



Exercise sheet 7

Exercise 1

Restate and prove a version of Theorem 7.1.1 with an explicit definition of the constants c_1, c_2 and c_3 .
(6 points)

Exercise 2

Prove Corollary 7.1.2.

Additionally show that the constants c_1^*, c_2^* and c_3^* can be chosen as follows.

- $c_1^* = 2c_1$,
- $c_2^* = \frac{1}{4}c_2$,
- $c_3^* = c_3$,

where c_1, c_2 and c_3 are as in Theorem 7.1.1.

(6 points)

Exercise 3

Do Exercise 10 from the lecture:

Let $\mathcal{F} \subset L_r(P)$ be a function class for a probability measure P and $\varepsilon > 0$. Show that it holds that

- $H_{[\cdot]}(2\varepsilon, \mathcal{F}, \|\cdot\|_\infty) \leq H(\varepsilon, \mathcal{F}, \|\cdot\|_\infty) \leq H_{[\cdot]}(\varepsilon, \mathcal{F}, \|\cdot\|_\infty)$,
- $H(\varepsilon, \mathcal{F}, \|\cdot\|_{r,P}) \leq H(\varepsilon, \mathcal{F}, \|\cdot\|_\infty)$,
- $H_{[\cdot]}(\varepsilon, \mathcal{F}, \|\cdot\|_{r,P}) \leq H_{[\cdot]}(\varepsilon, \mathcal{F}, \|\cdot\|_\infty)$.

(3 points)