



Mathematical Image Processing

Prof. Dr. Marko Lindner, Dr. Christian Seifert
Fabian Gabel, M.Sc.
Institute of Mathematics (E-10)

Learning Objectives

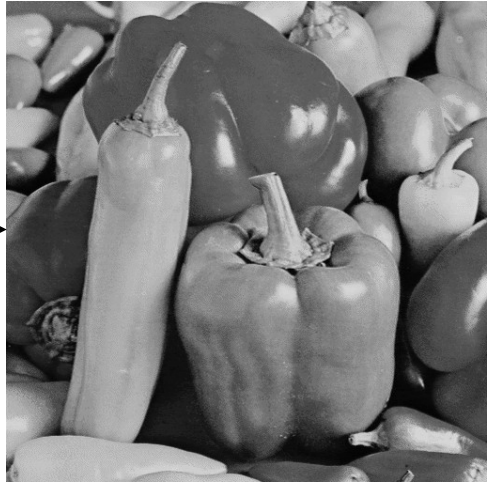
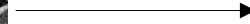
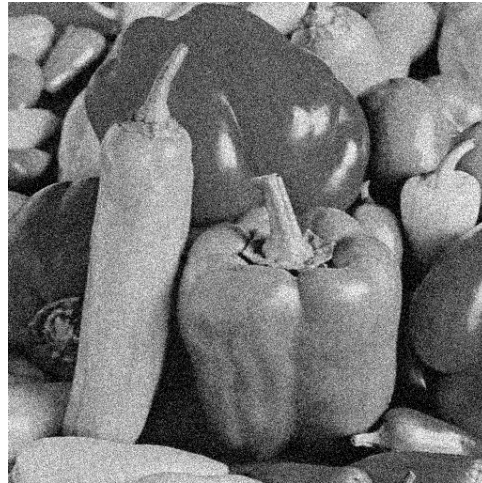
- **Theoretical Knowledge**

Students are able to...

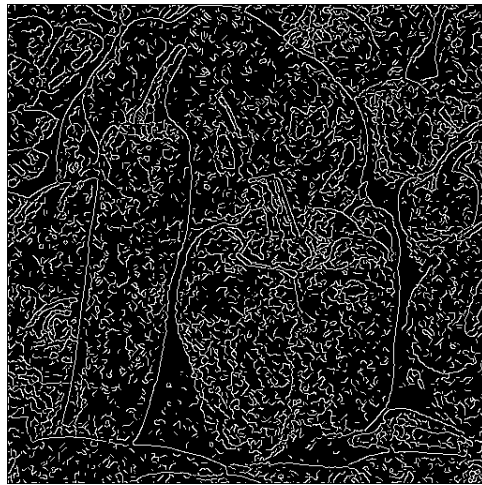
- explain and implement methods of image processing
- sketch and interrelate basic concepts of functional analysis (PDEs, variational calculus)
- Example, see right: denoising and edge detection

- **Personal Competence**

- to work together in heterogeneously composed teams
- to check their understanding of complex concepts on their own



$$\phi: H^1(\mathbb{R}^d) \rightarrow \mathbb{R}, \quad u \mapsto \frac{1}{2} \int_{\mathbb{R}^d} |u^0(x) - u(x)|^2 dx + \frac{\lambda}{2} \int_{\mathbb{R}^d} |\nabla u(x)|^2 dx$$



Focus of Innovation

Opening the Module for non-TUHH Students

Provide revised course material

- focus on self-study

Establish and maintain (online) course infrastructure

- accessibility
- communication
- collaborative distance learning
- submission, feedback of assignments

Webpage

Course Diary

We suggest to work through the

Please refer to [the complete lecture notes](#)

Eleventh week, January 25, 2021

- [Lecture notes: Chapter 11](#)
- [Note on total variation \(see also the lecture notes\)](#)
- [Lecture in ZOOM on Thursday, January 28, 2021](#)
Meeting-ID: 834 6740 250
- [Video of Lecture 11](#)
- **Exercises Week 11 (Please do them at the end of Chapter 11 of the book)**
 - 11.3
- **Exercise class in ZOOM on Friday, January 29, 2021**
Meeting ID: 833 9109 402
- [Notes of the exercise session](#)
- **Optional Assignments Week 11 (Please do them at the end of Chapter 11 of the book)**
 - 11.1 (5 points)
 - 11.4 (5 points)

at the end of Chapter 11 of the book

- [Clone URL](#) of the web page
- [Zip files](#) of the git folder

Etherpad

Hello everyone,

you can **anonymously** write your questions and suggestions in this Etherpad using a regular text editor.

Best wishes,
Fabian

Back to the course homepage: <https://media.tuhh.de/e10/>

#####

#####New Questions:

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#####Questions that already have answers:

Is it possible to get the whole lecture notes instead of single pages? I would like to have them in the university or copy shop.

We are currently writing the lecture notes and will publish them as soon as there is a final version.

How can we download the image processing assignments?
See here <https://communicating.tuhh.de/>

Mattermost

Fabian Nuraddin Alexander Gabel 9:30 AM
If you don't want to use the example in the book, you can use the example in the book (edited)

GitLab BOT 12:58 PM
Fabian Nuraddin Alexander Gabel pushed to master
ec380237: Add templates for week 04

Moritz 5:23 PM
@Fabian Nuraddin Alexander Gabel Hello Fabian,
Bests, Moritz

Fabian Nuraddin Alexander Gabel 5:40 PM
Hi Moritz,
that is a good question. The following text is a quote from the help text read in the book:
“ The last line of the help text reads: You are not allowed to call these functions in the converse, if the function that you

Name	Last commit	Last update
ex01	create README and ex01	2 weeks ago
ex02	Add test image to ex02	1 week ago
ex03	Add example implementation calcHistogram...	3 days ago
ex04	Add templates for week 04	23 hours ago
README...	Add templates for week 04	23 hours ago

README.md

Assignments for Mathematical Image processing (continuously updated)

This weekly updated repository contains the templates for your programming assignments of the course [Mathematical Image Processing Winter Term 2020/2021](#).

Please work the assignments in **groups of three students** and hand it in before the deadline communicated on the [course website](#).

Collaboration in GitLab

Structure – One Week

Webpage update

Tenth week, January 18, 2021

- [Lecture notes: Chapter 9.2 and 10](#)
- [Lecture in ZOOM on Thursday, January 21, 2:15 p.m. to 4:45 p.m.:](#)
Meeting-ID: 834 6740 2507, Passcode: 558586.
- [Video of Lecture 10](#)
- **Exercises Week 10 (Please prepare before the exercise class):**
 - 5.14
at the end of Chapter 5 of the complete lecture notes.
- [Exercise class in ZOOM on Thursday, January 21, 7:00 p.m. to 7:45 p.m.:](#)
Meeting ID: 833 9109 4022, Passcode: 579501.
- [Notes of the exercise session of week 10](#)
- **Assignments Week 10 (Deadline January 27, 11:59 pm.):**
 - 9.1 (5 points)
 - 10.1 (5 points)at the end of Chapter 9 and 10 of the lecture notes.
 - [Clone URL](#) of the weekly updated repository with the assignments. For tas
 - [Zip files](#) of the git folder with the material for the assignments of week ten.

Monday

Lecture

Exercise

Office Hour
Mattermost
Etherpad

Teacher:
Push templates
and unit tests

GitLab
Repo

Students:
Pull updates

Students'
Repo

Students:
Work on assignment,
track progress,
submit solution

Corrector:
Pull solution,
Push feedback

Feedback and Future Improvements

Teaching Staff:

- Positive:
 - Constantly high participation until the end of the semester
- Next time:
 - Decrease software installation overhead and compatibility issues (MATLAB, Octave)
 - Merge teams that lose participants over time

Students (CheckING):

- *Really liked the lecture notes, they are very well done.*
- *It's probably the first class I've experienced with the most application.*
- *The homework was good and helped understand the material*
- *I liked that the "test-programs" were provided. This is really helpful.*
- *Was forced to use git, that was good.*
- *I enjoyed the organized structure, office hours, and overall availability.*
- *The service around is very well organized.*
- *Cool digital format (mattermost, etherpad etc)*