
Inverse problems related to the magnetic Schrödinger and Maxwell operators: increasing stability in the presence of high frequencies and recovery of singularities.

A Data Management Plan created using DMPTuuli

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Project abstract:

Inverse problems research concentrates on the mathematical theory and practical interpretation of indirect measurements. Applications include medical imaging, image processing, mathematical finance, astronomy, geophysics, nondestructive material testing and sub-surface prospecting. They are typically ill-posed with the modulus of continuity of logarithmic type. Hence small errors in measurements will result in exponentially large errors in the reconstruction of the target material parameters.

This project aims to develop methods and tools to obtain better stability estimates in the presence of large frequencies related to the magnetic Schrödinger equation and Maxwell equation. Our study will improve previous stability estimates. As a consequence, it will lead to constructing more efficient numerical algorithms. Recovery of singularities from scattering data will also be studied.

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1. General description of data

27.09.2018

All data collected for this project will be taken from specialized Journals in Inverse Problems. I will also use the free open access repository arXiv.org and the repository of the University of Jyväskylä (jyx.jyu.fi). Data consists of generally accepted formats, all of them in PDF format.

In all conversions with my collaborators, we will maintain the original information. Moreover, the data (articles) produced by this project will be previously submitted to specialised Journals in Inverse Problems where anonymous experts will check them to give the corresponding positive (or negative) reports.

Files will be stored using checksums that are used to ensure that data is not corrupted when copying, transmitting and saving it.

2. Ethical and legal compliance

The research does not include processing of personal data, does not handle with sensitive data. No experiments are involved. The results are purely theoretical.

Nevertheless, good scientific conduct is naturally followed in all data-related issues.

In this project, I would own the copyrights of the results, but the University of Jyväskylä may assume the right to the invention.

3. Documentation and metadata

The results of this project will be published in high-quality international journals as well as presented at national and international conferences and seminars.

4. Storage and backup during the research project

Preprint version of all publications will be made available through the free open access repository arXiv.org. In addition, the articles will be available on the University of Jyväskylä repository (jyx.jyu.fi)

The data will be available to all researchers of the project and everyone who require the articles.

5. Opening, publishing and archiving the data after the research project

Data itself, complete with a full description of methods, will be published as datasets are completed in free access repository arXiv.org and YJU repository. No restriction to access all data involved in this project.

The data will be deposited at the University of Jyväskylä repository called JYX indefinitely, in the format originally deposited.

Final preparation of the data and publishing it will require 6 months. This will be supported by Open Science Center of the University of Jyväskylä.

