



Abstract Details

[AOGS 1st Annual Meeting](#) > [Non-linear Geophysics](#) > **ANALYSIS OF COMPLEX 2-D AND 3-D FRACTALIZED SCALED WAVELETS- >**

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Title: ANALYSIS OF COMPLEX 2-D AND 3-D FRACTALIZED SCALED WAVELETS

Abstract:

ABSTRACT The complex 2-D and 3-D Mexican hat wavelet scaled time series functions are mathematically defined. The 2-D and 3-D Mellin (real and complex domains), Mellin (real and complex domains)-Fourier transforms of the complex scaled time wavelet functions are derived. The algorithm for the extraction of values of scale parameters are formulated. 2-D and 3-D complex wavelets are numerically simulated and used as input time series data for computing the discrete 2-D and 3-D Mellin (real and complex domains) and Mellin (real and complex domains) - Fourier transforms. The scale extraction algorithms are implemented and established the validity of the methods on simulated complex Mexican hat wavelet models. Further, introducing the random noise in simulated complex Mexican hat wavelet models, the discrete 2-D and 3-D Mellin, Mellin-Fourier transforms (real and complex domains) are computed. The algorithm for extraction of scale parameters and testing the validity is implemented. Remarkably, the errors of the extracted values of scale parameters, extracted from the complex scaled wavelet models, are less than 5%. This unique approach is applicable for wider areas like 2-D and 3-D imaging of the earth using the seismic data - for anisotropy studies, analyzing chaotic and fractal nature of the earth media, satellite image processing, medical imaging, animated graphic image processing etc.

Presentation Mode:

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