

## 4.17 NC

### The development of the analog to mathematical package Wavelet Toolbox (MATLAB) using IDL

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Presented are the results derived from developing the software package for spectral wavelet analysis of astronomical data. The analog is represented by the expansion package of computer mathematics system MATLAB 6.0/6.1 Wavelet Toolbox 2/2.1, which is currently the most powerful tool for studying, creating and applying wavelets, and for carrying out wavelet transforms. The Wavelet Transform Analyzer (WTA) package evolved by our team is designed for employing one- or two-dimensional wavelet transform of observational data. The programs were written by using the data processing and visualization language, IDL (Interactive Dialog Language) which is a default standard for the astronomical community. An added motivation for the use of the IDL language has also been the fact that currently there is no software for processing astronomical data, based on using wavelet transforms. The WTA package provides the following output data: amplitude, power and phase spectra; skeletons or maps of local extrema; local or global energy spectra; measures of local intermittency or contrast; histograms and integral variances; autocorrelation functions; Hilbert transforms; signal reconstruction; one- and two-dimensional cross-correlations of harmonics; decomposition and synthesis of two-dimensional images; and denoising. For the online control of the signal processing there is a possibility of operating with a variety of mother functions (Wave, WHAT, DOG, Morlet, Paul), as well as modifying their frequency and spatial characteristics.

Keywords: **IDL, software, Wavelet Toolbox (MATLAB), astronomical data**

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