**Task 1**

First let’s approximate the following one-dimensional pde :

Where:

the concentration of some type of cell

some constant

the concentration of some nutrient

* We have assumed zero dependence of u w.r.t time so we have eliminated the partial derivative w.r.t time
* Assume for simplicity
* Also assume that

Consider zero-Newman boundary condition on the left boundary :

And Dirichlet BC at the right boundary :

We want to obtain an approximate solutioin of the pde with physics informed neural networks (PINNs).

To do so, we approximate the underlying solution with a feedforward neural network with tunable parameters :

We define the residuals:

1.Interior residual (Pde):

2.Spatial boundary residuals:

We define the following training sets:

Compute the loss functions

Solve the following minimization problem: