NumPy Reference

Release

1.20

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This reference manual details functions, modules, and objects included in NumPy, describing what they are and what they do. For learning how to use NumPy, see the complete documentation.

- Array objects
  - The N-dimensional array (**ndarray**)
  - Scalars
  - Data type objects (**dtype**)
  - Indexing
  - Iterating Over Arrays
  - Standard array subclasses
  - Masked arrays
  - The Array Interface
  - Datetimes and Timedeltas
- Constants
- Universal functions (**ufunc**)
  - Broadcasting
  - Output type determination
  - Use of internal buffers
  - Error handling
  - Casting Rules
  - Overriding Ufunc behavior
  - **ufunc**
  - Available ufuncs
- Routines
  - Array creation routines
  - Array manipulation routines
  - Binary operations
  - String operations
  - C-Types Foreign Function Interface (**numpy.ctypeslib**)
  - Datetime Support Functions
  - Data type routines
  - Optionally SciPy-accelerated routines (**numpy.dual**)
  - Mathematical functions with automatic domain (**numpy.emath**)
  - Floating point error handling

    - Discrete Fourier Transform (**numpy.fft**)
    - Functional programming
    - NumPy-specific help functions
    - Indexing routines
    - Input and output
    - Linear algebra (**numpy.linalg**)
    - Logic functions
    - Masked array operations
    - Mathematical functions
    - Matrix library (**numpy.matlib**)
    - Miscellaneous routines
    - Padding Arrays
    - Polynomials
    - Random sampling (**numpy.random**)
    - Set routines
    - Sorting, searching, and counting
    - Statistics
    - Test Support (**numpy.testing**)
    - Window functions
- Typing (**numpy.typing**)
    - Differences from the runtime NumPy API
    - API
- Global State
    - Performance-Related Options
    - Interoperability-Related Options
    - Debugging-Related Options
- Packaging (**numpy.distutils**)
    - Modules in **numpy.distutils**
    - Configuration class
    - Building Installable C libraries
    - Conversion of **.src** files
- NumPy Distutils - Users Guide
    - SciPy structure
    - Requirements for SciPy packages
    - The **setup.py** file
    - The **__init__.py** file
    - Extra features in NumPy Distutils
- NumPy C-API
    - Python Types and C-Structures
    - System configuration
    - Data Type API

    - Array API
    - Array Iterator API
    - UFunc API
    - Generalized Universal Function API
    - NumPy core libraries
    - C API Deprecations
- NumPy internals
    - NumPy C Code Explanations
    - Memory Alignment
    - Internal organization of numpy arrays
    - Multidimensional Array Indexing Order Issues
- SIMD Optimizations
    - Build options for compilation
    - Understanding CPU Dispatching, How the NumPy dispatcher works?
    - Dive into the CPU dispatcher
- NumPy and SWIG
    - numpy.i: a SWIG Interface File for NumPy
    - Testing the numpy.i Typemaps