Model C: scalar fields $\begin{cases} \varphi(x,t) & \text{non cons.} \\ \varepsilon(x,t) & \text{cons.} \end{cases}$

$$\partial_t \varphi(x,t) = -\Omega \frac{\delta \mathcal{H}[\varphi,\varepsilon]}{\delta \varphi(x,t)} + \xi(x,t)$$

stochastic noise

$$\partial_t \varepsilon(x,t) = \Omega \rho \nabla^2 \frac{\delta \mathcal{H}[\varphi,\varepsilon]}{\delta \varepsilon(x,t)} + \zeta(x,t)$$

$$\langle \xi(x,t)\xi(x',t')\rangle = 2\Omega\, \delta^{(d)}(x-x')\,\delta(t-t')$$

$$\langle \zeta(x,t)\zeta(x',t')\rangle = -2\rho\Omega \nabla^2 \delta^{(d)}(x-x')\,\delta(t-t')$$

$$\mathcal{H}[\varphi,\varepsilon] = \int d^dx \left[\frac{1}{2}(\nabla\varphi)^2 + \frac{1}{2} r_0 \varphi^2 + \frac{1}{4!} g_0 \varphi^4 + \frac{1}{2}\varepsilon^2 + \right.$$
$$\left. + \frac{1}{2}\gamma \varepsilon \varphi^2 \right]$$

Nonequilibrium dynamics : RG, θ OJ '93

We find: $\epsilon = 4-d > 0$

- $F_R(v) = 1 - \frac{v}{6}\epsilon + O(\epsilon^2)$
- $X^\infty = \frac{1}{2}\left(1 - \frac{\epsilon}{12}\right) + O(\epsilon^2)$ ← the same as Model A with $N=1$