

Enhancing Seismic Insight by Spectral Decomposition

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Abstract/Excerpt

Spectral Decomposition is a novel technology developed in recent years. It has proved to be very useful for seismic data interpretation, because decomposing data into its spectral components reveals stratigraphic and structural details that are often obscured in the broadband data. Most popularly utilized spectral decomposition methods include Short windowed Fourier transform (SWFT) (Partyka, 1999), Morlet wavelet based wavelet transform (MWT) (X. Miao & W. Moon, 1994, Casatagna, 2003), and Matching Pursuit Decomposition (MPD) (X. Miao & S. Cheadle 1998). SWFT involves explicit use of windows, which affects temporal and spectral resolution. Wave-package-like spectral decomposition even though provides better spectral resolution but reduces temporal resolution, which is undesirable for thin bed interpretation. In this paper, in addition to the previously discussed WT and MPD methods, we introduce a generalized Stransform (ST) based spectral decomposition method. We explore the merits and disadvantages of the methods, and apply them to real data to show the interpretive benefits of spectral decomposition.