5.5 ADVECTION-DISPERSION EQUATION

Summing the diffusive and advective components:

$$n\frac{\partial c}{\partial t} = n\left\{\frac{\partial}{\partial x}D_x\frac{\partial c}{\partial x} + \frac{\partial}{\partial y}D_y\frac{\partial c}{\partial y} + \frac{\partial}{\partial z}D_z\frac{\partial c}{\partial z}\right\}$$

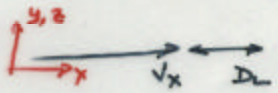
$$-\left\{\frac{\partial}{\partial x}(v_x^d c) + \frac{\partial}{\partial y}(v_y^d c) + \frac{\partial}{\partial z}(v_z^d c)\right\}$$

Reduces to:

1-D case:

$$D_L\frac{\partial^2 c}{\partial x^2} - \frac{v_x^d}{n}\frac{\partial c}{\partial x} = \frac{\partial c}{\partial t}$$

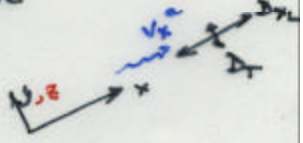
(v_x^a)



2-D case:

$$D_L\frac{\partial^2 c}{\partial x^2} + D_T\frac{\partial^2 c}{\partial y^2} - \frac{v_x^d}{n}\frac{\partial c}{\partial x} = \frac{\partial c}{\partial t}$$

(v_x^a)



Usual assumptions:

- Homogeneous medium
- Constant value of D_L, D_T

} analytical solutions

- Heterogeneous
- Velocity dependent D_L, D_T

} numerical solutions.