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Ridgelet transform on tempered distributions

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Abstract: We prove that ridgelet transform $R : \mathscr{S}(\mathbb{R}^2) \to \mathscr{S}(\mathbb{Y})$ and adjoint ridgelet transform $R^* : \mathscr{S}(\mathbb{Y}) \to \mathscr{S}(\mathbb{R}^2)$ are continuous, where $\mathbb{Y} = \mathbb{R}^+ \times \mathbb{R} \times [0, 2\pi]$. We also define the ridgelet transform $\mathcal{R}$ on the space $\mathscr{S}'(\mathbb{R}^2)$ of tempered distributions on $\mathbb{R}^2$, adjoint ridgelet transform $\mathcal{R}^*$ on $\mathscr{S}'(\mathbb{Y})$ and establish that they are linear, continuous with respect to the weak*-topology, consistent with R, R^* respectively, and they satisfy the identity $(\mathcal{R}^* \circ \mathcal{R})(u) = u$, $u \in \mathscr{S}'(\mathbb{R}^2)$.

Keywords: ridgelet transform, tempered distributions, wavelets
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