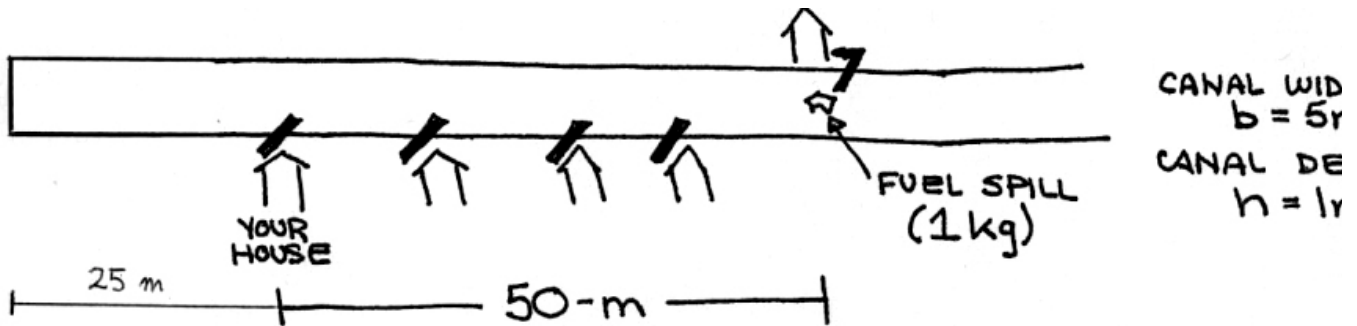


Problem 4.2

You own a house and dock along a boat canal, which ends 25 m upstream from you. One day, your neighbor has a small (1 kg) fuel spill. Due to the boat traffic, the diffusivity in the canal is quite high, $D = 0.01 \text{ m}^2/\text{s}$. The current in the canal is negligible, such that the fuel is transported to your house ($x = -50 \text{ m}$) by diffusion only. Assume the fuel mixes rapidly across the width and depth, and that there is no flux through the canal walls.



- What is the concentration at your house 10 hrs after the spill ?
- What is the maximum concentration at your house, and when does it occur ?
- Suppose the safety limit is 0.2 g/m^3 . At what time after the spill is this concentration reached?
- Repeat a, b & c assuming that the boundary at $x = -75 \text{ m}$ is totally absorbing.