

# 1 Advection

## 1.1 advec1

- *advec1.i*
- 1D generated mesh with libmesh
- Uses DG Kernels
- InflowBC and OutflowBC
- Transient problem

Figure 1 shows the results. It seems like the variable has to be a CONSTANT MONOMIAL.

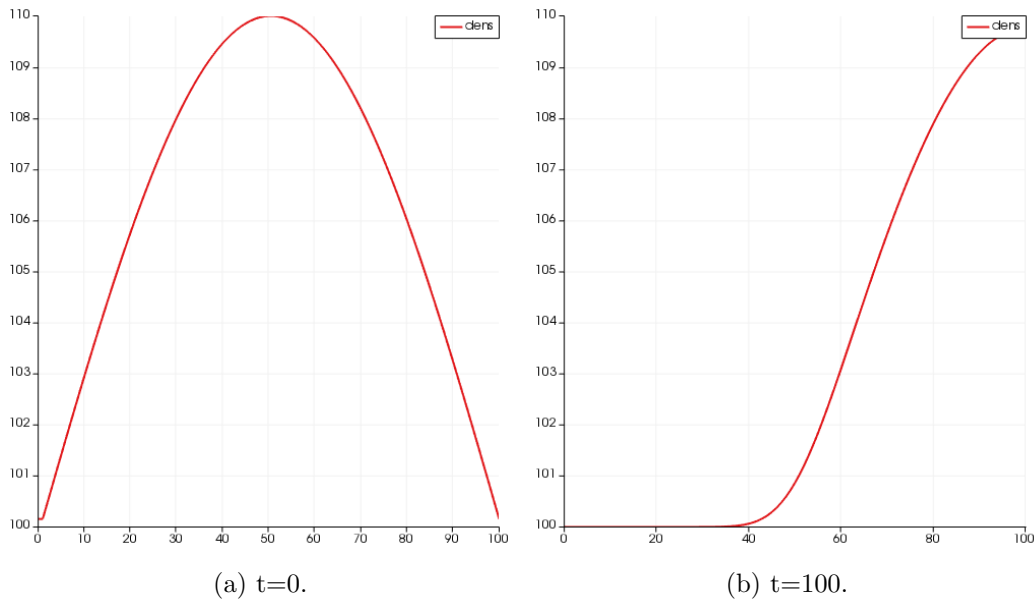


Figure 1: Advected density.

## 1.2 periodic\_bc2

- *moose/examples/ex04\_bcs/periodic\_bc2.i*
- 1D generated mesh with libmesh
- Periodic BCs
- Transient problem

In *advec1-bc.i* I tried to add periodicBCs to the previous problem and it does not work. Here I tried to isolate the problem. Figure 2 shows the results. It does not work if the variable is a CONSTANT MONOMIAL. It works if the variable is FIRST order (either MONOMIAL or LAGRANGE).

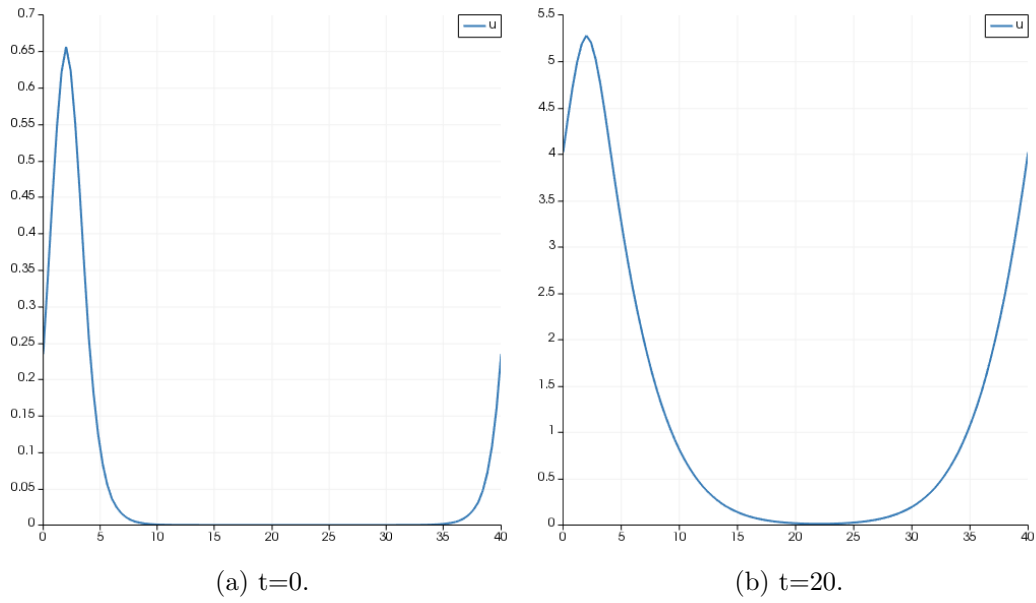


Figure 2: Periodic BCs.

### 1.3 advec1-ss

- *advec1-ss.i*
- 1D generated mesh with libmesh
- Uses DG Kernels
- Inflow and OutflowBC
- Steady problem

Same as previos problem but steady state and adds a source. Figure 3 shows the results.

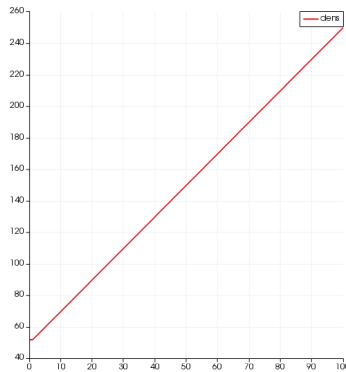


Figure 3: Steady state solution.

### 1.4 advec2

- *advec2.i*

- 1D generated mesh with libmesh
- Uses DG Kernels
- TemperatureInflowBC and TemperatureOutflowBC
- Transient problem

Very similar to *advec1.i* Advects BC. Figure 4 shows the results.

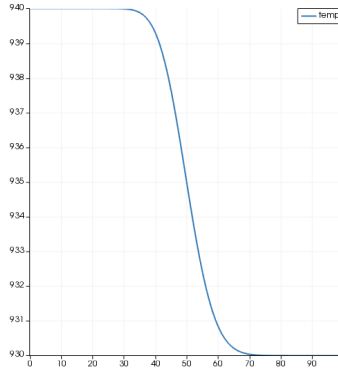


Figure 4: Advects BC.

## 1.5 advec3

- *advec3.i*
- 1D generated mesh with libmesh
- Uses DG Kernels
- TemperatureInflowBC and TemperatureOutflowBC
- Transient problem

Similar to *advec1.i* Adds a point source and solves for temperature. Figure 5 shows the results.

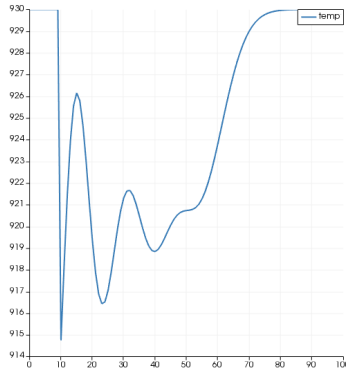


Figure 5: Advected temperature from point source.

## 1.6 advec4

- *advec4.i*
- pseudo-1D: 2D-coolant.msh
- Uses DG Kernels
- TemperatureInflowBC and TemperatureOutflowBC
- Transient problem

Similar to *advec3.i* but has a  $q''$  on the wall. Figure 6 shows the results.

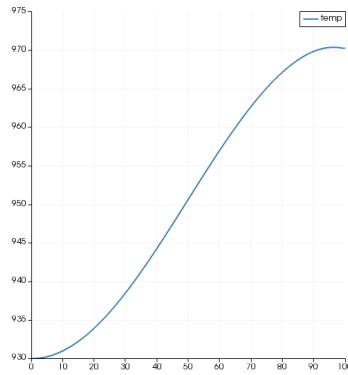


Figure 6: Advects temperature while wall is been heated.