1D Slab Electrode Model

Governing Equation: dc/dt = d^2c/dx^2

Ficks 2nd law of Diffusion where D =1

Initial Condition: t = 0, c = 1

BC1: x = 0, dc/dx = 0

BC2: x = 1, dc/dx = -delta

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**System Discretization**

Ghost points at i=-h/2, 1+h/2

h/2

h/2

h

h

h

i=1

i=Nx

x=1+h/2

i from 2 to Nx-1

x=-h/2

h= 1/N+1 and x = ih given initial node is i=0

h= 1/N+1 and x = h(i-1) given initial node is i=1

Assume initial node point starts at index 1. This keeps code consistent between Maple and MATLAB. Including ghost points at -h/2 and 1+h/2 will change the node location x and node spacing h. Nx refers to the number of node points including ghost points.

h= 1/N-2 and x = (i-2) h+h/2= h (i-1.5) given initial ghost node is at i=1

Rectangular Cell-centered Finite Difference

A math equation with numbers and symbols

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Spherical Cell-centered Finite Difference

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