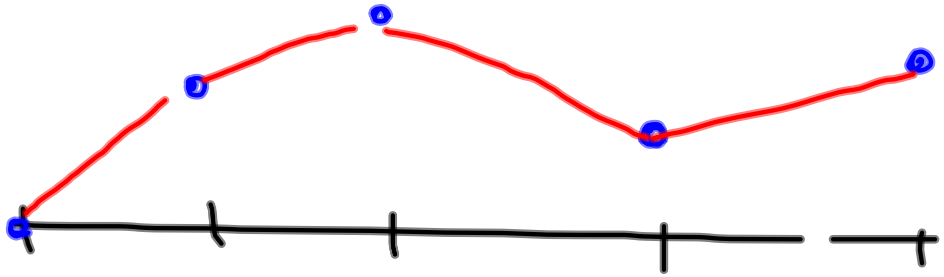
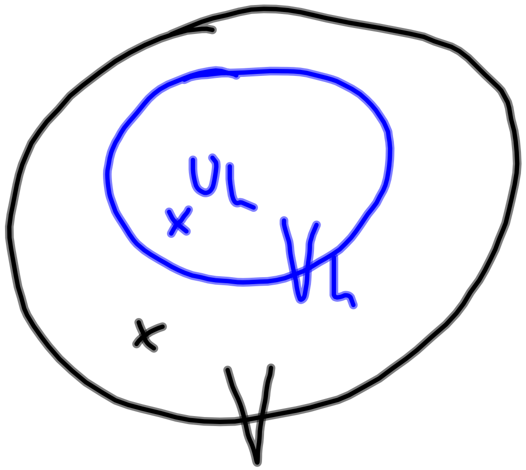


$$V_h = \{ v \text{ cont}, \ v' \text{ cont a trozos, etc} \}$$

$$\int_\Omega \left(-\Delta u = f \right) w \quad \int_{\Gamma_\phi} \left(\nabla u \cdot \underline{n} = \phi \right) w \quad +$$

$$\underbrace{\int_\Omega -w\,\Delta u}_{\text{Green}} - \int_\Omega w f \underbrace{- \int_{\Gamma_\phi} w\, \nabla u \cdot n}_{} + \int_{\Gamma_\phi} w \phi$$

$$\int \nabla w\, \nabla u + \int_{\Gamma_\phi}$$



(V) Hallar $u \in V$ / $a(u,v) = (f,v) \quad \forall v \in V$

(V_h) Hallar $u_h \in \underline{\underline{V_h}}$ / $a(u_h,v) = (f,v) \quad \forall v \in \underline{\underline{V_h}}$

No Homog:

(V_h) Hallar $\underbrace{u_h \in V_h}_{\text{INCOG}}$ / $\boxed{a(u_h,v) = (f,v) + \langle \phi, v \rangle_{\Gamma_\phi} \quad \forall v \in W_h}$ ECS

$$a(u_h, w) = \int_\Omega \nabla u_h \, \nabla w \, d\Omega \Longrightarrow$$

$$= \int_\Omega \nabla \left(\varphi_i \underline{\xi_i} + \sum_{k=M+1}^{N} \varphi_k \underline{\bar{\xi}_k} \right) \nabla \varphi_j \, d\Omega$$

$i, j = 1, M$

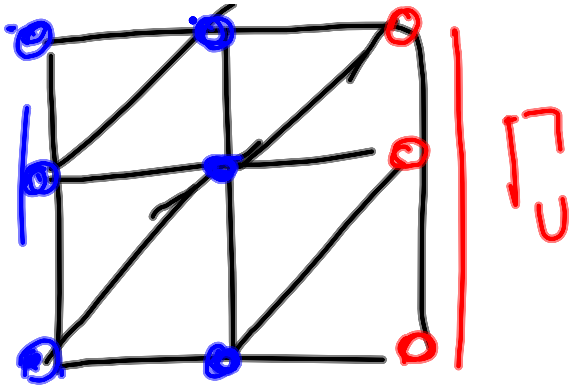
$$\int \nabla \varphi_j \, \nabla \varphi_i \, d\Omega \, \xi_i + \sum_{k=M+1}^{N} \int \nabla \varphi_j \quad \nabla \varphi_k \, d\Omega \, \bar{\xi}_k$$

$$\underline{\nabla}\varphi = \begin{Bmatrix} \partial\varphi/\partial x_1 \\ \partial\varphi/\partial x_2 \end{Bmatrix}$$

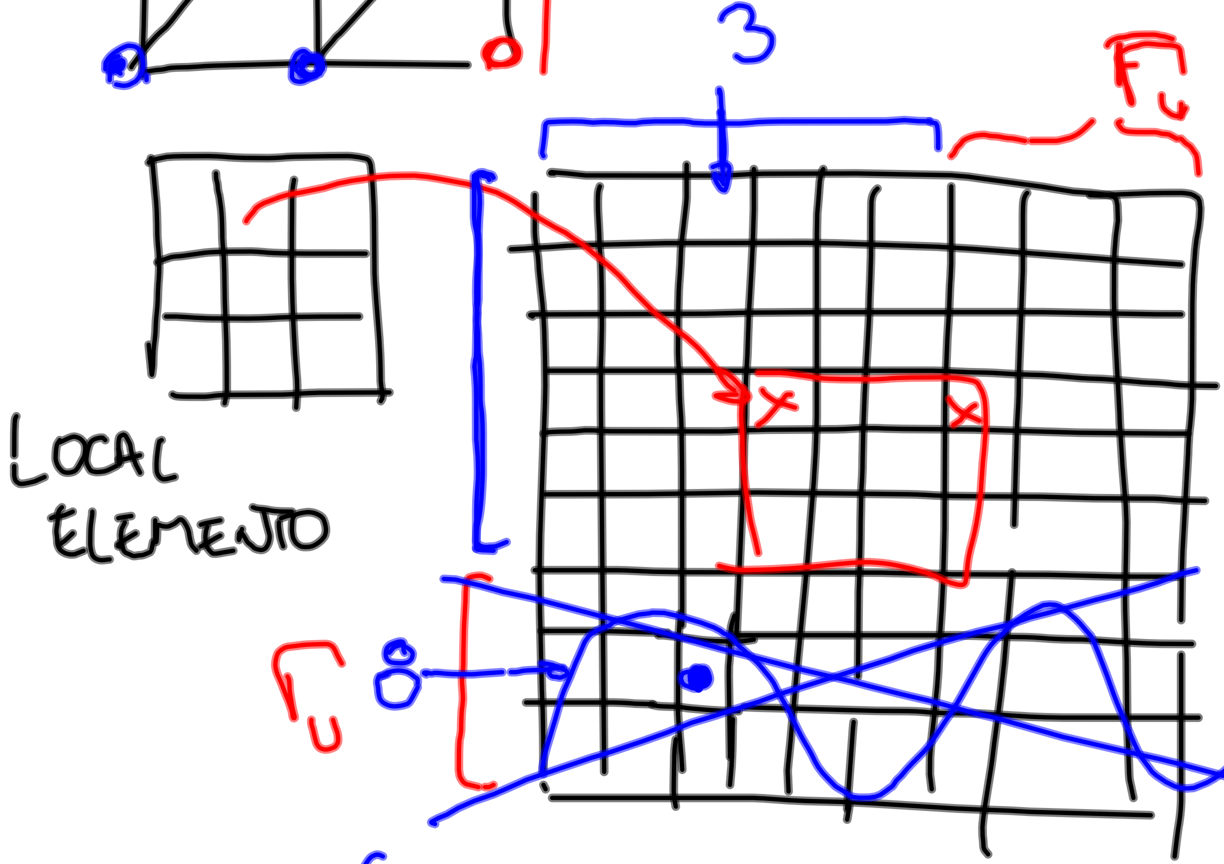
$$\underline{\nabla}\varphi_i \cdot \underline{\nabla}\varphi_j = \frac{\partial\varphi_i}{\partial x_1}\frac{\partial\varphi_j}{\partial x_1} + \frac{\partial\varphi_i}{\partial x_2}\frac{\partial\varphi_j}{\partial x_2}$$

$$\Delta\varphi = \frac{\partial^2\varphi}{\partial x_1^2} + \frac{\partial^2\varphi}{\partial x_2^2} = \underline{\nabla}\cdot\underline{\nabla}\varphi$$

$u_h \in V_h$? $\quad a(u_h, v) = (f, v) \quad \forall\, v \in W_h$

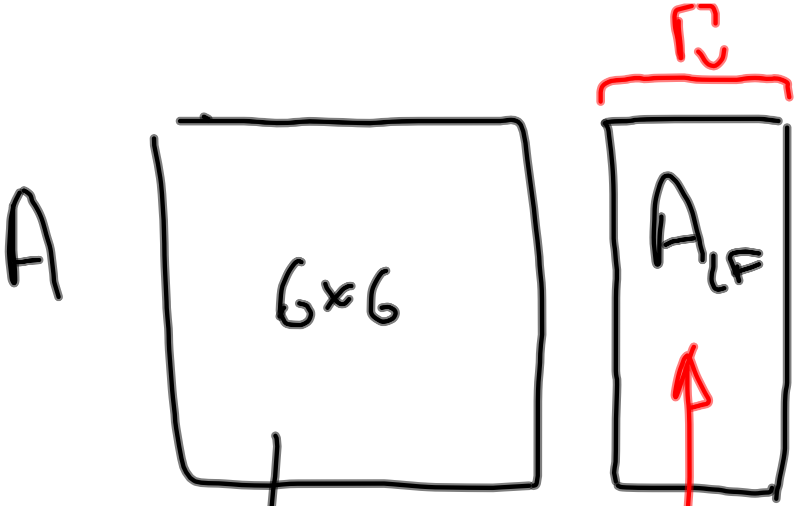


$\dim(W_h) = 6$



$a(\varphi_8, \varphi_3)$

$W_h = \{ v \text{ cont},\ v|_K \text{ lineal},\ v = 0 \text{ en } \Gamma_u \}$



$a(\varphi_i, \bar{\varphi}_k)$

$i = 1, M$

$k = M+1, N$

$$A\,\xi = f - A_{LF}\,\bar{\xi}$$

$\{\text{row}, \text{col}, \text{sk}\}$

$$\begin{array}{cc} & \text{col} \\ \text{row} & \begin{bmatrix} & & \\ & \text{sk} & \\ & & \end{bmatrix} \end{array}$$

$$nglobal = (nodo - 1) * ndu + ncmp$$

Ej: $ndu = 2$

nodo	cmp	nglob
1	1	1
1	2	2
2	1	3
⋮		
10	1	19