

Type Term Project or Bachelor Thesis

Title **Implementation of a Fourier-based Ridgelet Transform**

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Description. This project is concerned with the implementation of a ridgelet transform which decomposes a two-dimensional signal (think of an image) into a superposition of ridge functions associated with different directions and scales (Candes 1998). Such transforms are important in image processing, specifically for X-ray images, but also in the numerical discretization of parametric linear transport PDEs (Grohs 2011). Since it is quite difficult to construct a useful ridgelet transform in space, we opt for an FFT-based construction in Fourier domain.

Prerequisites. Numerical analysis, programming skills (MATLAB and/or C++).

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References

- E. Candes (1998), Ridgelets: theory and applications, PhD thesis, Stanford University.
- P. Grohs (2011), ‘Ridgelet-type frame decompositions for Sobolev spaces related to linear transport’, *Journal of Fourier Analysis and Applications*.