University of Salzburg — Lecturer: Roland Kwitt

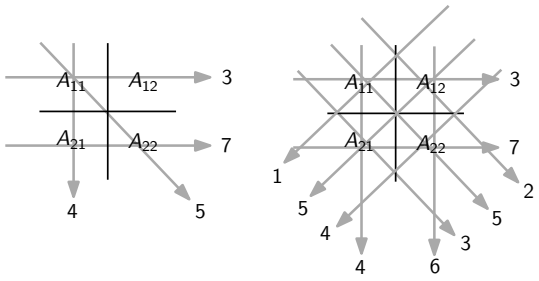
Medical Imaging – Proseminar (911.934)

Exercise sheet **B**

For the following two exercises, please use the templates provided on the GitHub course webpage.

Exercise 1. 4 P.

Below are two examples of projections through a 2×2 grid: (*left*) from 4 directions and (*right*) from 10 directions.



Write Python code to compute the values for $[\mathbf{A}]_{ij} = A_{ij}$ using *direct reconstruction*, i.e., solving the corresponding system of equations. Basically, you have to solve $\mathbf{Ax} = \mathbf{b}$ with $\mathbf{A}$ and $\mathbf{b}$ chosen appropriately (you can use `numpy.linalg` for that, in particular the `solve` or `lstsq` method).

Solve this exercise within the provided Jupyter notebook `ExB-Submission.ipynb`.

Exercise 2. 6 P.

Implement the Karczmarz algorithm from the (CT) lecture (using the template code within `ExB-Submission.ipynb`) and solve the two reconstruction tasks from the previous question using your solution.

Solve this exercise within the provided Jupyter notebook `ExB-Submission.ipynb`.

Total #points: 10 P.