - 1, j + \phi i, j + 1 + \phi i, j - 1 - 4\phi}{\Delta x^2} \tag{1}$$
