Generalized Coorbit Theory and Applications to Shearlets

by Lukas Sawatzki

DESCRIPTION:

Since the 1980s the coorbit theory has provided a powerful tool for analyzing function spaces. It allows to define certain function spaces, so-called coorbit spaces, by means of representations of groups in Hilbert spaces, and offers a uniform strategy to discretize these spaces. The basic idea is to understand coorbit spaces as smoothness spaces, where smoothness is measured by the asymptotic behavior of transforms of the functions. Here, the transformation is defined by the representation of the group.

In the present dissertation the existing coorbit theory is generalized in two different ways and applied to examples. Thus, the theory is also applicable to transformations whose reproducing kernel is non-integrable. This is true for function spaces whose transformation is based on a group as well as for the case where only a more general structure is given. In both cases the discretization of function spaces is discussed and sufficient criteria for discretizations are formulated.

The work is complemented by illustrative examples, such as applications of the theory to wavelets and shearlets, and the development of novel function spaces based on inhomogeneous shearlets.

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