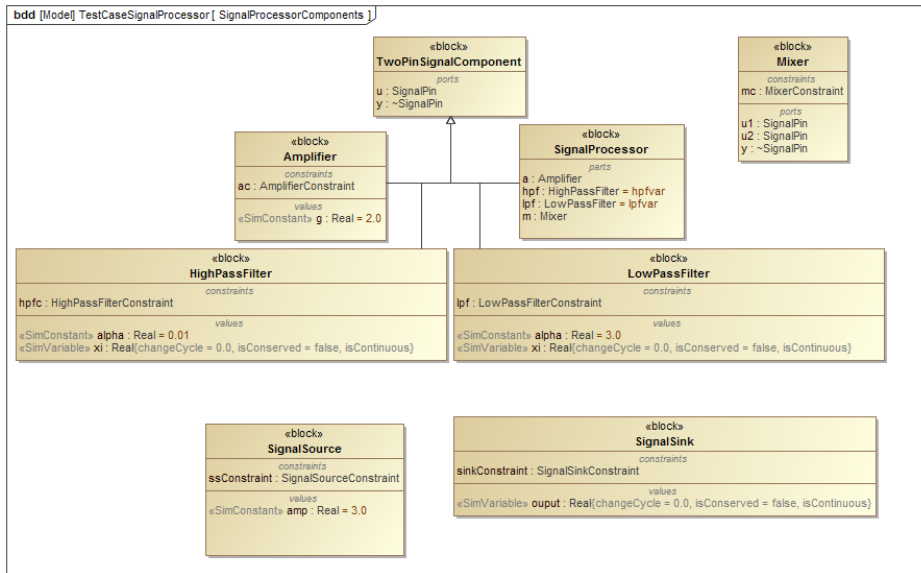


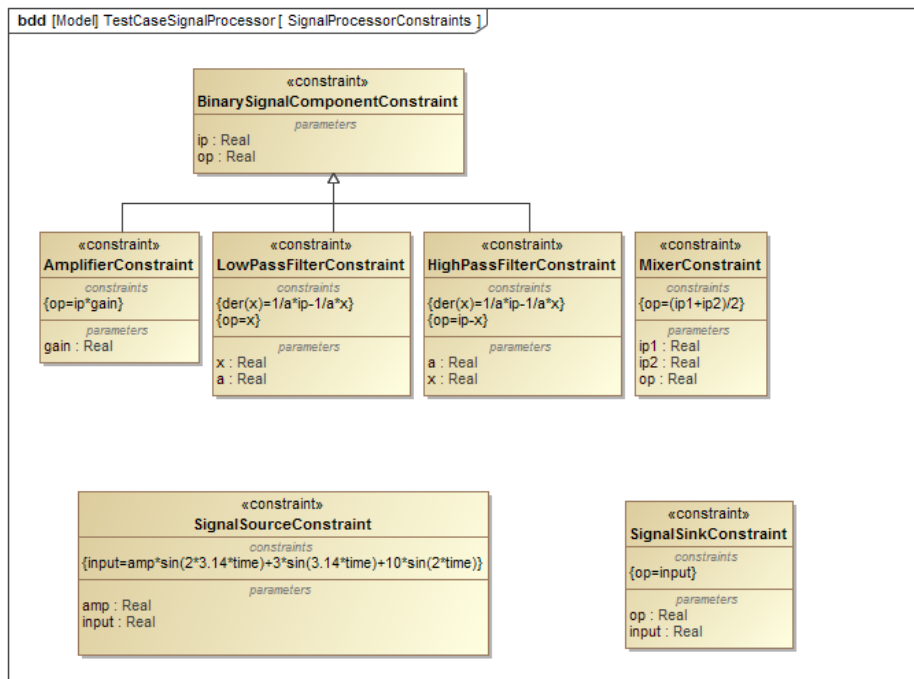
Description of the SignalProcessorV3.mdzip SysML models

In this model, there are three main components: an input signal generator, a signal processor, and an output signal scope. The signal flow from the input generator to the output scope is modeled by 10 SysML diagrams.

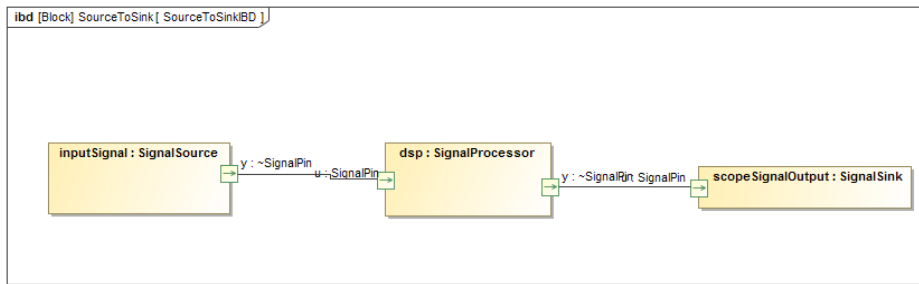
1. **SignalProcessorComponents Block Definition Diagram:** This diagram contains a block describing a generic two-pin (ports) signal component class, *TwoPinSignalComponent*, that is a generalization of other blocks. The generalization contains a block describing the *SignalProcessor* class and its properties, a block describing the *Amplifier* class and its properties, a block describing the *HighPassFilter* class and its properties, and a block describing the *LowPassFilter* and its properties. The latter three of these blocks as well as the block describing the *Mixer* class (and its properties) will be shown to be related to the *SignalProcessor* class in internal body diagrams. There is also a block describing the *SignalSource* class that generates numeric information for signal flow as well as a block describing the *SignalSink* class that receives the signal flow.



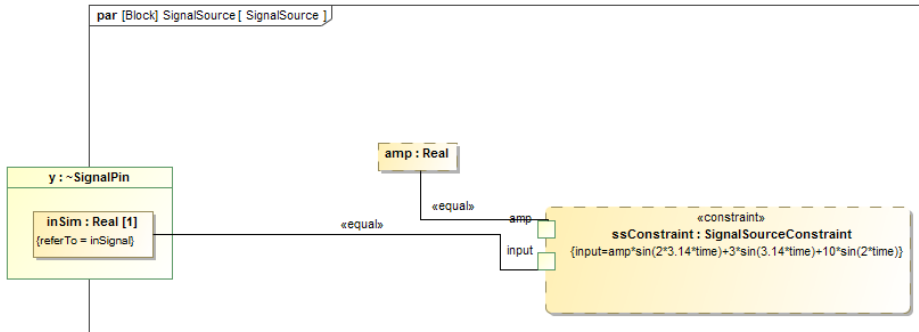
2. **SignalProcessorConstraints Block Definition Diagram:** Mathematical expressions are provided in constraint blocks *AmplifierConstraint*, *LowPassFilterConstraint*, *HighPassFilterConstraint* that make use of the parameters used in the constraint block *BinarySignalComponentConstraint*. These three constraint blocks, along with the *MixerConstraint* constraint block, describe the filtering and mixing of the generated signal that goes through the signal processor. The *SignalSinkConstraint* constraint block expresses the output of the signal processor as the output of the entire system, and the *SignalSourceConstraint* constraint block provides the generated input signal that flows through the system.



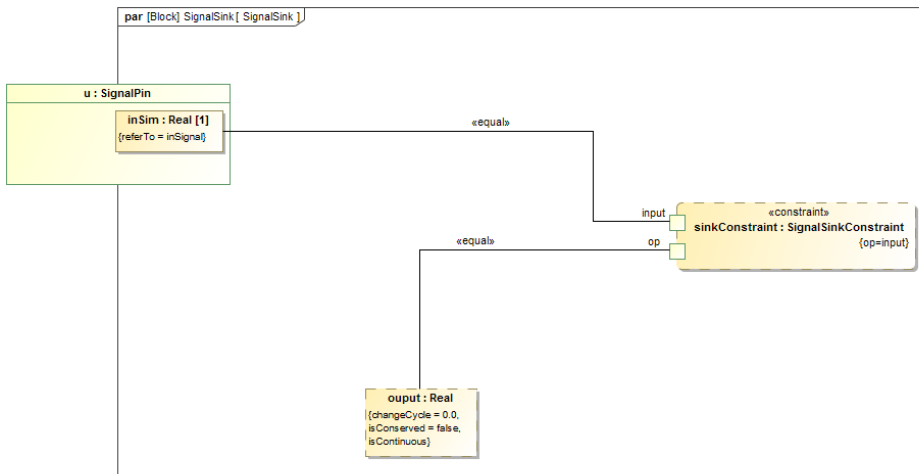
3. **SourceToSinkIBD Internal Block Diagram:** This diagram is part of the *SourceToSink* block. The flow of signal between the part properties *input Signal* (typed by *SignalSource*), *dsp* (typed by *SignalProcessor*), and *scopeSignalOutput* (typed by *SignalSink*) is shown to be going through pins typed by *SignalPin*. These pins are the interface between the three connected system components.



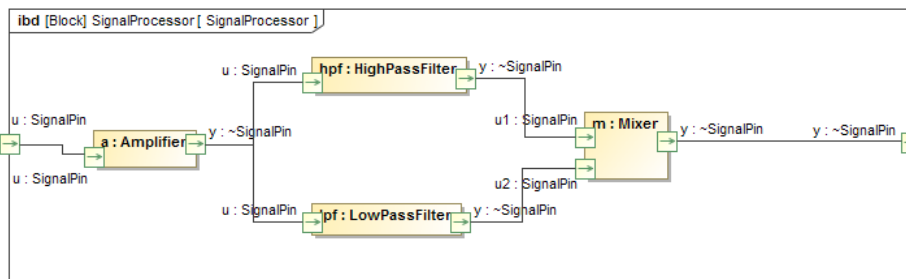
4. **SignalSource Parametric Diagram:** The constraint parameters (variables in the mathematical expressions of the constraints) of the *SignalSource* Constraint constraint block are bound to the properties and ports of the *SignalSource* block (from the *SignalProcessorComponents* block definition diagram).



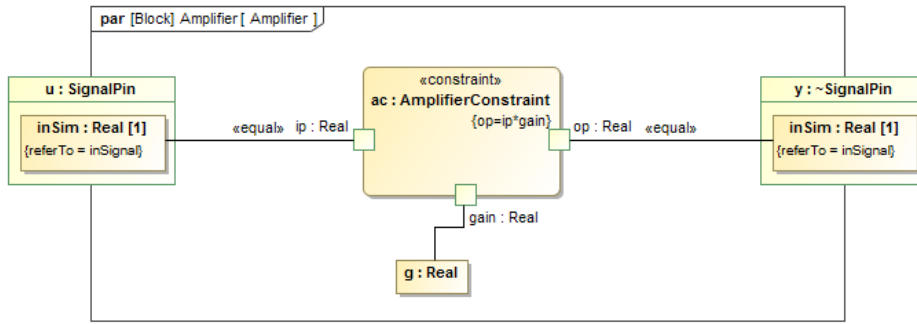
5. **SignalSink Parametric Diagram:** The constraint of the *SignalSinkConstraint* constraint block are bound to the properties and ports of the *SignalSink* block (from the *SignalProcessorComponents* block definition diagram).



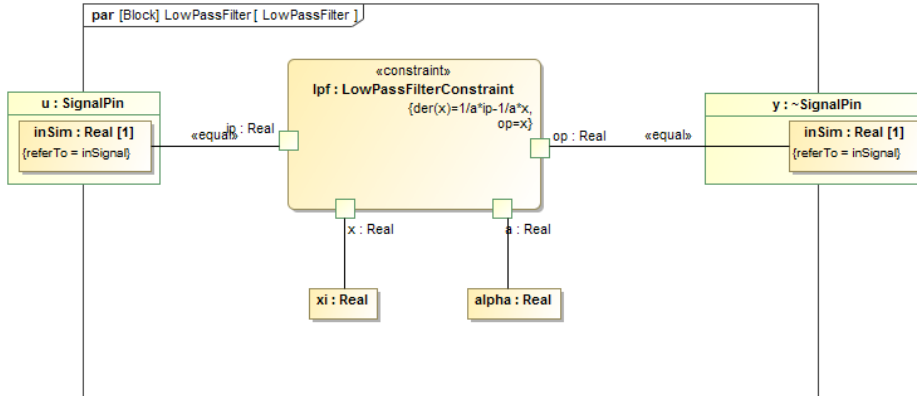
6. **SignalProcessor Internal Block Diagram:** This diagram is part of the *SignalProcessor* block and shows how the signal becomes amplified, filtered, and then remixed again. The flow of signal between the part properties *hpf* (typed by *HighPassFilter*), *lpf* (typed by *LowPassFilter*), *a* (typed by *Amplifier*), and *m* (typed by *Mixer*) is shown to be going through ports typed by *SignalPin*. These ports serve as interfaces where the signal flows from one part to the other.



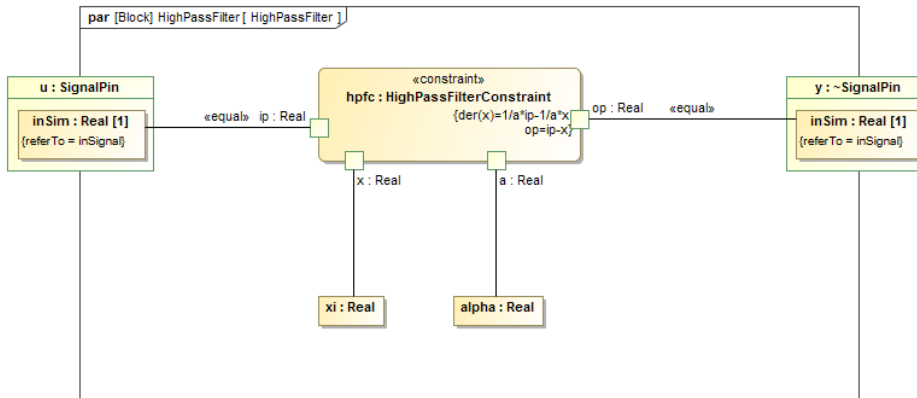
7. **Amplifier Parametric Diagram:** The constraints of the *AmplifierConstraint* constraint block are bound to the properties and ports of the *Amplifier* block (from the *SignalProcessorComponents* block definition diagram).



8. **LowPassFilter Parametric Diagram:** The constraint of the *LowPassFilterConstraint* constraint block are bound to the properties and ports of the *LowPassFilter* block (from the *SignalProcessorComponents* block definition diagram).



9. **HighPassFilter Parametric Diagram:** The constraint of the *HighPassFilterConstraint* constraint block are bound to the properties and ports of the *HighPassFilter* block (from the *SignalProcessorComponents* block definition diagram).



10. **Mixer Parametric Diagram:** The constraint of the *MixerConstraint* constraint block are bound to the properties and ports of the *Mixer* block (from the *SignalProcessorComponents* block definition diagram).

