Questions:

$v \in H^{-1/2} \cap H^s$, $s \in [-\frac{1}{2}, 1]$

1. $\inf_{W_h \in X_h} \|v - w_h\|_{H^{-1/2}(\Gamma)} \leq C h^{s+1/2} \|v\|_{H^s(\Gamma)}$

e.g. $X_h = P_0(\mathcal{T}_h) = S_h^0(\Gamma) = \text{span}\{\chi_i\}$

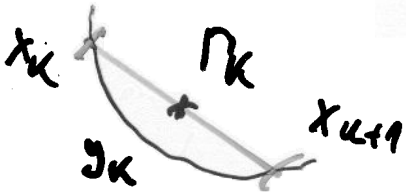
2. Generation of K_h and f_h:

$$\langle \varphi_k, V\varphi_i \rangle = \int_\Gamma \varphi_k(y) \int_\Gamma E(x,y)\, \varphi_i(x)\, ds_x\, ds_y$$

$$= \int_{\Gamma_k} \int_{\Gamma_i} E(x,y)\, ds_x\, ds_y = ???$$

e.g. $\varphi_i = \chi_i$

$$\approx h_k \int_{\Gamma_i} E(x, y_k)\, ds_x = (\uparrow) \quad !!$$



? ↕ ? cpd

3. Solution of $\underline{(13)}_h$ $K_h x_h = f_h$ e.g. by PCG !

4. $\kappa(K_h) = \text{cond}_2(K_h) = O(h^{-1})$ → preconditioning ?

5. ops $(K_h * \underline{v}_h^k) = O(h^{-2(d-1)}) \xrightarrow[\text{techniques}]{\text{data sparse}} O(h^{-(d-1)}) \overset{!}{=} O(n)$

(K_h: dense)

2D: $O(h^{-2}) \longrightarrow O(h^{-1})$

3D: $O(h^{-4}) \longrightarrow O(h^{-2}) * (\log h^{-1})^p$