

## ME 3001-001, Fall 2019

### Activity : FDM - 1D Vibration - Wave Equation

The 1D vibration of an elastic member is governed by the following partial differential equation known as the '1D wave equation'.

$$\frac{\partial^2 u}{\partial t^2} = c^2 \frac{\partial^2 u}{\partial x^2}$$

It is important to define the boundary conditions and the initial conditions carefully.

With the FDEs we can transform the PDE into a new equation in terms of  $u_i^{j+1}, u_{i-1}^j, u_i^j, u_{i+1}^j, u_i^{j-1}$

Equation 2 can be used explicitly but we have to start carefully.