Shearlet Coorbit Spaces: Traces and Embeddings

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In recent years it has turned out that shearlets have the potential to retrieve directional information so that they became interesting for many applications. Moreover the shearlet transform has the outstanding property to stem from a square integrable group representation. This remarkable fact provides the opportunity to design associated canonical smoothness spaces, so-called shearlet coorbit spaces by applying the general coorbit theory derived by Feichtinger and Gröchenig. However, once these abstract smoothness space are established some natural questions arise. Of course one would like to know how these spaces look like and how they are related to other known classical smoothness spaces such as Besov or Triebel-Lizorkin spaces. Moreover, one would like to understand the structure of these new spaces. That is, it would be desirable to know how these new scales of shearlet coorbit spaces behave under embeddings and trace operations.

In this talk we examine structural properties of shearlet coorbit spaces in higher dimensions. We prove embedding theorems for subspaces of shearlet coorbit spaces resembling shearlets on the cone in three dimensions into Besov spaces. The results are based on general atomic decompositions of Besov spaces. Furthermore, we establish trace results for these subspaces with respect to the coordinate planes. It turns out that in many cases these traces are contained in lower dimensional shearlet coorbit spaces. To prove these results we apply the concept of coorbit molecules recently developed by Gröchenig and Piotrowski.

Joint work with S. Dahlke (Philipps-Universität Marburg), G. Steidl (Technische Universität Kaiserslautern) and G. Teschke (Hochschule Neubrandenburg).