

Poincaré's Friedrichs inequality (Thm 21.4):

(5)

There exist a constant  $C$  depending on  $\Omega$ , such that for all  $v \in H^1(\Omega)$ :

$$\|v\|_{L_2(\Omega)}^2 \leq C (\|v\|_{L_2(\Omega)}^2 + \|\nabla v\|_{L_2(\Omega)}^2)$$

Proof:

Trace theorem (Thm 21.5):

If  $\Omega$  is a bounded domain with boundary  $\Gamma$ , then there exist a constant  $C$  such that for all  $v \in H^1(\Omega)$ :

$$\|v\|_{L_2(\Gamma)} \leq C \|v\|_{H^1(\Omega)}$$

Proof: