

1. a) **What is a node?**
b) **What is your inference if the global stiffness matrix is observed to be singular matrix?**

2. **In terms of natural coordinates, write the expressions for shape functions of one dimensional linear element.**

Shape functions:

$$N_i = \frac{1 - \xi}{2}$$
$$N_j = \frac{1 + \xi}{2}$$

i want to place the image here

Where ξ is a natural coordinate.

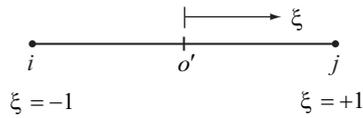


Figure 1: