Mathematical methods of signal and image processing

Winter semester 2021/2022

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Exercise sheet 4 **Due: 19. November 2021**

General information

- Current information will be announced in RWTHmoodle.
- The due date only indicates in which exercise session the solution will be discussed.
- Office hours: By arrangement via Zoom.

Problem 1

Let $f : \mathbb{R}^d \to [0, 1]$ be Lipschitz continuous with constant $L > 0$ and $B \subset \mathbb{R}^d$ nonempty. Show that then also $f \oplus B$ and $f \ominus B$ are Lipschitz continuous with a constant smaller or equal to L.

Problem 2 (Sobel and Prewitt edge detector)

Implement the Sobel edge detector and the Prewitt edge detector, including the visualization of the gradient directions using HSV, from Remark 2.13 and test the algorithm on the images from the first exercise sheet.

> Please note that the implementation of the filters is a good exercise, so check Exercise Sheet 3 again.

Problem 3 (Canny edge detector)

Implement the Canny edge detector from Remark 2.16 and test the algorithm on the images from the first exercise sheet.