Exercise on advection tests

Use the Pencil Code from `http://pencil-code.googlecode.com` to simulate the advection of a passive scalar obeying the equation

$$\frac{\mathrm{d}c}{\mathrm{d}t} = -U\frac{\mathrm{d}c}{\mathrm{d}x} + \kappa\frac{\mathrm{d}^2c}{\mathrm{d}^2x} \tag{1}$$

where $U = \text{const}$ is a parameter. Use a smoothed hat function as initial condition. You may choose

```
&pscalar_init_pars
  initlncc='hatwave-x', ampllncc=1e-0, widthcc=.1
/
```

1. Determine values of pscalar_diff for which the Gipps phenomena are kept at a minimum.
2. Study how this depends on the width parameter of the initial profile, widthcc=.1.
3. How does the run time affect the results?