

# Hints exercise

Pascal Auf der Maur  
pascalau@student.ethz.ch

March 2, 2020

## Pen and Paper

### Problem 1

- Formulate  $A$  and  $z$  with the help of the  $w$  vector ( $Aw = z$ )
- Plug in the matrices in the usual formula

### Problem 2

- Really hard problem
- Express  $\alpha^*$ ,  $\alpha_0$ ,  $\beta^*$  and  $\beta_0$  with formula 1.13 in the script.

## Coding

### 2.1

- Generate own data with noise for least squares and try to recover the default values.
- Observe behaviour of LSQ in different situations.
- Implement least squares on 3D data by formulating the matrix and vectors.
- `np.vander` might be useful

### 2.2

- Implement LSQ with SVD decomposition
- `np.linalg.svd` and `np.linalg.pinv` might be useful