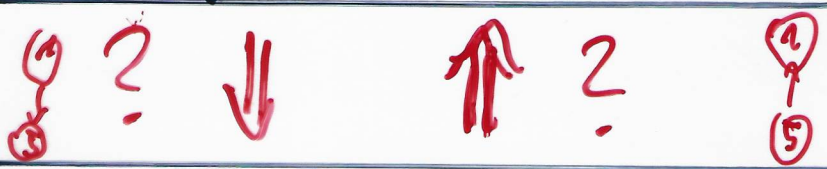


Exercises:

Ex 1.1 = Exercises 01 - 02 of Tutorial 1
 Formulate the classical assumptions which we have to impose on the data $\{a_{ij}, b_i, c, \alpha, f, g_i, \Omega\}$ of (5).
 Provide sufficient conditions in order to ensure that a generalized solution $u \in \tilde{V}_g \cap X \cap H^2(\Omega)$ of (6) is also a solution of (5) in the classical sense!
 Consider first the Dirichlet problem for the Poisson equation for the training:

(5) _{Poisson} Find $u \in X := C^2(\Omega) \cap C(\bar{\Omega})$:
 $-\Delta u(x) = f(x), x \in \Omega \subset \mathbb{R}^d$ (*)
 $u(x) = g(x), x \in \Gamma = \partial\Omega \in C^1$



(6) _{Poisson} Find $u \in \tilde{V}_g := \{v \in \tilde{V} = H^1(\Omega) : v = g \text{ on } \Gamma\}$:
 $\int_{\Omega} \nabla^T u \nabla v dx = \int_{\Omega} f v dx \quad \forall v \in \tilde{V}_0 = \tilde{H}^1(\Omega)$
 $= a(u, v) \quad = \langle F, v \rangle$

Ex 1.2 = Exercise 03 : Show that in the following cases a) - c) the assumption of the L&M-Th. are satisfied, and compute μ_1 and μ_2 ! We assume (7) and

- a) $b_i = 0; c(x) \geq 0 \quad \forall x \in \Omega; \alpha(x) \geq 0 \quad \forall x \in \Gamma_3; \text{meas}_{d-1}(\Gamma_1) > 0;$
- b) $b_i = 0; c = 0; \alpha(x) \geq \underline{\alpha} = \text{const} > 0 \quad \forall x \in \Gamma_3, \text{meas}_{d-1}(\Gamma_3) > 0, \Gamma_1 = \emptyset;$
- c) $b_i = 0, c(x) \geq \underline{c} = \text{const} > 0 \quad \forall x \in \Omega, \Gamma = \Gamma_2$ (i.e. $\Gamma_1 = \Gamma_3 = \emptyset$)