Fixed-Point Toolbox Release Notes

The “Fixed-Point Toolbox 1.0 Release Notes” on page 1-1 introduce the the Fixed-Point Toolbox. The following topics are discussed in these Release Notes:

Printing the Release Notes

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

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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:

- Chapter 3, "Working with `fi` Objects"
- Chapter 4, "Working with `fimath` Objects"
- Chapter 5, "Working with `fipref` Objects"
- Chapter 6, "Working with `numerictype` Objects"
- Chapter 7, "Working with `quantizers` Objects"

To get in-depth information about the properties of these objects, refer to Chapter 9, "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
```

Known Software Problems

The following sections describe major known software problems in the Fixed-Point Toolbox Version 1.0:

- "Bitwise Operators Might Return Wrong Answer for [Slope Bias] Signals" on page 1-5

Bitwise Operators Might Return Wrong Answer for [Slope Bias] Signals

Bitwise functions such as `bitshift` might give a wrong answer for [Slope Bias] fixed-point signals. To work around this problem, use the function `stripscaling` to convert a [Slope Bias] signal into a binary point-only signal. Perform the bitwise operation on the binary point-only signal, and then add the slope and bias back to the signal using the function `rescale`.