Rotation of multidimensional signals with spectral schemes

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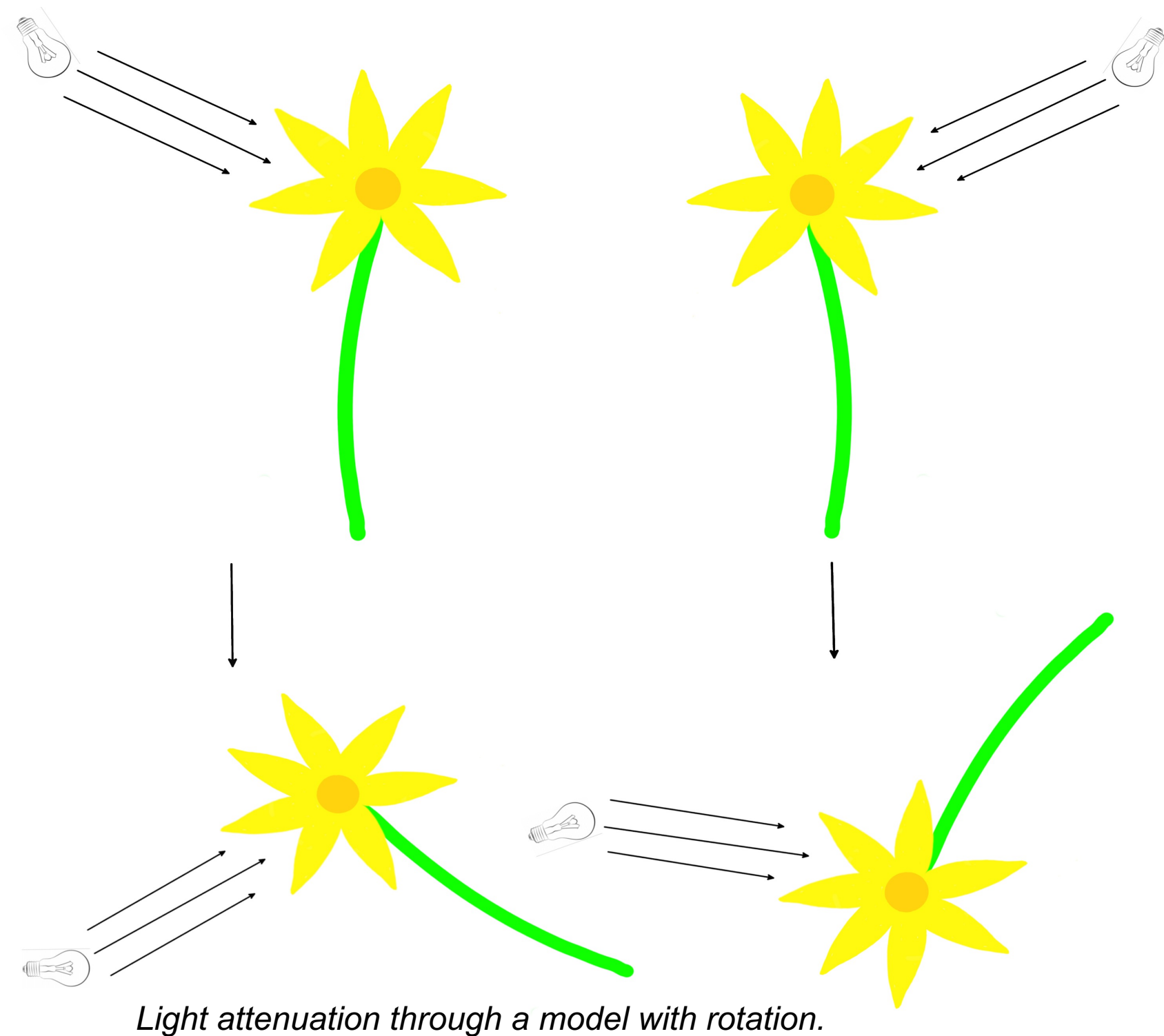Co-Advisors: Dr Diego Rossinelli, Dr Patrick Zulian

3D section of the optic nerve, realized with .

Light attenuation through a model with rotation.

Light transport of high amounts of data

- 3D Perception vs. Slice.

- Light attenuation.

- Rotation of 3D signal with high performance methods.

Motivation

The goal of the project is the implementation of a numerical method to rotate a multidimensional signal while maintaining both a high degree of accuracy and performance.

Three-pass rotation, Michael Unser

Three 1D translations of data

- 1D translations, $f(x-h)$ and data $f(x_i)$
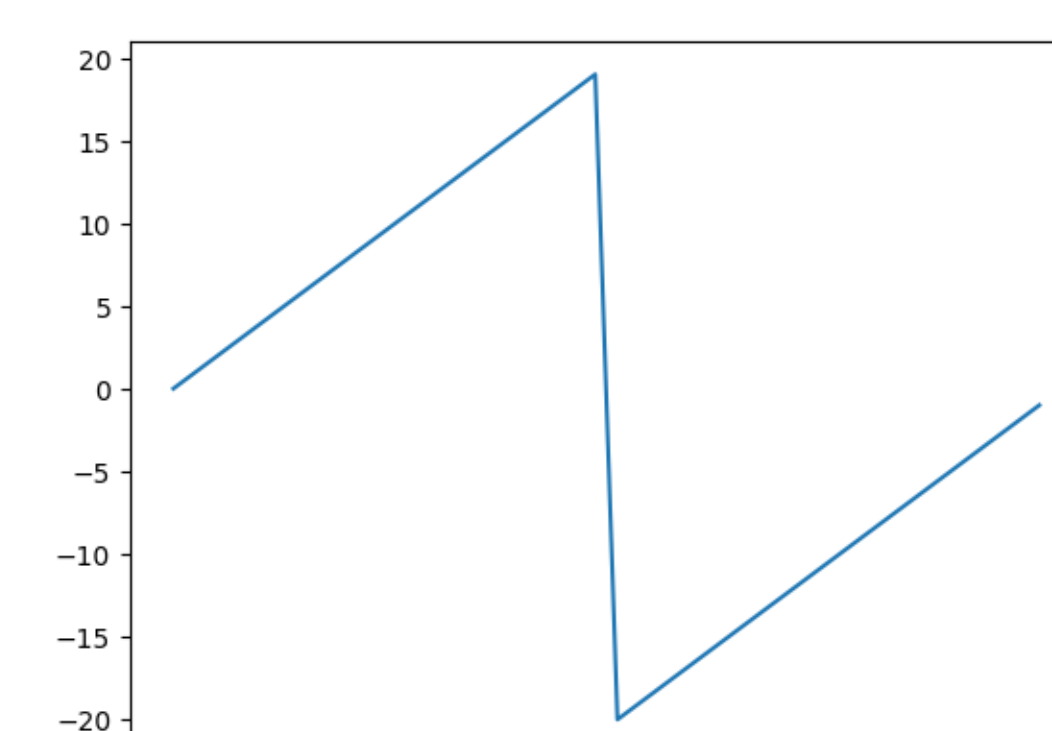- $f \approx \sum_i \phi_i (x_i - h)c_i \rightarrow Ax = b$, global operation.

Digital Filter Design / FIR

- Property of DFT → Shift equivariant.

- Fractional Shift.

- Smoothing of high frequencies, local operation.

Frequency analysis

All-pass vs. Low-pass

Time Domain