The goal (introduction)

The goal of this code is to model the flow of the concentration of a substance through a homogeneous porous media. The flow obeys the advection diffusion equation

The domain



The Governing Equations in the domain

Advection Diffusion Equation

Where u = scalar field variable (eg concentration)

D = diffusion coefficient

**w** = velocity

f = source term

Boundary conditions

The Problem

* The ADE is a second order PDE, which means that u is both continuous and very smooth
* Numerical simulations work with numbers instead of functions, meaning that the solution a computer outputs is globally continuous but not globally differentiable.
* The ADE in the second order PDE is written in what is known as the ‘strong form’, so we need to convert it to a weak form

Greens theorem



Sub in