The astronomy & astrophysics toolbox for MATLAB

Description

The *MATLAB Astronomy & Astrophysics Toolbox* (MAAT) is a collection of functions and classes for astronomy and astrophysics experimental and theoretical research.

NOTE: This page describes a new version of MAAT with many new capabilities. However, this version is not fully backward compatible. An older version of MAAT is still available, but not supported (see installation instructions).

The toolbox is organized in several packages and sub packages that allow easy-to-navigate platform, as well as several "container" classes (e.g., image, catalog, time containers) with their own functions (methods), as well as static classes. The toolbox contains detailed documentation and examples, as well as a detailed help section for each function (see documentation).

The MAAT toolbox has functions and classes covering the following topics:

- **Documentation:** A package containing live documents (documentation with example code) covering many aspects of this toolbox with examples (see documentation).
- **Astronomical image processing**: A complete set of functions to reduce and analyze astronomical images, from bias removal to image subtraction and source extraction and PSF photometry.
- **Astronomical spectra processing**: A set of functions to reduce and analyze astronomical spectral data.
- **Astronomical catalogs access, images excess, search and manipulation**: Tools to store and manipulate astronomical catalogs as well as functions for fast excess of astronomical catalogs stored locally, and access of external image databases and catalogs (e.g., VizieR, MAST, IRSA, SDSS, Chandra).
- **Astronomical spectra excess, fitting and manipulation**: Manipulation, matching and fitting of astronomical spectra and astronomical filters. Including a local database of spectral template.
- **Time series analysis**: Tools for time series analysis.
- **Celestial coordinates, ephemeris and time**: Large number of functions for celestial coordinates, time, celestial mechanics, and ephemeris.
- **Fitting and statistics utilities**: Tools for statistics, data analysis and signal processing.
- **Cosmology**: Functions for cosmology.
- **Binaries**: Binary stars orbit fitting and eclipsing binary.
- **Occultations**: Diffractive stellar occultations.
- **GRB**: Gamma Ray Bursts related functions.
- **Supernovae**: Shock cooling, radioactive decay and tools for SN research.
- **Stars and galaxies**:
- **General utilities**: Astronomical constants, units conversions, strings, files and IO related functions, and functions for manipulating matlab objects.
- **ds9 control**: Full interaction with ds9 image viewer, including easy creation and display of region files, imexam-like functionality, and interaction with the image processing tools.
- **FITS images manipulation**: Additional functions (to those available as part of the matlab CFITSIO library) to read, write and manipulate FITS files.
- **Telescope optics**: Signal-to-noise calculation, zernikie polynomials, scintillation and wavefront simulations, and telescope control.
- **Plotting**: Additional functions for plotting.
- **WWW access**: Powerful functions for world wide web downloading and searching.

Credit

If you are using this code or products in your scientific publication please give a reference to Ofek (2014; ascl.soft 07005).

Authors

The *MATLAB Astronomy & Astrophysics Toolbox* (MAAT) contains tools contributed by the following individuals:

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Bugs

The code may contains bugs - please report any bugs to: ofek dot eran at gmail dot com.

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Installation

See http://weizmann.ac.il/home/eofek/matlab/doc/install.html for installation instruction and additional documentation.