

Steps Involved in FEM

BASIC STEPS OF FEM

- 1 Discretization of the structure**
- 2 Selection of Displacement function**
- 3 Formation of the element stiffness matrix and load vector**
- 4 Formation of Global stiffness matrix and load vector**
- 5 Incorporation of Boundary conditions**
- 6 Solution of Simultaneous equations**
- 7 Calculation of element strains and stresses**
- 8 Interpretation of the result obtained.**

Discretization or Finite element zing and their type

- 1. Based on Dimension**
- 2. Based on Material Property**
- 3. Based on Degree of Freedom**

1 Based on Dimension

One dimensional element - line element , two dimensional element – Triangular and quadrilateral, three dimensional elements - Tetrahedral and hexahedral elements

2 Based on Material Property

Linear element , non linear element

3 Based on Degree of Freedom

Translational - one or two or three degree of freedom

Rotational - one or two or three degree of freedom.

Category of finite elements

Simple , complex and multiple elements

The order of polynomial used in interpolation function decided by the geometry of the element

For

Simple elements - Interpolation function contains only constant and linear terms only.

ie. **Approximating polynomial expression has only constant and linear terms in simplex element. So they are called linear elements.**

The elements specified for $n=1$ single order polynomial for one two and three dimensional elements.

The simplex element of one dimensional is a line with two nodes at the ends