Latest Features in Fixed-Point Designer

March 2016

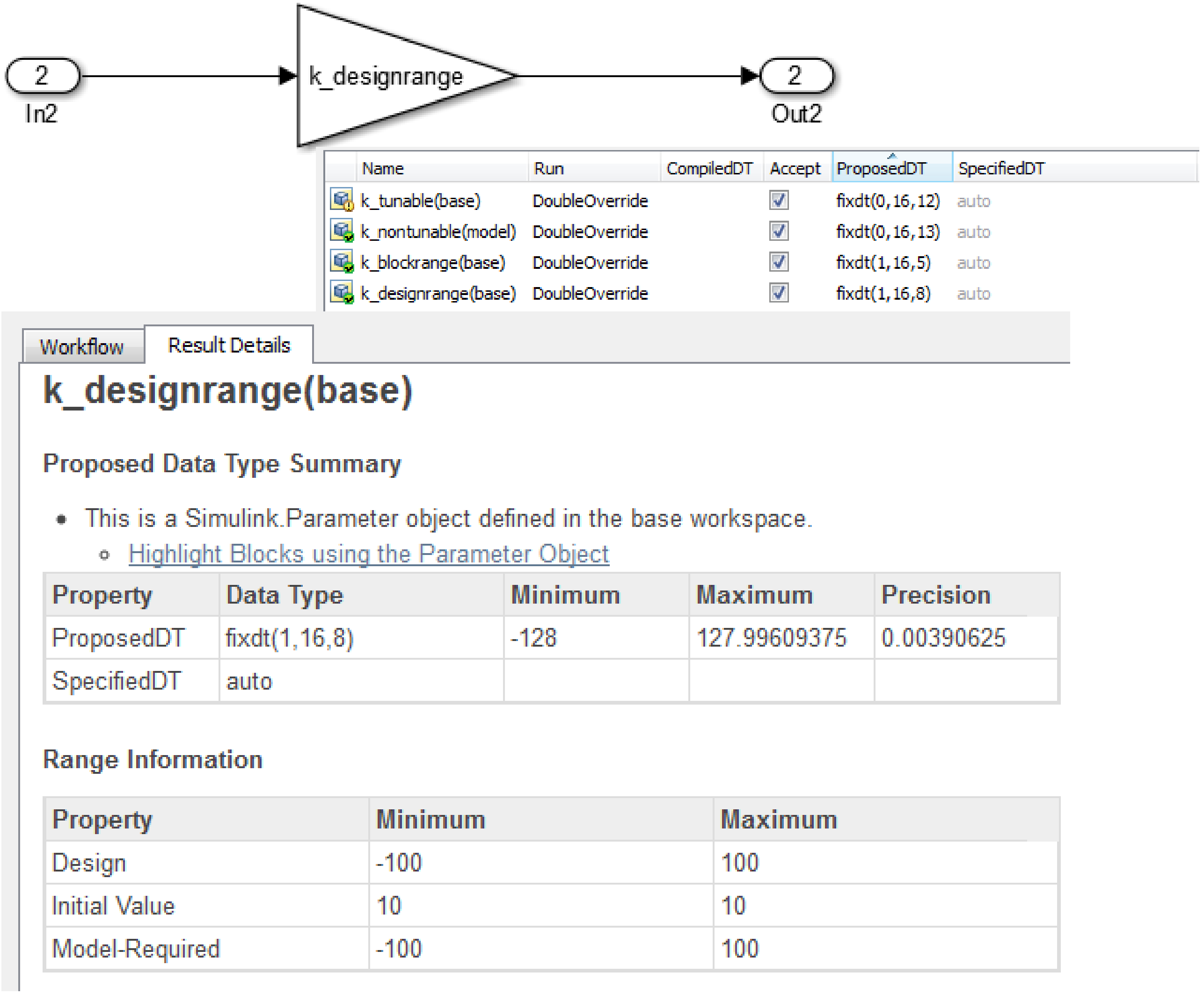
R2016a

Auto Scaling Parameter Objects

Automatically propose and apply data types for parameter objects

- Proposals are based on design ranges when they are specified on the parameter object
  - – In absence of design range on a tunable parameter object, it is inferred from blocks using the parameter

- Parameter objects defined in base/model workspace as well as data dictionary are supported



Name	Run	CompiledDT	Accept	ProposedDT	SpecifiedDT
k_tunable(base)	DoubleOverride		☑	fixdt(0,16,12)	auto
k_nontunable(model)	DoubleOverride		☑	fixdt(0,16,13)	auto
k_blockrange(base)	DoubleOverride		☑	fixdt(1,16,5)	auto
k_designrange(base)	DoubleOverride		☑	fixdt(1,16,8)	auto

k_designrange(base)

Proposed Data Type Summary

- This is a Simulink.Parameter object defined in the base workspace.
  - Highlight Blocks using the Parameter Object

Property	Data Type	Minimum	Maximum	Precision
ProposedDT	fixdt(1,16,8)	-128	127.99609375	0.00390625
SpecifiedDT	auto			

Range Information

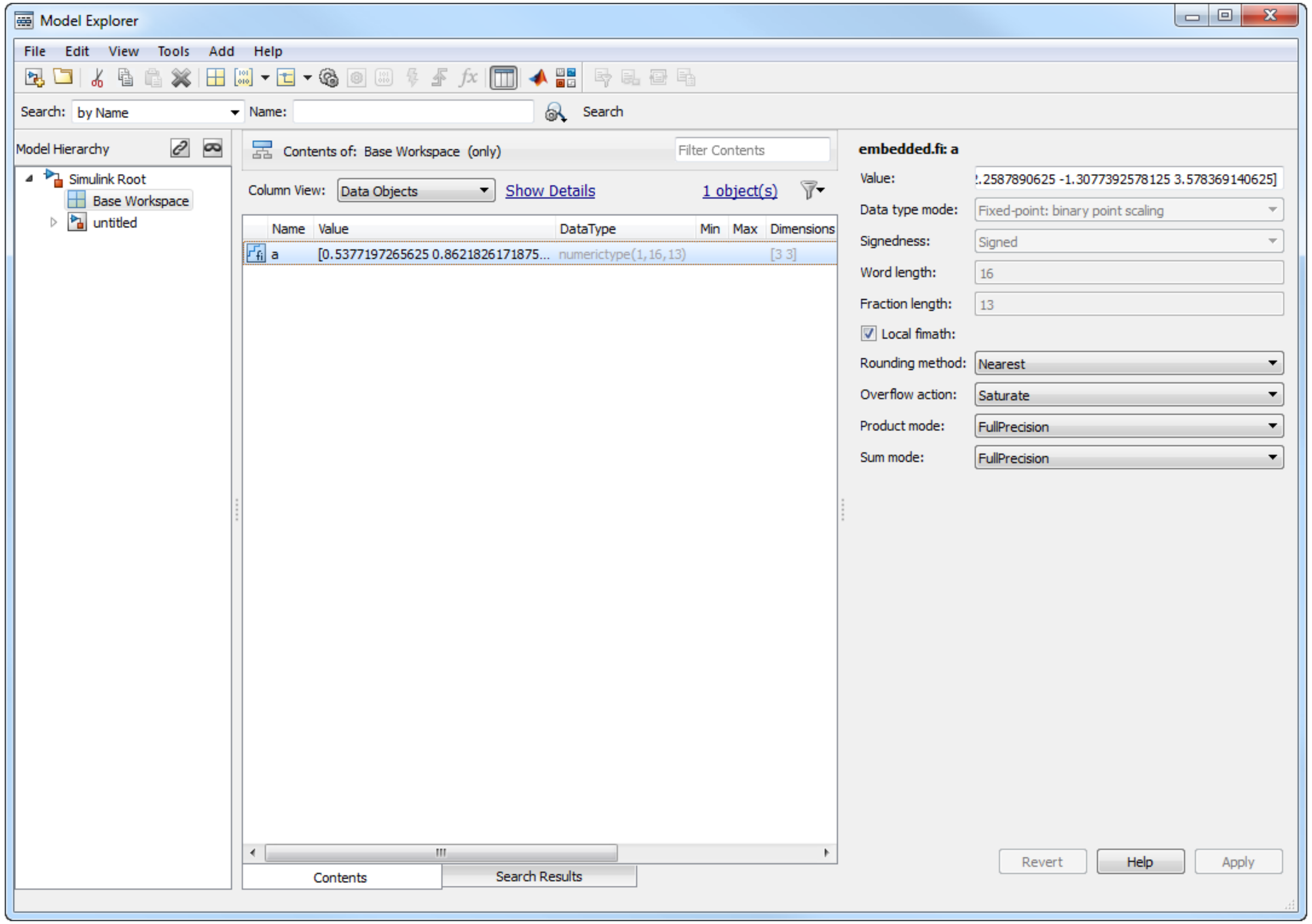
Property	Minimum	Maximum
Design	-100	100
Initial Value	10	10
Model-Required	-100	100

```
» ex_param_autoscale
```

fi Objects in Model Explorer

View and edit fi objects in Model Explorer

- View and edit fi objects and their local fimath properties using Model Explorer in Simulink
- Change the writable properties of fi objects from the Model Explorer



Search: by Name
Name:

Contents of: Base Workspace (only)

Column View: Data Objects

	Name	Value	DataType	Min	Max	Dimensions
fi	a	[0.5377197265625 0.8621826171875...	numerictype(1,16,13)			[3 3]

embedded.fi: a

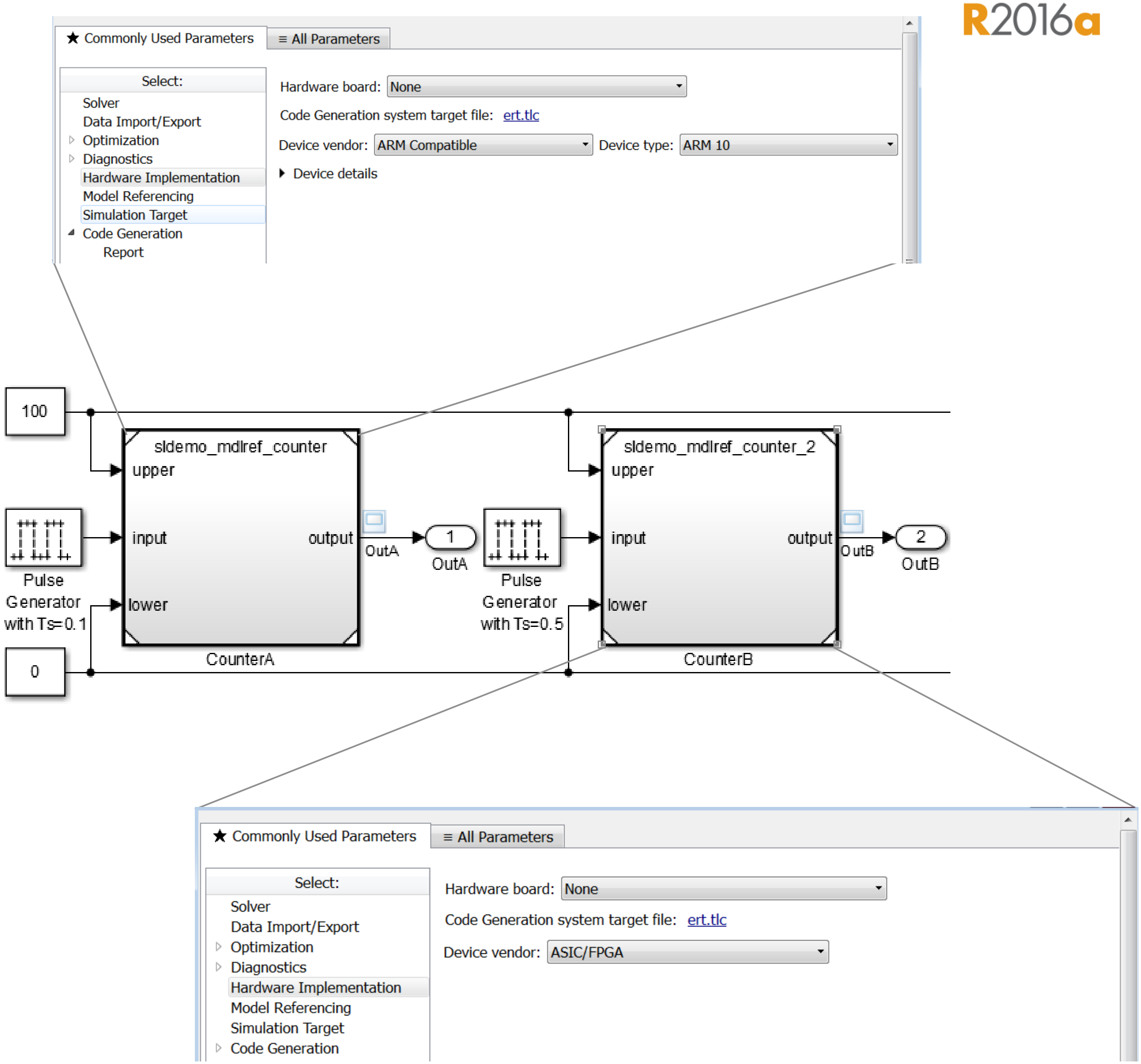
Value: :.2587890625 -1.3077392578125 3.578369140625]
Data type mode: Fixed-point: binary point scaling
Signedness: Signed
Word length: 16
Fraction length: 13
☑ Local fimath:
Rounding method: Nearest
Overflow action: Saturate
Product mode: FullPrecision
Sum mode: FullPrecision

MathWorks
R2016a

Simulation for Mixed Targets

Simulate system-level designs that integrate referenced models targeting an assembly of heterogeneous embedded devices

- Simulink models can now simulate system engineering level models that target multiple hardware devices
- For example, one referenced model can have device vendor configuration parameter set to ‘ARM Compatible’ and another referenced model set to ‘ASIC/FPGA’



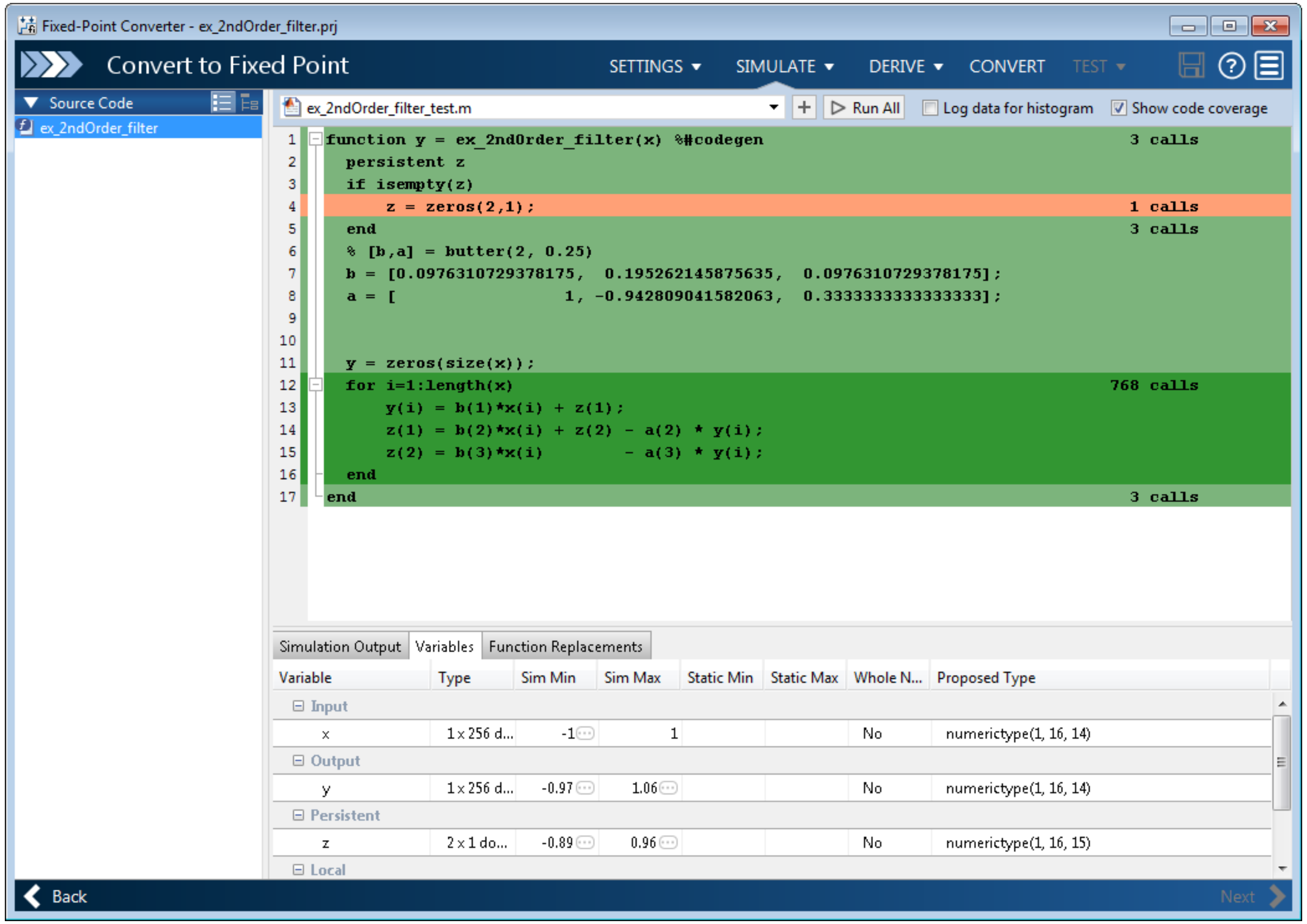
Hardware board: None
Code Generation system target file: ert.tlc
Device vendor: ARM Compatible
Device type: ARM 10

Hardware board: None
Code Generation system target file: ert.tlc
Device vendor: ASIC/FPGA

Fixed-Point Converter App Enhancements

Enhancements to language support and appearance of generated code in the Fixed-Point Converter app

- Support for arrays of structures
- Structures in generated fixed-point code
  - Proposes a unified data type for structures that are similar, no longer generating copies of structures
- Changes to fixed-point conversion code coverage
  - The app shows the coverage as a line execution count



```
function y = ex_2ndOrder_filter(x) %#codegen                                          3 calls
  persistent z
  if isempty(z)
      z = zeros(2,1);                                                                 1 calls
  end                                                                                 3 calls
  % [b,a] = butter(2, 0.25)
  b = [0.0976310729378175,  0.195262145875635,  0.0976310729378175];
  a = [                  1, -0.942809041582063,  0.3333333333333333];


  y = zeros(size(x));
  for i=1:length(x)                                                                 768 calls
      y(i) = b(1)*x(i) + z(1);
      z(1) = b(2)*x(i) + z(2) - a(2) * y(i);
      z(2) = b(3)*x(i)        - a(3) * y(i);
  end
end                                                                                   3 calls
```

Variable	Type	Sim Min	Sim Max	Static Min	Static Max	Whole N...	Proposed Type
⊟ Input							
x	1 x 256 d...	-1	1			No	numerictype(1, 16, 14)
⊟ Output							
y	1 x 256 d...	-0.97	1.06			No	numerictype(1, 16, 14)
⊟ Persistent							
z	2 x 1 do...	-0.89	0.96			No	numerictype(1, 16, 15)
⊟ Local							