Mathematical methods of signal and image processing

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Prof. Dr. Benjamin Berkels, Vera Loeser M.Sc.

Presence exercise sheet 5

Problem 1

Let X be a set, $f : X \to \mathbb{R}$ a function and $T : \mathbb{R} \to \mathbb{R}$ an increasing, continuous function. Then,

$$\inf_{x\in X} T(f(x)) = T(\inf_{x\in X} f(x)) \text{ and } \sup_{x\in X} T(f(x)) = T(\sup_{x\in X} f(x)).$$

In other words, continuous, increasing functions can be interchanged with the infimum and the supremum.