Fixed-Point Toolbox Release Notes

The Fixed-Point Toolbox 1.2 Release Notes describe the changes introduced in the latest version of the Fixed-Point Toolbox. The following topics are discussed in these Release Notes:

- "New Features" on page 1-2
- "Major Bug Fixes" on page 1-4
- "Known Software Problems" on page 1-5

The Fixed-Point Toolbox Release Notes also provide information about the earlier versions of the product, in case you are upgrading from a version that was released prior to Release 14 with Service Pack 1.

- Chapter 2, "Fixed-Point Toolbox 1.1 Release Notes"
- Chapter 3, "Fixed-Point Toolbox 1.0 Release Notes"

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New Features

This section introduces the new features and enhancements added to the Fixed-Point Toolbox 1.2 (Release 14 with Service Pack 2) since Fixed-Point Toolbox 1.1 (Release 14 with Service Pack 1):

- "Overflow and Underflow Logging" on page 1-2
- "New Functions" on page 1-2

Overflow and Underflow Logging

The Fixed-Point Toolbox now allows you to log overflows and underflows as warnings for all assignment, plus, minus, and multiplication operations. Refer to "Using fipref Objects to Set Logging Preferences" in the Fixed-Point Toolbox documentation for more information.

New Functions

The following functions are new in the Fixed-Point Toolbox 1.2:

abs	all	and	any	area
bar	barh	buffer	clabel	comet
comet3	compass	coneplot	contour	contour3
contourc	contourf	diag	end	errorbar
etreeplot	ezcontour	ezcontourf	ezmesh	ezplot
ezplot3	ezpolar	ezsurf	ezsurfc	feather
find	fplot	gplot	hankel	hist
histc	inspect	intmin	ipermute	isnumeric
isobject	line	logical	lowerbound	mesh
meshc	meshz	not	numberofelements	or
patch	pcolor	permute	plot3	plotmatrix
plotyy	polar	pow2	quiver	quiver3
rgbplot	ribbon	rose	scatter	scatter3
sdec	sign	slice	spy	stairs

stem	stem3	streamribbon	streamslice	streamtube
sum	surf	surfc	surfl	surfnorm
text	toeplitz	treeplot	tril	trimesh
triplot	trisurf	triu	uplus	upperbound
voronoi	voronoin	waterfall	xlim	ylim
zlim				

Major Bug Fixes

The Fixed-Point Toolbox 1.2 includes several bug fixes made since Version 1.1. This section describes the particularly important Version 1.2 bug fixes. If you are upgrading from a version earlier than Version 1.1, you should also see the Version 1.1 Major Bug Fixes.

Segmentation Violation Due to Multiple Loop Operations Fixed

In Version 1.1 of the Fixed-Point Toolbox in the last release, it was possible to obtain a segmentation violation when performing multiple operations on a `fi` object within a loop. This has been fixed for this release.

Known Software Problems

This section lists known software problems in Version 1.2 of the Fixed-Point Toolbox.

isequal Always Returns true for fimath Objects

In Release 14 with Service Pack 2, the Fixed-Point Toolbox isequal function always returns true for fimath objects. For example, the following returns 1 when it should return 0:

```
a = fimath('roundmode','floor');
b = fimath('roundmode','ceil');
isequal(a,b)

ans =

     1
```

To work around this problem, use the following syntax instead:

```
isequal(get(a),get(b))

ans =

     0
```

Fixed-Point Toolbox 1.1 Release Notes

Major Bug Fixes

The Fixed-Point Toolbox 1.1 includes several bug fixes made since Version 1.0. This section describes the particularly important Version 1.1 bug fixes.

Bitwise Operators Return Correct Answers for [Slope Bias] Signals

In the previous release, bitwise functions such as `bitshift` might have given wrong answers for [Slope Bias] fixed-point signals. This has been corrected in this release.

fi Object Operations with an Empty Array Work Properly

In the previous release, a segmentation violation occurred for any operation with the format

```
a op e
```

where `a` is a `fi` object, `e` is an empty array, and `op` is any operator such as +,-,*,.*,<,>, etc. This has been corrected in this release.

ispropequal Returns Correct Answers for fimath Objects

The `ispropequal` function has been updated to work properly in this release.

Fixed-Point Toolbox 1.0 Release Notes

Introduction to the Fixed-Point Toolbox

The Fixed-Point Toolbox provides fixed-point data types in MATLAB and enables algorithm development by providing fixed-point arithmetic. The Fixed-Point Toolbox enables you to create the following types of objects:

- `fi` — Defines a fixed-point numeric object in the MATLAB workspace. Each `fi` object is composed of value data, a `fimath` object, and a `numerictype` object

- `fimath` — Governs how overloaded arithmetic operators work with `fi` objects

- `fipref` — Defines the display attributes for `fi` objects

- `numerictype` — Defines the data type and scaling attributes of `fi` objects

- `quantizer` — Quantizes data sets

Features

The Fixed-Point Toolbox provides you with

- The ability to define fixed-point data types, scaling, and rounding and overflow methods in the MATLAB workspace

- Bit-true real and complex simulation

- Basic fixed-point arithmetic with binary point-only signals

  - Arithmetic operators +, -, *, .*

  - Division using the `divide` function

- Arbitrary word length up to `intmax('uint16')`

- Relational, logical, and bitwise operators

- Data visualization via the `plot` function

- Statistics functions such as `abs`, `max`, and `min`

- Conversions between binary, hex, double, and built-in integers

- Interoperability with Simulink, Signal Processing Blockset, and Filter Design Toolbox

- Compatibility with the Simulink To Workspace and From Workspace blocks

Getting Help

This section tells you how to get help for the Fixed-Point Toolbox in this document and at the MATLAB command line.

Getting Help in the Fixed-Point Toolbox User's Guide

The objects of the Fixed-Point Toolbox are discussed in the following chapters:

- "Working with fi Objects"

- "Working with fimath Objects"

- "Working with fipref Objects"

- "Working with numerictype Objects"

- "Working with quantizer Objects"

To get in-depth information about the properties of these objects, refer to "Property Reference"

To get in-depth information about the functions of these objects, refer to Chapter 10, "Function Reference"

Getting Help at the MATLAB Command Line

To get command-line help for Fixed-Point Toolbox objects, type

```
help objectname
```

For example:

```
help fi
help fimath
help fipref
help numerictype
help quantizer
```

To invoke Help Browser documentation for Fixed-Point Toolbox functions from the MATLAB command line, type

```
doc fixedpoint/functionname
```

For example:

```
doc fixedpoint/int
doc fixedpoint/add
doc fixedpoint/savefipref
doc fixedpoint/quantize
```