

Directional Stockwell transform and its desingularization formula

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In this paper, we introduce and study the directional Stockwell transform (DST) as a hybrid of the directional short-time Fourier transform and the ridgelet transform. We prove an extended Parseval identity and a reconstruction formula for this transform, as well as results for the continuity of both the DST and its synthesis transform on the appropriate space of test functions. We also develop a distributional framework for the DST on the Lizorkin space of distributions. Additionally, a connection of the DST with the Stockwell transform and the Radon transform is established and a desingularization formula is provided.