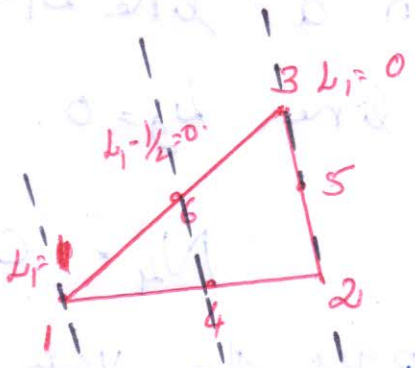
Six Noded triangle.

Consider a Six noded triangle element



Consider Shape function N_1,

Nodes 2, 5, 3 are on a Line $L_1=0$. Nodes 4 & 6 lie on a line $(L_1-1/2)=0$. hence, N_1 is written as.

$$N_1 = C L_1 (L_1 - 1/2)$$

This gives zero value to N_1 at all nodes except at node 1. to get value at node 1

$$1 = C(1)(1-1/2), \quad C \Rightarrow 2$$

hence

$$N_1 = 2L_1(L_1 - 1/2)$$

$$N_1 = L_1(2L_1 - 1)$$

Similarly

$$N_2 = L_2(2L_2 - 1)$$

$$N_3 = L_3(2L_3 - 1).$$

Consider Midside node 4. Nodes 2,5,3 are on a line $L_1 = 0$. and nodes 1,6,3 are on a line $L_2 = 0$. Hence, N_4 is expressed as

$$N_4 = C(L_1 L_2)$$

to get the value of node 4 $\left(L_1 = L_2 = \frac{1}{2}\right)$

$$1 = C\left(\frac{1}{2}\right)\left(\frac{1}{2}\right) \Rightarrow C = 4.$$

Hence with

$$N_4 = 4 L_1 L_2$$

$$N_5 = 4 L_2 L_3$$

$$N_6 = 4 L_1 L_3.$$