Change Log for LTPDA Toolbox v1.9.3

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This version of LTPDA is a significant change from the previous (v1.0) release. As such, the version numbering has taken a large step towards v2.0.

The most notable change is that this version only works with MATLAB R2008a (7.6) due to the use of the new class structure.

Main Differences

The main differences of this version are listed below.

1) The object classes have been re-written to follow the class coding standard of MATLAB 2008a. All objects in LTPDA are now handle objects (like pointers in other languages).

2) Many ltpda_* functions have be promoted to methods of the AO class:

Old function	New method
ltpda_pwelch	ao/psd
ltpda_cohere	ao/cohere
ltpda_cpsd	ao/cpsd
ltpda_tfe	ao/tfe
ltpda_lpsd	ao/lpsd
ltpda_lcohere	ao/lcohere
ltpda_lcpsd	ao/lcpsd
ltpda_ltfe	ao/ltfe
ltpda_polydetrend	ao/detrend
ltpda_rms	ao/rms
ltpda_xcorr	ao/xcorr
ltpda_lincom	ao/lincom
ltpda_nfest	ao/smoother
ltpda_lindetect	ao/lindetect
ltpda_gapfilling	ao/gapfilling
ltpda_spikecleaning	ao/spikecleaning

3) Selected new AO methods:

Method	Description
uminus	Unary minus operator for AOs
atan2	Four quadrant inverse tangent for AOs
fngen	Noise generator using Fourier methods
firwhiten	Automatic whitening of data using FIR filter
zeropad	Zero pads AOs
dft	Compute the DFT of an input AO at the given frequency(s)
compute	Allows simple combinations and computations of the input AOs
delay	Delays input time-series by an integer number of samples

4) A new class for state-space modeling is introduced.

5) The time class has changed. It stores the time now in milliseconds since the chosen epoch.

Converting the time to a string is done on demand now. As such, the time_format class is no longer needed and has been removed. This has an impact on the XML format and therefore XML files produced before version 1.0.

6) A new GUI that imitates the old GEO dataviewer has been introduced. This is more like an advanced calculator and allows on-demand access to most of the LTPDA functions as well as interface to the GEO data servers*. It also includes an interface to the MATLAB workspace so that it can be used more generally than for GEO.

7) The main LTPDA Analysis GUI has seen a lot of work and improvements.

8) There is a new option in the ltpda_startup file that allows the user to set the amount of terminal output the toolbox gives.
9) The toolbox contains some new classes and a new utility package:

Class	Description
ltpda_obj	Base class for all LTPDA objects

Class	Description
ltpda_nuo	All objects not containing history/name properties derive from this class
specwin	A class of spectral windows
time	A class to implement time stamps
ltpda_data	A base class from which we derive all data classes
data2D	A class for storing 2-dimensional data in fields X and Y
xydata	Store arbitrary 2D data sets
cdata	Store a 2D data set where the X data is a cell-array, typically strings.
fsdata	Store frequency-series data
tsdata	Store time-series data
data3D	Extends data2D to add another dimension, Z
xyzdata	Store time-frequency maps
provenance	Captures information about the computer running the toolbox
pz	Implements a description of an S-domain pole or zero
param	Store a key/value pair as a parameter
history	Store a processing step. Used to capture processing history.
minfo	Capture information about methods, method name, method class, parameter sets, etc.
ltpda_uo	The base class from which we derive all user objects. That it, those objects with a name.
plist	Store sets of parameters in a list.
ltpda_uoh	Extends ltpda_uo to add history tracking.
ssm	State-space model class.
ltpda_filter	The base class from which we derive two different digital filter types.

Class	Description
miir	Implement IIR filters
mfir	Implement FIR filters
timespan	Describes a span of time by a start and end time.
pzmodel	An S-domain pole/zero model.
ao	Analysis object class
rational	Rational representation of a transfer function.
parfrac	Partial fraction representation of a transfer function.
utils.const.msg	Constant values for terminal message output
utils.helper	Utility functions for extending the programming of LTPDA classes and methods.
utils.math	Utility functions to extend the math capabilities of MATLAB.
utils.mysql	Utility functions for dealing with an LTPDA MySQL Repository.
utils.plottools	Utility functions to deal with MATLAB plots.
utils.prog	Utility functions to extend the programming capabilities of MATLAB.
utils.timetools	Utility functions to handle date and time.

Other Changes

1) SI Units

A new class has been introduced to handle units through the toolbox. The new class (unit) supports a long list of SI units as well as all the standard SI prefixes.

>> help units

The standard operators and many of the signal processing methods now support handling of the units.

Still to do: add support for transfer functions through pzmodels and digital filters.

2) ASCII File Reading

Some significant work has been done on the code that reads arbitrary ASCII data files via the AO constructor. A new option is introduced which causes the use of a more robust (but slower) file reader. This new robust method is used as default, but if you know that your data file is a simple format (for example, only containing columns of data), then you can set 'robust' to 'no' to load data more quickly.

3) LTPDV

The data viewer LTPDV now has a 'build objects' panel and an 'object properties' panel.

NOTE: Due to a bug* in MATLAB's saving and loading of user objects to MAT files, all LTPDA objects are now converted to structures before being saved to MAT files. This behaviour should be transparent to the user. However, it is no longer possible to load an object using MATLAB's load() command; instead you must use the relevant object constructor to load the object. This means you must know which object the structure represents, otherwise an error will result. *Because of this bug, it is possible that any LTPDA objects saved to MAT file in LTPDA v1.9.1 may not be readable!*

* http://www.mathworks.com/support/bugreports/details.html?rp=461224