Effects of initial state on motion by curvature

#mbc #early_dynamics

Here we consider the initial state to be an isolated circular domain

$$u(r, t=0) = -u_0 \tanh((r - R_0)W^{-1})$$

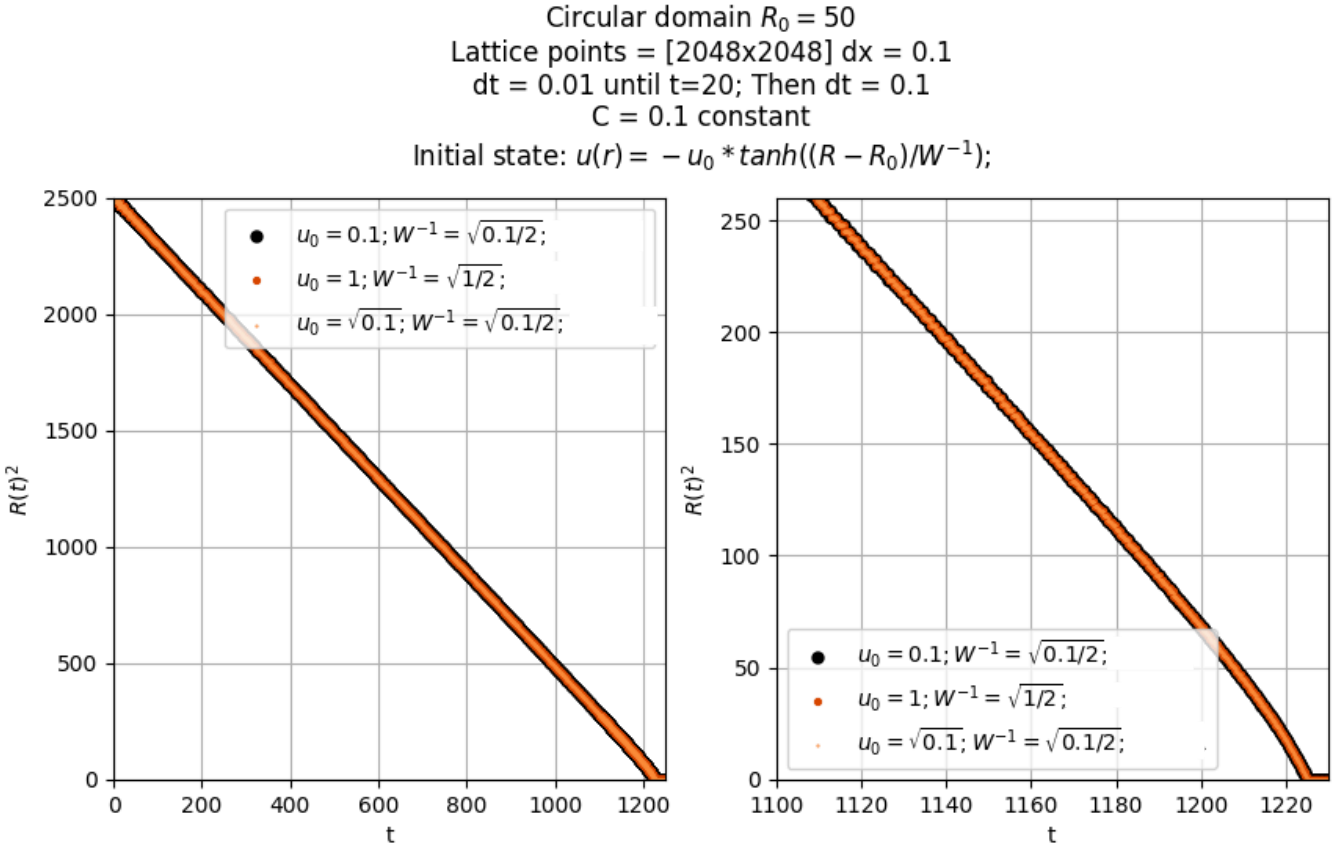
where u_0 and W represent the height and the width of the kink/interface.

> Do different values of u_0 and W lead to a different evolution of the radius $R(t)$?
> **Do the initial conditions influence** $R(t)$ in the early dynamics or in the late one?

Here I show some simulations, where it appears that the measure of $R(t)$ **seems to NOT be affected** by the choices of u_0 or W.

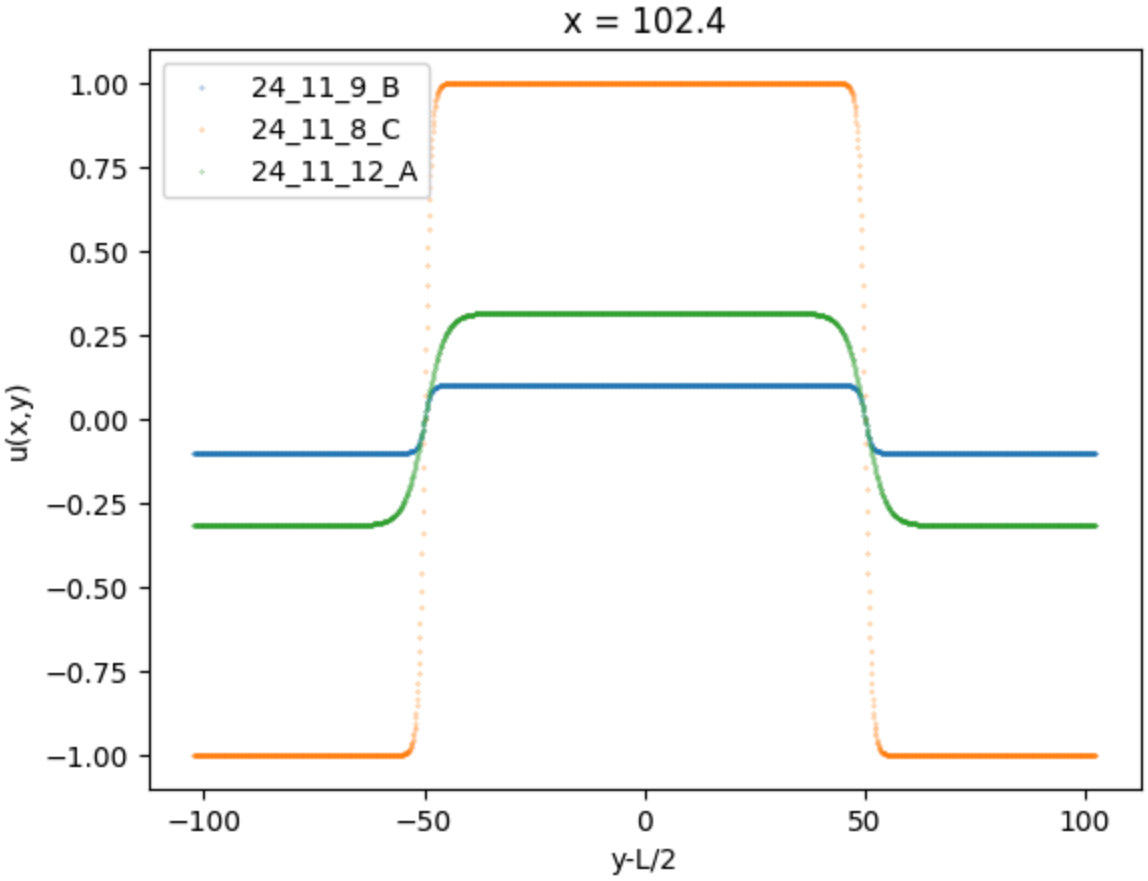
C constant

In the following simulations, $C = 0.1$ constant

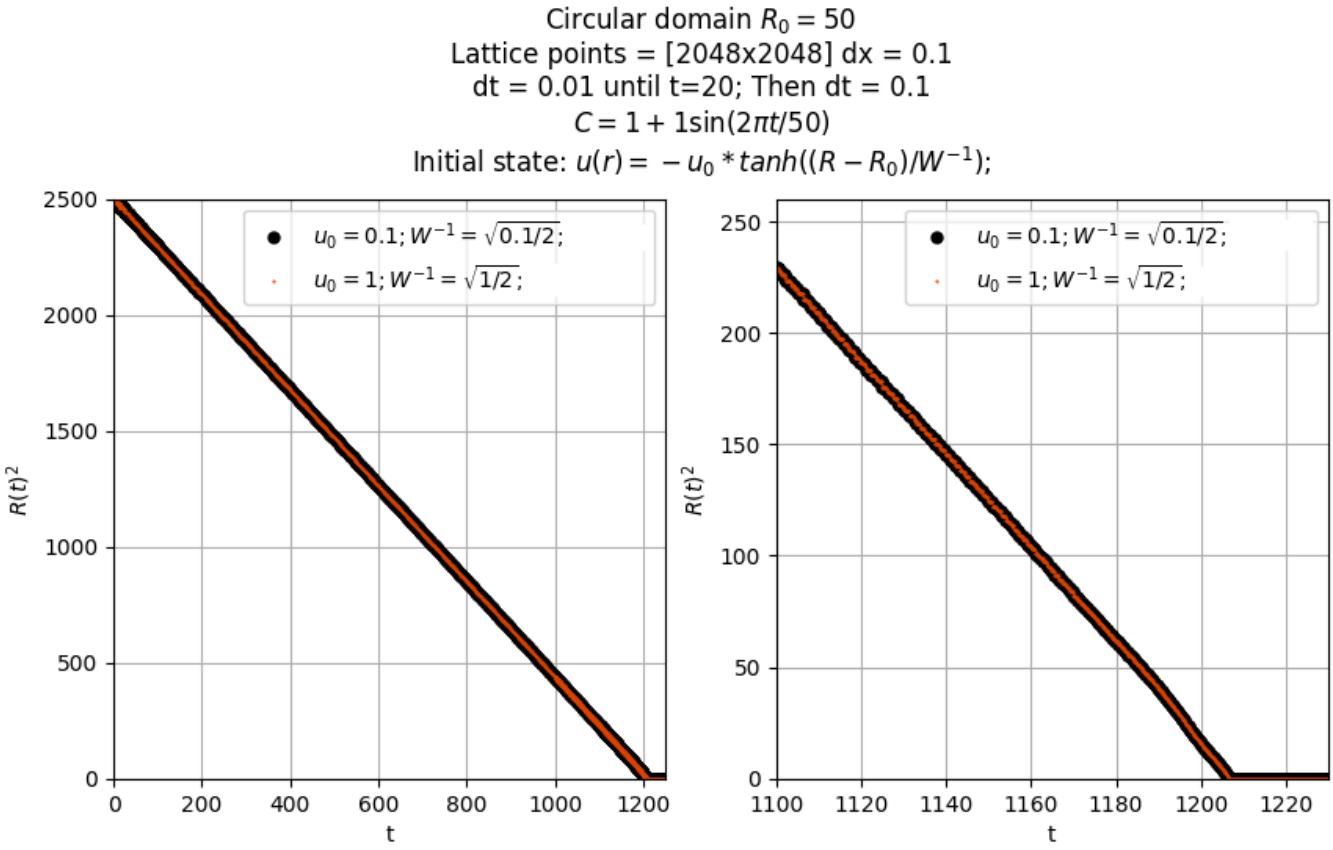


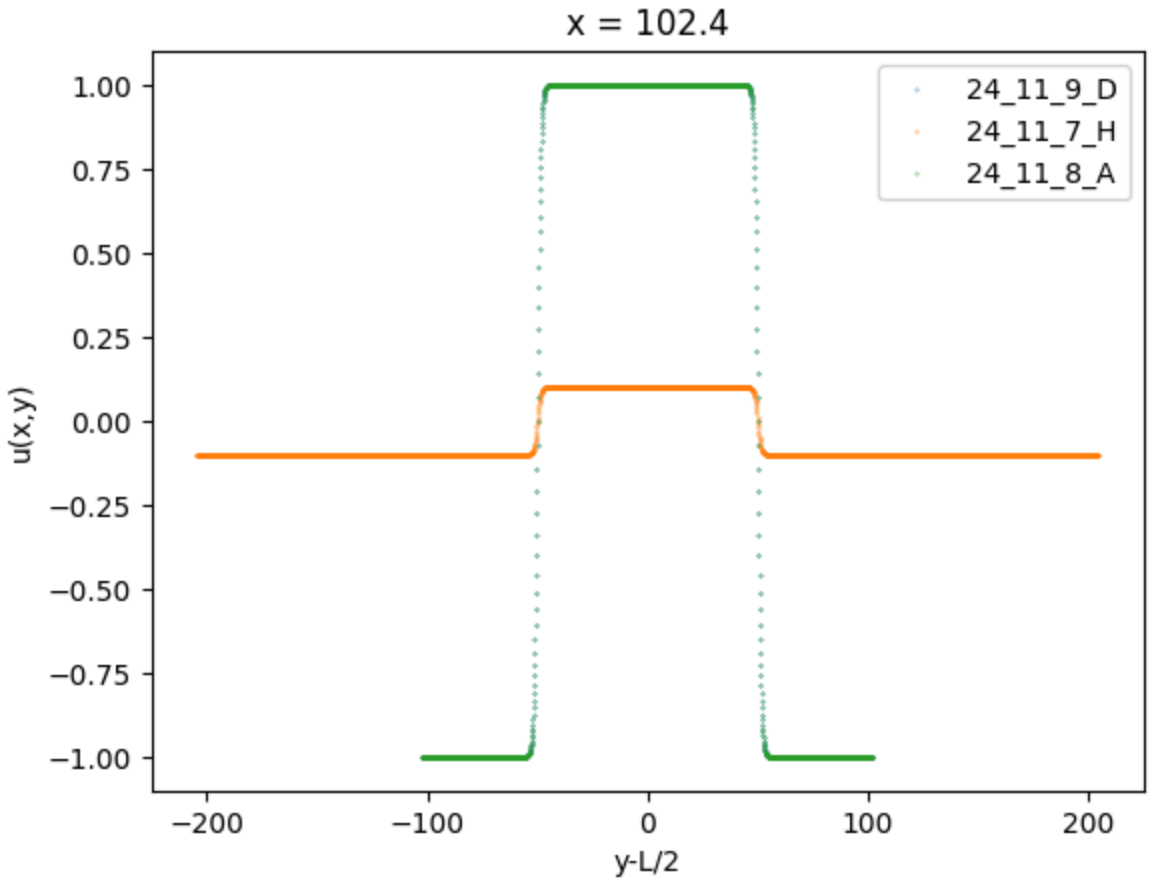
Here I show also the profile of the initial states considered above, obtained by evaluating $u(x, y)$ at time t=0 along $x = L/2$. You can see that the **blue and the green curves have the same**

kink's slope (the first derivative is the same), this means that the width W is the same.



C oscillating





But remember that

Motion by curvature is a first (leading) order effects, so if C changes the curve $R(t)$ will change. See Motion by curvature corrections.