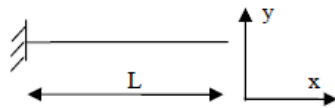


## Computer Assignment #2

Due in class on Monday, 11/17/2008

When you use ABAQUS CAE to solve a natural frequency problem, the way to do this kind of analysis is: When you create a step: Select procedure type Linear perturbation → Select Frequency. All other things are similar to what you have done for static problems.



Use ABAQUS CAE to get the natural frequency for a rod under **axial** loading. Show that the

analytical solution is given by  $f_1 = \frac{1}{4L} \sqrt{\frac{E}{\rho}}$ . Use 1 element, 2 elements... till 10 elements to

get the first natural frequency. You can model this rod as a beam. Hint: to avoid getting the bending mode, displacement in the y direction along the beam should be fixed so that the beam

can only deform in the x direction. Plot your dimensionless frequency  $\frac{f_1 L \sqrt{\rho}}{\sqrt{E}}$  as a function

of the element number.