Abstract. The (classical) modulation spaces, as introduced by Feichtinger during the 80's, consist of all tempered distributions whose short-time Fourier transforms (STFT) have finite mixed (weighted) Lebesgue norm. By choosing the Lebesgue parameters and weight functions in appropriate ways, one may quantify the degrees of asymptotic decay and singularity of the distributions in a "detailed way".

A major idea behind the design of these spaces was to find useful Banach spaces, which are defined in a way similar to Besov spaces, in the sense of replacing the dyadic decomposition on the Fourier transform side, characteristic to Besov spaces, with a uniform decomposition.

There have been several results, especially due to Feichtinger, Gröchenig and their collaborators, which shows that modulation spaces possess convenient properties. For example it was proved that modulation spaces admit reconstructible sequence space representations using Gabor frames.

During the last 20 years, several results have been proved which confirm the usefulness of the modulation spaces in time-frequency analysis, where they occur naturally. Parallel to this development, modulation spaces have been incorporated into the calculus of pseudo-differential operators, in the sense of (i) the study of continuity of pseudo-differential operators acting on modulation spaces, and (ii) the use of modulation spaces as symbol classes.

In the present talk we consider different continuity and Schatten-von Neumann properties for operators and pseudo-differential operators when acting on modulation spaces. We also consider bijectivity properties of pseudo-differential and Toeplitz operators when acting on modulation spaces.

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