Unification of Euler and Werner deconvolution in three dimensions via the generalized Hilbert transform
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The extended Euler deconvolution algorithm recently introduced by Mushayandebvu et al. (1999) is shown to be a generalization and unification of 2D Euler deconvolution and Werner deconvolution. After recasting the extended Euler algorithm in a way that suggests a natural generalization to three dimensions, we show that the three dimensional extension can be realized using Nabighian’s (1984) generalized Hilbert transforms. The resulting algorithm is both a generalization of extended Euler deconvolution to three dimensions and a 3D extension of Werner deconvolution. At a practical level, the new algorithm helps stabilize the Euler algorithm by providing at each point three equations rather than one.

The algorithm was tested on both theoretical and field data. The preliminary tests indicate that the results obtained using all three equations in the 3D Extended Euler deconvolution yield more reliable location and depth information than the standard 3D Euler deconvolution.

References