

Handling Nuemann BCs

1st order method

$$\frac{u_1 - u_0}{h} = \alpha$$

Error is $\mathcal{O}(h)$

2nd order method

Ghost point method

1-sided Forward difference

$$u'(x_0) = \frac{-3u_0 + 4u_1 - u_2}{2h} + \mathcal{O}(h^2)$$

The matrix is no longer tridiagonal