Literature and Resources

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ISP / ADLS
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Part I / Signal Processing

Books

Digital Signals Theory. Brian McFee, 2022
: Very instructive, beautiful presentation, with code examples, open access. Link

Think DSP: Digital Signal Processing in Python. AB Downey, 2016
: Hands-on, accompanied by great Jupyter notebooks, open access. Link

The Scientist and Engineer's Guide to Digital Signal Processing. SW Smith, 2002
: A classic in the field, open access. Link

DSP First. McClellan, Schafer and Yoder, 2015 (2nd edition)
: Provides a good theoretical basis, practical at the same time.

Python materials

- SciPy: User guide on signal processing
  - `scipy.signal`, see also the user guide
  - `scipy.interpolate`, see also the user guide
  - `scipy.fft`, see also the user guide
- librosa: Python package for music and audio analysis. Tutorials
- ThinkDSP: Jupyter notebooks for the book by Allen Downey on github

Miscellaneous

- DSP @ Stack Exchange. Hint: Sort the questions by votes or frequency.
- Rich Radke: Digital Signal Processing – Lecture videos. YouTube
- Grant Sanderson / 3Blue1Brown:
  - But what is a Fourier series? From heat flow to drawing with circles. YouTube
  - But what is a Fourier series? A visual introduction. YouTube

Part II / Image Processing

Books

Computer Vision: Algorithms and Applications. R Szeliski, 2021
: Comprehensive textbook on computer vision/image processing, open access. Link

Digital Image Processing. Gonzalez and Woods, 2009 (4th edition)
: Very often cited book on the first principles of computer vision. Link

Digital Image Processing for Medical Applications. Dougherty, 2009
: Open access textbook on image processing with a focus on medical imaging. Link

Programming Computer Vision with Python. Jan Erik Solem, 2012
: Introduction to computer vision using Python, open access. Link

Python materials

- OpenCV: A real-time optimized computer vision library with a Python interface
- Pillow/PIL: A neat image processing library, object-oriented: tutorials
- Pillow/PIL: A tutorial on RealPython
- scikit-image: Offers a collection of algorithms for image processing: user guide
- Mahotas: Another library with computer vision algorithms

Miscellaneous

- Online course: First principles of computer vision. Shree Nayar, 2022. Link
- Online course: Basics of computer vision. Vincent Mazet, 2024. Link
- Cambridge in Colour: A learning community for photographers. Great! Link
- The Python Coding Book: 2D Fourier transform in Python. Tutorial, 2021. Link