

# AI505 – Optimization

## Sheet 05, Spring 2025

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Exercises with the symbol  $^+$  are to be done at home before the class. Exercises with the symbol  $*$  will be tackled in class. The remaining exercises are left for self training after the exercise class. Some exercises are from the text book and the number is reported. They have the solution at the end of the book.

### Exercise 1 $^+$

Learn the basics of PyTorch <https://pytorch.org/tutorials/>.

### Exercise 2 $^+$

Write the update rule for stochastic gradient with mini-batches of size  $m$  on a generical machine learning model  $y = h(x)$  and with loss function  $L$ .

Write the update formula with momentum in the case of mini-batch of size  $m$ .