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on

COMPLEX AND HYPERCOMPLEX ANALYSIS

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Radon type transforms in Clifford analysis

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In our work, we focus on the study of Radon type transforms in the setting of Clifford analysis. Three concrete settings of Radon type transforms will be studied. Firstly, we study the action of the Szegö-Radon transform on biaxially monogenic functions. The Szegö-Radon transform is defined as the orthogonal projection operator of a suitable Hilbert module of monogenic functions on the unit ball, onto a closed submodule of plane waves. We consider this transform acting on a special class of monogenic functions, namely functions that are invariant under the subgroup $SO(p) \times SO(q)$ of the orthogonal group $SO(p + q)$. Secondly, we investigate the action of the Bargmann-Radon transform on axially monogenic functions. The Bargmann-Radon transform is a projection of the monogenic Bargmann module on its closed submodule of monogenic plane waves. We compute the explicit formula of this transform on axially monogenic functions. We also provide an example of the Bargmann-Radon transform on functions generated by the CK-extension. Finally, we study the refinement of the Szegö-Radon transform to the setting of hypermonogenic functions. We obtain an explicit expression for the Szegö-Radon transform in the hypermonogenic setting which is still an orthogonal projection operator. By means of the generalized CK-extension, we also characterize the Szegö-Radon image of general hypermonogenic functions. A dual transformation is constructed which yields an inversion method for the hypermonogenic Szegö-Radon transform.

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