<u>Discrete system</u> of equations:

$$U \in V_h \Rightarrow U = \sum_{j=1}^{M} \xi_j \phi_j \quad , \quad \xi_j = U(N_j)$$

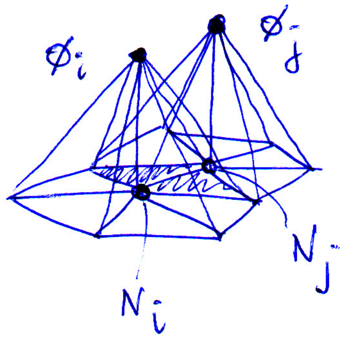
(G) & choosing $v = \phi_i \Rightarrow$

$$\sum_{j=1}^{M} (\nabla \varphi_j, \nabla \varphi_i)\, \xi_j = (f, \varphi_i) \qquad i = 1, \dots, M$$

Which is the same as $A\xi = b$

$A = (a_{ij})$; $a_{ij} = (\nabla \phi_j, \nabla \phi_i)$ (stiffness matrix)

$b = (b_i)$; $b_i = (f, \phi_i)$ (load vector)



a_{ij} non-zero only if ϕ_i and ϕ_j have common support: that is only if $i = j$ or if N_i and N_j are neighbors.

$a_{ij} = \sum_K a_{ij}^K$; a_{ij}^K stiffness matrix contribution for element K

The sum is taken over the common support of ϕ_i and ϕ_j : $\mathrm{supp}(\phi_i) \cap \mathrm{supp}(\phi_j)$