Wavelet Toolbox Release Notes

The "Wavelet Toolbox 3.0.2 Release Notes" on page 1-1 describe the changes introduced in the latest version of the Wavelet Toolbox. The following topics are discussed in these Release Notes:

- "New Features" on page 1-2
- "Upgrading from an Earlier Release" on page 1-3

If you are upgrading from a version earlier than Version 3.0.1, you should also see these sections:

- "Wavelet Toolbox 3.0.1 Release Notes" on page 2-1
- "Wavelet Toolbox 3.0 Release Notes" on page 3-1
- "Wavelet Toolbox 2.2 Release Notes" on page 4-1

Printing the Release Notes
If you would like to print the Release Notes, you can link to a PDF version.

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Wavelet Toolbox 3.0.2 Release Notes

New Features

No significant new features have been introduced for Version 3.0.2 of the Wavelet Toolbox. Except for minor bug fixes, the product is essentially unchanged from Version 3.0.1.

Upgrading from an Earlier Release

There are no upgrade issues involved in upgrading from the Wavelet Toolbox 3.0 or 3.0.1 to Version 3.0.2.

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Wavelet Toolbox 3.0.1 Release Notes

New Features

No significant new features have been introduced for Version 3.0.1 of the Wavelet Toolbox. Except for minor bug fixes, the product is essentially unchanged from Version 3.0.

Upgrading from an Earlier Release

There are no upgrade issues involved in upgrading from the Wavelet Toolbox 2.2 or 3.0 to Version 3.0.1.

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Wavelet Toolbox 3.0 Release Notes

New Features

This section summarizes the new features and enhancements introduced in the Wavelet Toolbox 3.0.

For information about Wavelet Toolbox features that are incorporated from Version 2.2, see "New Features" on page 4-2 in the Wavelet Toolbox 2.2 Release Notes.

Wavelet Design for CWT

The **New Wavelet for CWT** tool designs a new wavelet adapted to a given pattern using least squares optimization. The new wavelet can be used for accurate pattern detection using the continuous wavelet transform (cwt). This new tool is useful for creating new wavelets for accurate 1-D pattern detection. From the command line, use the pat2cwav function.

Image Fusion

The **Image Fusion** tool performs fusion of two images. Image fusion using wavelets merges the wavelet decompositions of two original images using various fusion methods applied to approximations coefficients and details coefficients. Examples of uses of this tool are creating a new image from two different images and restoring an image from two fuzzy versions of an original image. From the command line, use the wfusimg and wfusmat functions to fuse two images and fuse two matrices or arrays, respectively.

Fractional Brownian Generation 1-D

The **Fractional Brownian Generation 1-D** tool performs the random generation of fractional Brownian motion, which is a useful model for Internet traffic and financial series. From the command line, use the wfbm and wfbmesti functions to synthesize and perform parameter estimation of fractional Brownian motion, respectively.

Lifting Methods

You can use lifting methods to design new wavelets. The new lifting methods also allow integer-to-integer wavelet transforms and transforms using different length decomposition high-pass and low-pass filters. Five groups of new lifting functions are included in the Wavelet Toolbox version 3.0:

- Key lifting scheme structures
  - addlift—Add primal or dual elementary lifting steps to a lifting scheme
  - displs—Display a lifting scheme
  - lsinfo—Information about lifting schemes
- Biorthogonal quadruplets of filters
  - bswfun—Compute and plot biorthogonal "scaling and wavelet" functions
  - filt2ls—Transform a quadruplet of filters to a lifting scheme
  - liftfilt—Apply elementary lifting steps on quadruplet of filters
  - ls2filt—Transform a lifting scheme to a quadruplet of filters
- Orthogonal or biorthogonal ("true") wavelets and "lazy" wavelets.
  - liftwave—Provides lifting scheme associated to a wavelet
  - wave2lp—Provides Laurent polynomials associated to a wavelet
  - wavenames—Provides wavelet names available for LWT
- Direct and inverse Lifting Wavelet Transform (LWT)
  - lwt—1-D Lifting Wavelet Transform
  - lwt2—2-D Lifting Wavelet Transform
  - lwtcoef—Extract or reconstruct 1-D LWT wavelet coefficients
  - lwtcoef2—Extract or reconstruct 2-D LWT wavelet coefficients
  - ilwt—Inverse 1-D Lifting Wavelet Transform
  - ilwt2—Inverse 2-D Lifting Wavelet Transform
- Laurent polynomials and matrices (see Note below)
  - laurmat—Constructor for the class LM of Laurent Matrices
  - laurpoly—Constructor for the class LP of Laurent Polynomials

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Note If you saved laurmat or laurpoly objects using the names lm or lp, respectively, in the Beta release, you must rename them to laurmat or laurpoly, respectively, in this release of the Wavelet Toolbox 3.0.

Speed Enhancements

Many functions, including those involving decomposition and reconstruction, have been enhanced so they run more efficiently.

New Extension Modes for DWT

Four new extension modes are available for `dwt`, which allows specifying half- or whole-point symmetry, or half- or whole-point anti-symmetry. See `dwtmode`. These new extension modes are supported by both `wextend` to extend or truncate signal or images, and by the corresponding GUI tools: **Signal Extension** and **Image Extensio**n.

New Supported Image Formats

Images stored using JPEG, TIFF, PCX, and others can be directly loaded into the Wavelet Toolbox GUI.

Images stored in `uint8` format can be used in all the 2-D tools.

Images stored in True Colour mode are converted automatically in indexed mode when loaded in the 2-D tools. See the Wavelet Toolbox documentation on working with images for more information.

Major Bug Fixes

The Wavelet Toolbox 3.0 includes several bug fixes made since Version 2.2. This section describes the particularly important Version 3.0 bug fixes.

If you are upgrading from a version earlier than Version 2.2, you also should see the bug fix summary for the Wavelet Toolbox 2.2 Release Notes.

Complex Wavelets

Numeric values associated with the fbsp and shan wavelet families (in particular, the shanwavf, fbspwavf, and scal2frq functions) were incorrect and have been fixed.

Density Estimation 1-D Normalization

An omitted normalization step has been added in the **Density Estimation 1-D** tool.

Upgrading from an Earlier Release

There are no upgrade issues involved in upgrading from the Wavelet Toolbox 2.2 to Version 3.0.

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Wavelet Toolbox 2.2 Release Notes

New Features

This section summarizes the new features and enhancements introduced in the Wavelet Toolbox 2.2.

For information about Wavelet Toolbox features that are incorporated from Version 2.1, see "New Features" on page 5-2 of the Wavelet Toolbox 2.1 Release Notes.

New and Enhanced Functions

CFS2WPT

`cfs2wpt`, a new function for building a wavelet packet tree object from a set of coefficients has been added.

WENERGY and WENERGY2

`wenergy` and `wenergy2`, two new functions for calculating the energy represented by the approximation and details coefficients for 1-D and 2-D wavelets, respectively, have been added.

WENTROPY Enhancement

The `wentropy` function now includes an option for using your own entropy function, including passing a parameter in.

WAVEFUN2 Enhancement

An option to product plots has been added to `wavefun2`.

Loading .wav and .au files

You can now load `.wav` and `.au` files directly into the Wavelet Toolbox GUI using `wavread` and `auread`, respectively.

Major Bug Fixes

You can see a list of the particularly important Version 2.2 bug fixes. If you are viewing these Release Notes in PDF form, please refer to the HTML form of the Release Notes, using either the Help browser or the MathWorks Web site and use the link provided.