

## Pseudodifferential operators and wave front sets on quasi-analytic Gelfand-Shilov spaces

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The talk is focused on the challenging problem of developing a global pseudo-differential theory and to define wave front sets on quasi-analytic function and distribution spaces. The lack of compactly supported functions in this setting makes this analysis rather difficult. On the other hand, recent results show that some interesting operators in Mathematical Physics satisfy quasi-analytic estimates, see [1]. We first consider some classes of symbols related to the harmonic oscillator which motivate this analysis, and we discuss the possibility of constructing a global calculus in these classes. Moreover, we derive some regularity and decay estimates for PDE involving these operators. Finally we introduce global wave front sets for tempered ultradistributions and investigate their applications. The proofs of some of these results are based on a combination of standard microlocal techniques with tools coming from time-frequency analysis and they have been obtained in collaboration with L. Rodino, R. Schulz and J. Toft.

### REFERENCES

- [1] M. Cappiello, L. Rodino, J. Toft, *On the inverse to the harmonic oscillator*, *Comm. Partial Differential Equations* **40** (2015) no. 6, 1096-1118.
- [2] M. Cappiello, R. Schulz, *Microlocal analysis of quasianalytic Gelfand-Shilov type ultradistributions*, *Complex Var. Elliptic Equ.* **61** (2016) no. 4, 538-561.
- [3] M. Cappiello, J. Toft, *Pseudo-differential operators in a Gelfand-Shilov setting*, *Math. Nachr.* (2016). To appear.