

One Day Conference

Analysis and Geometry

Boman's Fest

Celebrating
Jan Boman's 90-th birthday



Stockholm University, October 25, 2023



Programme

All lectures of the meeting will take place at Stockholm University,

Albano, House 2, lecture room 13

Wednesday, October 25

10.00-10.10 **Opening**

10.10-10.55 Christer Kiselman

11:05-11.35 Svante Linusson

11.40-13.00 **Lunch at restaurang Provianten**

13.00-13.45 Mikko Salo

13.55-14.40 Joachim Toft

14.45-15.15 **Coffee break**

15.15-16.00 Jan-Olov Strömberg

16.10-16.55 Todd Quinto

17.30- **Conference dinner at restaurang Provianten**

Is smoothness preserved or lost under compactifications?

Christer Oscar Kiselman (Uppsala)

A subset of a vector space is considered as a subset of three compactifications of the space. We then study the smoothness of its closure in the chosen compactified space. As an example we mention here two parallel lines, which are extended to two circles which are tangent to each other at the north pole, thus with no problem concerning smoothness, and on the other hand a parabola, whose closure in the Riemann sphere is a curve of class C^1 but not of class C^2 .

Jan Boman, my coauthor

Svante Linusson (KTH)

I will talk about the combinatorial Radon transform and how my very first research paper was written jointly with Jan Boman.

Invertibility of ray transforms associated with double fibrations

Mikko Salo (Jyväskylä)

We study integral transforms associated with a double fibration. This class includes various transforms encountered in tomography problems, such as (magnetic) geodesic X-ray transforms, generalized Radon transforms, and (Lorentzian) light ray transforms. If the underlying curve or surface family is real-analytic and a Bolker condition holds, we show that certain analytic singularities of a function can be determined from its transform which is treated as an analytic elliptic Fourier integral operator. This work is based on fundamental ideas introduced by Jan Boman and Todd Quinto in 1987, and leads to local and global uniqueness results and Helgason type support theorems for these transforms.

This is joint work with Marco Mazzucchelli (ENS Lyon) and Leo Tzou (Amsterdam).

Some examples of estimates using functions and their Fourier transforms

Jan-Olov Strömberg (KTH)

When I was a PhD-student at Stockholm University more than 50 years ago, Jan Boman introduced me to techniques making estimates of functions by use of their Fourier transforms. These techniques have followed me over the years. I will try to remember some examples and I may end with a problem about convergence of solutions of the Schrödinger equation (a collaboration with Per Sjölin) .

Fractional Fourier transform, harmonic oscillator propagators and Strichartz estimates

Joachim Toft (Växjö)

Using the Bargmann transform, we give a proof of that harmonic oscillator propagators and fractional Fourier transforms are essentially the same. We deduce continuity properties for such operators on modulation spaces, and apply the results to prove Strichartz estimates for the harmonic oscillator propagator when acting on modulation spaces. Especially we extend some results in [1, 2, 3, 4]. We also show that general forms of fractional harmonic oscillator propagators are continuous on suitable on so-called Pilipović spaces and their distribution spaces. Especially we show that fractional Fourier transforms of any complex order can be defined, and that these transforms are continuous on any Pilipović space and corresponding distribution space, which are *not* Gelfand-Shilov spaces.

The talk is based on a joint work with Divyang Bhimani and Ramesh Manna.

- [1] D. G. Bhimani *The nonlinear Schrödinger equations with harmonic dinger equations with harmonic potential modulation spaces*, Discrete Contin. Dyn. Syst. **39** (2019), 5923–5944.
- [2] D. Bhimani, R. Balhara, S. Thangavelu *Hermite multipliers on modulation spaces*, in: Analysis and partial differential equations: perspectives from developing countries, Springer Proc. Math. Stat., **275**, Springer, Cham, 2019, pp. 42–64.
- [3] E. Cordero, K. H. Gröchenig, F. Nicola, L. Rodino *Generalized metaplectic operators and the Schrödinger equation with a potential in the Sjöstrand class*, J. Math. Phys. **55** (2014), 081506.
- [4] E. Cordero, F. Nicola *Metaplectic representation on Wiener amalgam spaces and applications to the Schrödinger equation*, J. Func. Anal. **254** (2008), 506–534.
- [5] J. Toft *Images of function and distribution spaces under the Bargmann transform*, J. Pseudo-Differ. Oper. Appl. **8** (2017), 83–139.
- [6] J. Toft, D. Bhimani, R. Manna *Fractional Fourier transforms, harmonic oscillator propagators and Strichartz estimates on Pilipović and modulation spaces*, Appl. Comput. Harmon. Anal. **67** (2023), Paper No. 101580, 38 pp.

**Some Beautiful Microlocal Analysis and Integral
Geometry
Celebrating Jan Boman's 90th Birthday!**

Todd Quinto (Boston)

I discuss Jan Boman's mathematics plus a little bit. The mathematics will include the work that I know the best, as well as a brief overview of his other work.

Organisers:

- Pavel Kurasov (Stockholm)
- Todd Quinto (KTH)
- Ozan Öktem (Boston)